ΙΔΡΥΜΑ ΕΥΓΕΝΙΔΟΥ
1954

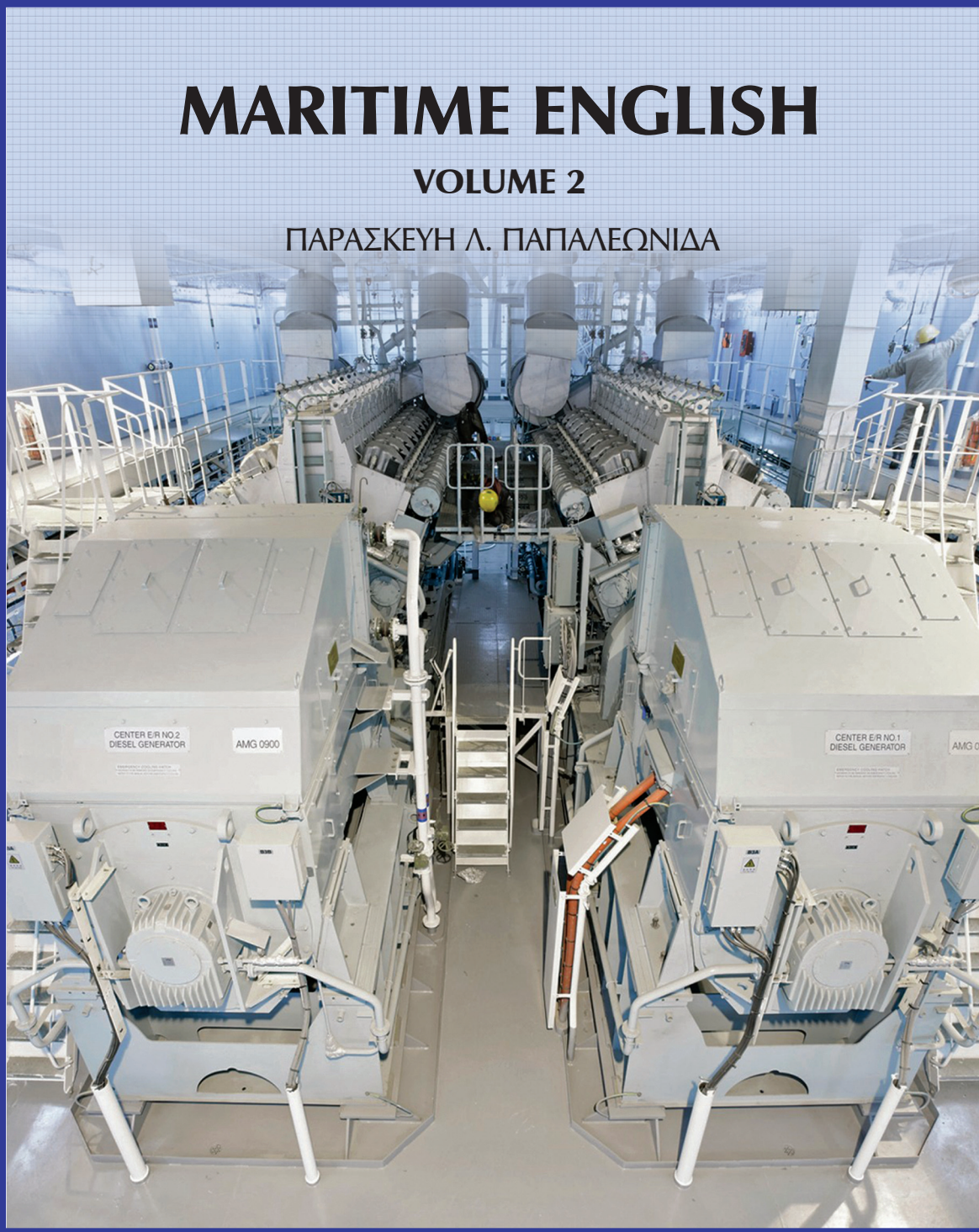
ΧΡΥΣΟΥΝ ΜΕΤΑΛΛΙΟΝ
ΑΚΑΔΗΜΙΑΣ ΑΘΗΝΩΝ

ΕΚΠΑΙΔΕΥΤΙΚΟ ΚΕΙΜΕΝΟ
ΑΚΑΔΗΜΙΩΝ ΕΜΠΟΡΙΚΟΥ ΝΑΥΤΙΚΟΥ

MARITIME ENGLISH

VOLUME 2

ΠΑΡΑΣΚΕΥΗ Λ. ΠΑΠΑΛΕΩΝΙΔΑ



ΙΔΡΥΜΑ ΕΥΓΕΝΙΔΟΥ

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MARITIME ENGLISH

VOLUME II

ΠΑΡΑΣΚΕΥΗΣ Λ. ΠΑΠΑΛΕΩΝΙΔΑ
Καθηγήτριας Αγγλικής ΑΕΝ/Μακεδονίας

ΑΘΗΝΑ
2020

ΙΔΡΥΜΑ ΕΥΓΕΝΙΔΟΥ
1954

ΠΡΟΛΟΓΟΣ ΙΔΡΥΜΑΤΟΣ ΕΥΓΕΝΙΔΟΥ

Το 1952 ο Ευγένιος Ευγενίδης (1882-1954) όρισε με τη διαθήκη του τη σύσταση του Ιδρύματος Ευγενίδου, του οποίου ως μοναδικό σκοπό έταξε «νὰ συμβάλῃ εἰς τὴν ἐκπαίδευσιν νέων ἑλληνικῆς ὑπηκοότητος ἐν τῷ ἐπιστημονικῷ καὶ τεχνικῷ πεδίῳ». Ο ιδρυτής και χορηγός του Ιδρύματος Ευγενίδου ορθά προέβλεψε ότι αναγκαίο παράγοντα για την πρόοδο της Ελλάδος αποτελεί η άρτια κατάρτιση των Ελλήνων τεχνιτών κατά τα πρότυπα της επαγγελματικής εκπαίδευσης άλλων ευρωπαϊκών χωρών.

Την 23η Φεβρουαρίου του 1956 εγκρίθηκε η σύσταση του κοινωφελούς Ιδρύματος Ευγενίδου, την διοίκηση και διαχείριση του οποίου κατά την ρητή επιθυμία του ιδρυτή του ανέλαβε η αδελφή του Μαριάνθη Σίμου (1895-1981). Τότε ξεκίνησε η υλοποίηση του σκοπού του Ιδρύματος και η εκπλήρωση μίας από τις βασικότερες ανάγκες του εθνικού μας βίου από την Μαριάνθη Σίμου και τους επιστημονικούς συνεργάτες της.

Το έργο της Μαριάνθης Σίμου συνέχισε από το 1981 ο πολύτιμος συνεργάτης και διάδοχος του Ευγενίου Ευγενίδη, Νικόλαος Βερνίκος-Ευγενίδης (1920-2000). Από το 2000 το έργο του Ιδρύματος Ευγενίδου συνεχίζει ο Λεωνίδας Δημητριάδης-Ευγενίδης, ο οποίος υλοποιεί τον σκοπό του Ιδρύματος προσαρμόζοντας το όραμα του ιδρυτή του στις σύγχρονες εξελίξεις.

Μία από τις πρώτες δραστηριότητες του Ιδρύματος Ευγενίδου, ευθύς μετά την ίδρυσή του, υπήρξε η συγγραφή και έκδοση εκπαιδευτικών βιβλίων για τους μαθητές των τεχνικών σχολών, καθώς διαπιστώθηκε ότι αποτελεί πρωταρχική ανάγκη ο εφοδιασμός τους με σειρές από βιβλία, τα οποία θα έθεταν τα ορθά θεμέλια για την παιδεία τους και θα αποτελούσαν συγχρόνως πολύτιμη βιβλιοθήκη για κάθε τεχνικό. Καρπός αυτής της δραστηριότητας είναι η Βιβλιοθήκη του Τεχνίτη, η οποία αριθμεί 32 τίτλους, η Βιβλιοθήκη του Τεχνικού, που περιλαμβάνει 50 τίτλους, η Τεχνική Βιβλιοθήκη με 11 τίτλους και η Βιβλιοθήκη του Τεχνικού Βοηθού Χημικού με 3 τίτλους. Επιπλέον, από το 1977 μέχρι σήμερα έχουν εκδοθεί 171 τίτλοι για τους μαθητές των Τεχνικών και Επαγγελματικών Λυκείων και 16 για τους μαθητές των Σχολών Μέσης Τεχνικής και Επαγγελματικής εκπαίδευσης.

Ξεχωριστή σειρά βιβλίων του Ιδρύματος Ευγενίδου αποτελεί η Βιβλιοθήκη του Ναυτικού (1967 έως σήμερα), η οποία είναι το αποτέλεσμα της συνεργασίας του Ιδρύματος Ευγενίδου με την Διεύθυνση Εκπαίδευσης Ναυτικών του Υπουργείου Ναυτιλίας. Η συγγραφή και έκδοση των εκπαιδευτικών βιβλίων για τους σπουδαστές των ναυτικών σχολών ανατέθηκε στο Ίδρυμα Ευγενίδου με την υπ' αριθμ. 61288/5031/9.8.1966 απόφαση του Υπουργείου Εμπορικής Ναυτιλίας, όπότε και λειτούργησε η αρμόδια Επιτροπή Εκδόσεων, η οποία είχε συσταθεί ήδη από το 1958. Η συνεργασία Ιδρύματος Ευγενίδου και Υπουργείου Εμπορικής Ναυτιλίας ανανεώθηκε και επικαιροποιήθηκε με Υπουργικές Αποφάσεις το 1999 και το 2005, με τις οποίες το ΥΕΝ ανέθεσε στο Ίδρυμα Ευγενίδου την συγγραφή των εκπαιδευτικών βοηθημάτων για τις Ακαδημίες Εμπορικού Ναυτικού (Α.Ε.Ν.). Η ανάθεση της αρμοδιότητας για την έκδοση των διδακτικών βιβλίων για τις Ακαδημίες επαναβεβαιώθηκε με νομοθετική ρύθμιση τον Μάρτιο του 2020 (Ν. 4676).

Στην Βιβλιοθήκη του Ναυτικού περιλαμβάνονται 137 διδακτικά βιβλία ναυτικής εκπαίδευσης, καθώς και σχετικές έρευνες και πρακτικά συνεδρίων. Όλα τα βιβλία της Βιβλιοθήκης του Ναυτικού ανταποκρίνονται στις ανάγκες των σπουδαστών των ΑΕΝ και είναι γενικότερα χρήσιμα για όλους τους αξιωματικούς του Εμπορικού Ναυτικού, που ασκούν το επάγγελμα ή εξελίσσονται στην ιεραρχία. Επιπλέον οι συγγραφείς και η Επιτροπή Εκδόσεων καταβάλλουν κάθε προσπάθεια ώστε τα διδακτικά βιβλία να είναι επιστημονικώς άρτια, να επικαιροποιούνται με βάση τα εκάστοτε αναλυτικά προγράμματα σπουδών των Α.Ε.Ν. και να παραμένουν συμβατά με τις μεταβαλλόμενες διεθνείς απαιτήσεις.

Η διαχρονική συμβολή του Ιδρύματος Ευγενίδου στη Ναυτική Εκπαίδευση επιτυγχάνεται όχι μόνο

με την έκδοση των σχετικών εκπαιδευτικών βιβλίων αλλά και με δωρεές στις Ακαδημίες Εμπορικού Ναυτικού, υποτροφίες σε αξιωματικούς του Λιμενικού Σώματος, εκπόνηση μελετών/ερευνών και διεξαγωγή συνεδρίων για την ναυτική εκπαίδευση και την ναυτιλία γενικότερα, καθώς και παροχή πρόσβασης σε κορυφαίες ναυτιλιακές βάσεις δεδομένων μέσω της Βιβλιοθήκης του.

Με την προσφορά των εκδόσεών του στους καθηγητές, στους σπουδαστές των ΑΕΝ και σε όλους τους αξιωματικούς του Εμπορικού Ναυτικού, αλλά και με την πλειάδα εκδόσεων για Τεχνικούς, το Ίδρυμα Ευγενίδου συνεχίζει να συμβάλλει στην τεχνική εκπαίδευση της Ελλάδος, υλοποιώντας επί 60 και πλέον χρόνια το όραμα του ιδρυτή του, αείμνηστου ευεργέτη Ευγένιου Ευγενίδη.

ΠΡΟΛΟΓΟΣ ΣΥΓΓΡΑΦΕΑ

Το βιβλίο αυτό αποτελεί διδακτικό βοήθημα για το μάθημα «Ναυτικά Αγγλικά» Δ', Ε' και ΣΤ' εξαμήνου στις Ακαδημίες Εμπορικού Ναυτικού και στοχεύει να βοηθήσει τους/τις σπουδαστές/ιριες να αποκτήσουν τις γλωσσικές δεξιότητες εκείνες, που θα τους επιτρέψουν να επικοινωνούν με ευχέρεια στο επαγγελματικό τους περιβάλλον, δηλαδή να ανταποκρίνονται σε γενικότερες και ειδικότερες καταστάσεις επικοινωνίας ως Αξιωματικοί του Εμπορικού Ναυτικού. Με γνώμονα τις προδιαγραφές του Διεθνούς Ναυτιλιακού Οργανισμού (IMO) (Model Course 3.17 για τα Ναυτικά Αγγλικά) το βιβλίο Maritime English Volume II δίνει έμφαση στην «επικοινωνιακή επάρκεια» των Αξιωματικών Φυλακής στην Αγγλική, ενισχύοντας την επικοινωνιακή μεθοδολογία. Χρησιμοποιώντας σύγχρονα αυθεντικά κείμενα ναυτικού ενδιαφέροντος, τονίζοντας την αλληλεπίδραση με την προώθηση της κατανόησης του λόγου κατά ζεύγη και ομάδες, συμπεριλαμβάνοντας συνεντεύξεις, εφιστώντας την προσοχή σε στρατηγικές αυτοδιαχείρισης της μαθήσεως και μέσα από δραστηριότητες που προσομοιώνουν (κατά το δυνατό) αυθεντικές διαδραστικές καταστάσεις και επιτρέπουν στους/στις σπουδαστές/ιριες να ασκούνται ως εν δυνάμει πομποί και δέκτες σε πραγματικά επικοινωνιακά γεγονότα, το βιβλίο ανταποκρίνεται στις ανάγκες της Αγγλικής για Ειδικούς Σκοπούς.

Οι γλωσσικές δεξιότητες που εξασκούνται σε κάθε άσκηση, καθώς και ο κεντρικός της άξονας επισημαίνονται με ειδικά σύμβολα στην αρχή κάθε ασκήσεως, ως εξής: α) Ομιλία β) Ανάγνωση γ) Γραπτός Λόγος δ) Κατανόηση Προφορικού Λόγου – Συζήτηση στην τάξη, ε) Αυτοαξιολόγηση, στ) Εργασία κατά ζεύγη ζ) Εργασία σε Ομάδες η) Πληροφορίες και θ) Κατανόηση ακουστικού κειμένου.

α) *β)* *γ)* *δ)* *ε)* *στ)* *ζ)* *η)* *θ)*

Οι Τυποποιημένες Ναυτικές Φράσεις Επικοινωνίας (IMO SMCP) παρουσιάζονται στις επιμέρους ενότητες του βιβλίου, ανάλογα με το θέμα, και δίνονται ασκήσεις για την εξάσκησή τους.

Οι γραμματικές δομές που απαντώνται στα επιμέρους θέματα παρουσιάζονται σε Παράρτημα (Appendix IV: Grammar) και υπάρχει σχετική παραπομπή σε αυτό κάθε φορά που χρησιμοποιείται για πρώτη φορά σε ασκήσεις ένα συγκεκριμένο γραμματικό φαινόμενο, ώστε αν υπάρχουν απορίες/ανάγκη να ανατρέχουν σε αυτό οι σπουδαστές.

Μετά από κάθε κείμενο δίνεται ένα «Γλωσσάριο» (Glossary) στο οποίο παρατίθενται συνώνυμα ή ορισμοί για το λεξιλόγιο του κειμένου, ώστε να αποτελέσει σημείο αναφοράς για την εξάσκηση και επανάληψη του λεξιλογίου και να ενθαρρύνει τους/τις σπουδαστές/ιριες να κρατούν τις δικές τους Άγγλο-Αγγλικές σημειώσεις λεξιλογίου με παρόμοιο τρόπο.

Επιπλέον, σε όλα τα κεφάλαια του βιβλίου, περιλαμβάνονται αρκετές δραστηριότητες κατανόησης ακουστικών κειμένων, το πκτικό υλικό των οποίων μπορεί να «κατεβάσει» και να αποθηκεύσει στον Η/Υ του ο σπουδαστής από τον ιστότοπο του Ιδρύματος Ευγενίδου και συγκεκριμένα στην ενότητα ***Βιβλιοθήκη του Ναυτικού (1967 έως σήμερα) – Διδακτικά Βιβλία για τους σπουδαστες ΑΕΝ*** *(https://www.eef.edu.gr/el).*

Το βιβλίο απευθύνεται σε τάξεις μεικτής ικανότητας και για το λόγο αυτό καταβλήθηκε προσπάθεια, ώστε να προσφέρει στον διδάσκοντα την ευελιξία να επιλέγει, ανάλογα με το επίπεδο της τάξεως, από μια ποικιλία διδακτικού υλικού. Βασίζεται δε στο ισχύον αναλυτικό πρόγραμμα διδασκαλίας των ΑΕΝ και για τις δύο ειδικότητες, Πλοιάρχων και Μηχανικών. Για την ειδικότητα των Πλοιάρχων, το διδακτικό υλικό παρουσιάζεται σε 5 ενότητες (Units) για κάθε εξάμηνο. Υπάρχει επίσης μία εισαγωγική ενότητα για το

υλικό του Δ' εξαμήνου (Introductory Unit) καθώς και 3 επαναληπτικές ενότητες (Reviews) με ολοκληρωμένες δραστηριότητες αποτελούμενες από ασκήσεις που βοηθούν στην εμπέδωση της σχετικής ορολογίας και την επέκταση ειδικών θεμάτων. Για την ειδικότητα των Μηχανικών, τα θέματα που προβλέπονται στην διδακτέα ύλη και είναι κοινά με αυτά των Πλοιάρχων καλύπτονται στο κύριο μέρος του βιβλίου, ενώ τα ειδικά θέματα των Μηχανικών παρουσιάζονται στο Παράρτημα για Μηχανικούς (Appendix I: English for Marine Engineers), το οποίο αποτελείται από τρία μέρη, ένα για κάθε εξάμηνο. Σε κάθε μέρος συμπεριλαμβάνεται και μία επαναληπτική ενότητα με κείμενα που βοηθούν στην επέκταση ειδικών θεμάτων. Καθώς οι Μηχανικοί διδάσκονται, πέρα από το Παράρτημα που τους αφορά, ***επιλογές*** *από το κυρίως μέρος του βιβλίου, παρατίθεται πίνακας με την ύλη ανά εξάμηνο προς διευκόλυνση των χρηστών του βιβλίου και των διδασκόντων.*

Εξάμηνο	Πλοίαρχοι	Μηχανικοί
Δ′	Units 1-5, Review 1	Unit 1: 1.3 Cultural Norms, 1.4 Cultural Difference Unit 3: 3.5 Safe working practice Unit 4: 4.4 Survival at Sea Unit 5 Appendix I/Part One
Ε′	Units 6-10, Review 2	Unit 6 Unit 8: 8.4 Request – Memo – Agenda , 8.5 Weekly observations Unit 9 Unit 10: Nav aids, Lifeboat launching Appendix I/Part Two
ΣΤ′	Units 11-15, Review 3	Unit 11 Unit 12 Appendix I/Part Three

Θα ήθελα να ευχαριστήσω την Επιτροπή Εκδόσεων του Ιδρύματος Ευγενίδου για την συμπαράστασή της κατά την πραγμάτωση αυτού του έργου. Είχα την μεγάλη χαρά να συνεργαστώ με το εξειδικευμένο προσωπικό του Εκδοτικού Τμήματος του Ιδρύματος, χωρίς την αμέριστη βοήθεια και τις φιλότιμες προσπάθειες του οποίου, το βιβλίο δεν θα έπαιρνε την τελική του μορφή, και του ανήκουν ιδιαίτερες ευχαριστίες.

Τέλος, είμαι ευγνώμων στον επιστημονικό σύμβουλο του βιβλίου, κ. Γεώργιο Δούναβη, καθηγητή Αγγλικής στην ΑΕΝ Σύρου, για την άφογη συνεργασία μας και την αδιάλειπτη παρουσία του ως υποστηρικτή αυτού του έργου και ως πολύτιμου συναδέλφου.

Η συγγραφέας

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Introductory Unit

Case Study: The Grounding of Astral

1. *Synopsis*
2. *Factual information*
3. *Analysis: contributory causes*
4. *Safety issues identified/recommendations made*

This unit presents a grounding accident and the contributory causes to this accident that were uncovered in the ensuing investigation[1]. Using the accident as a case study, this unit introduces some of the main issues covered in the next 5 units (which make up the material for ***Maritime English for the 4th Semester***).

The issues demonstrated in the *Astral* case study which will be discussed in the next units:
- Miscommunication and how it is affected by language competence and cultural difference
- Anchoring (equipment, commands, procedures).
- Safety management (Audits, Bridge Checklists, Contingency Plans, Bridge Standing Orders).
- Meteorological warnings and heavy weather response.

Goals to be achieved through the *Astral* case study:
- Discuss seafarers' competence for watchkeeping duties, as per STCW
- Discuss good seamanship in anchorage in heavy weather
- Discuss company's contingency plans and implementing them effectively
- Discuss misunderstandings in VTS communication with non-native English speakers

Chemical/oil product tanker Astral

1. Synopsis

On 10 March 2008, the Swedish registered tanker *Astral* dragged her anchor in severe weather and grounded on the Princessa Shoal, east of the Isle of Wight. The *Astral* sustained indentations to her hull and extensive damage to her rudder and stee-ring gear; there was no pollution and the vessel remained watertight.

Astral had anchored at the Nab Anchorage, 0.9 miles south of the Princessa shoal on 7 March to await a berth at Fawley Marine Terminal to discharge a cargo of diesel oil. On 9 March, increasingly severe weather forecasts were received predicting gale force winds from the south.

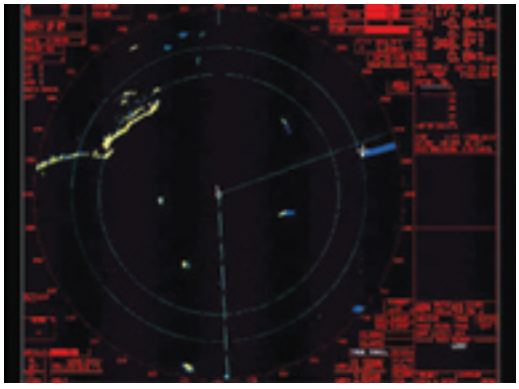
The ship's Navtex weather forecast received at 0041 on 10 March: *Southerly storm force 10 expected soon.*

Later that evening the duty Vessel Traffic Services Officer (VTSO), monitoring the anchored vessels' positions by radar, advised all the vessels at anchor of the weather forecast and re-commended that their engines should be available if required.

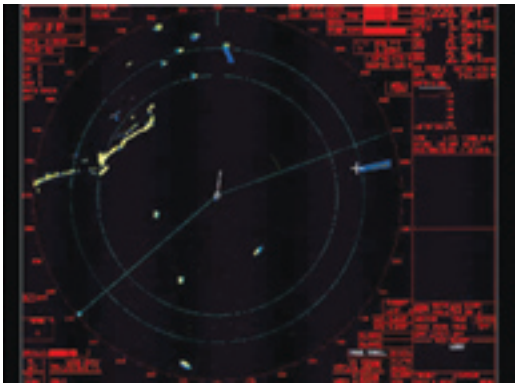
During the early morning of 10 March the weather deteriorated as the wind increased to southerly force 10. At 0650 the *Astral* started to drag anchor to the north. The Filipino officer of the watch (OOW) alerted the master at 0710 and requested the main engines, which were on 10 minutes notice, to be made ready for use.


Error Rate: 0.0%
Received MAR 10 2008 00:41:12
Position 50°39'N 1°02'W
2C2C EB54
EB54
NITONRADIO
GALE WARNING SUNDAY 09 MARCH
2207 UTC
THAMES DOVER WIGHT
SOUTHERLY STORM FORCE 10
EXPECTED SOON
PLYMOUTH
STORM FORCE 10 VEERING WESTERLY
AND INCREASING VIOLENT STORM
FORCE 11
SOON
LUNDY
STORM FORCE 10 VEERING WESTERLY
SOON
NNNN
Southerly storm force 10 expected soon

1. From Marine Accident Investigation Branch and Swedish Board of Accident Investigation, "Report on the investigation of the grounding of *Astral* on Princessa Shoal, East of Isle of Wight, 10 March 2008", January 2009.

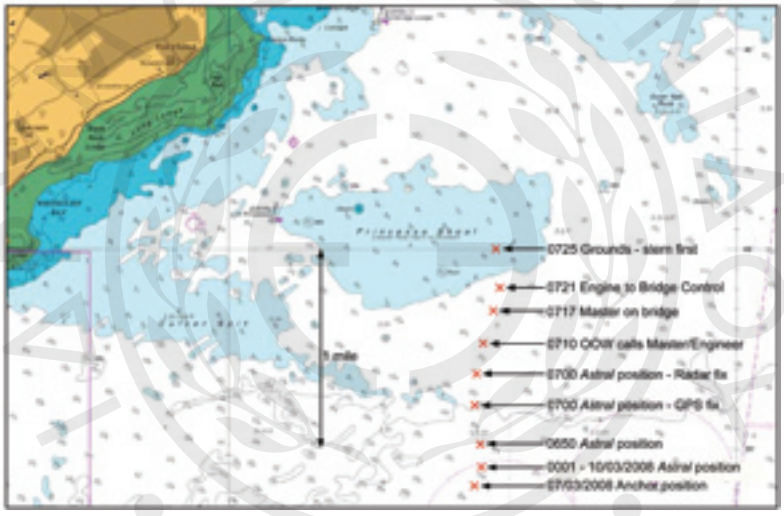


The Astral starts to drag anchor at 0655



Watch officer calls master at 0710

The master arrived on the bridge 7 minutes after being called and dispatched the anchor party forward. The engines were available for use at 0721 and the master applied power ahead, however the vessel continued to drag northward and grounded on the Princessa Shoal at 0725.



Positions of Astral during dragging

The *Astral* continued to drag and drift northward until her anchor held at 0855. The vessel was taken under tow at 0958 by the tug *Anglian Earl.*

The managers of the *Astral* have taken action to improve anchoring procedures on their vessels, and to conduct an additional pre-employment assessment of all officers recruited via manning agencies. The local harbour authorities have taken action to improve the information available to seafarers about the tenability of anchorages in their harbour areas and approaches. Recommendations have been made to the local harbour authorities to provide guidance to the VTSOs on the style and conduct of their communication, to reduce the possibility of misunderstanding by non-native English speakers.

A. *Find the following phrases in the text and choose the correct synonym for the word in italics.*

1. *a* Swedish *registered* tanker
   a. *it sailed under the Swedish flag*
   b. *it was classed by a Swedish classification society*

2. *sustained* indentations to her hull
   a. *escaped* b. *suffered*
3. *extensive* damage
   a. *widespread* b. *minor*
4. the weather *deteriorated*
   a. *became worse* b. *became better*
5. the main engines were *on 10 minutes notice*
   a. *had paused for 10 min* b. *needed 10 min before they could be used*
6. *dispatched* the anchor party forward
   a. *dismissed* b. *sent*

B. *Find the expressions in the text that have the following meaning and fill in the missing word(s).*

i. a tugboat was used to escort the vessel: *the vessel was taken* _____

ii. there was no ingress of water: *the vessel remained* _____

iii. how well the anchorages can be held, maintained: *the* _____ *of anchorages*

iv. officers given jobs through agencies which find new officers to join the company: *officers* _____ *via* _____ *agencies*

v. evaluation before someone is employed: *pre-employment* _____

2. Factual information

The second officer (navigator)

The 2/O, who was on watch at the time of the accident, held an STCW II/3 certificate of competence as a bridge watchkeeper. He was the ship's navigator and was responsible for passage planning. This was his first contract as a second officer on tankers, having previously served as third officer on tankers and as a second officer on bulk carriers, trading primarily deep sea. His performance had been considered weak by the master on board at the time of the accident. However, the master felt that any shortfalls in the performance of the officer were manageable, especially given that the 2/O was due to be relieved shortly.

Despite recording a "below average" score for intellect, the officer passed the manning agency selection criteria for the position with Veritas due to his age being over 50. Had he been under 50 years old, an "average" score would have been required. The manning agency's report on the 2/O also noted that while he scored "average" in 17 of the 19 categories of "personality traits and characteristics", ***he scored low in the "relaxed" and "assertive" categories***. The selection process had also included:

- A Marlins International Shipping Federation (ISF) English Language Test for Seafarers in which he scored 76%
- A psychological test and interpretation by an accredited clinic that included Sack's sentence completion test, Draw a person test, an Intelligence Test (IQ)
- A computer based test at Operational Level for an oil tanker deck officer in which he scored the following marks, achieving a Total Test Score of 57%:

  Cargo Handling - 65% *Control function - 50%* *Navigation - 50%*
  Fire Fighting - 50% *Survival - 86%*

Safety management procedures

An *Anchoring & Anchor Watch* checklist was completed during each watch (as per SMS manual), and each OOW noted the range and bearing to Nab Tower in the bridge logbook each hour. The company's re-written SMS was implemented during the early part of 2007. A separate document, the company's *Shore Management Bridge Standing Orders*, with regard to anchoring, stated:

> *A proper bridge watch shall be maintained by a certified Deck Officer when the ship is at anchor. The ship's position shall be fixed at the time of anchoring and checked frequently thereafter. The swinging circle of the ship is to be charted, centred on the position of the anchor. Particular attention is to be paid to the ship's movements during the change of tidal direction and changes in weather conditions. The master is to be informed immediately if there is any suspicion that the ship is dragging anchor or if the charted position falls outside the charted swinging circle.*

A copy of the *Shore Management Bridge Standing Orders* was contained in the Night Orders Book, the ship's copy of which was signed as being acknowledged by the master and OOWs.

Previous accidents - statistics

In two similar accidents, those of *Pasha Bulker* and *Young Lady*, in 2007, where the vessels dragged anchor and grounded in heavy weather, the master had made an inappropriate decision to remain at anchor, and relied on anchor equipment in conditions for which the equipment was neither intended nor approved. Also, the investigation found that the majority of masters expected to receive stronger guidance from the VTS operator as to when the anchorage was no longer tenable. It was concluded that the highest level of good seamanship was shown by those masters who weighed anchor on the receipt of gale warnings, rather than those who waited for the weather conditions to deteriorate or wait for the ship to drag her anchor in gale force conditions. The MAIB database shows that from 1992 to 2008 there were 21 accidents in United Kingdom territorial waters involving merchant vessels of over 500 gross tons dragging their anchor and subsequently grounding. Weather conditions contributed to 19 of these accidents, the anchoring position was relevant to 16, and in 7 cases the engines were not ready when needed.

Choose one of the following phrases to explain in class.

STCW II/3 certificate of competence	the officer was due to be relieved shortly
the swinging circle of the ship	the highest level of good seamanship

3. Analysis: contributory causes

A. ***There are four titles missing in the following analysis. Put them in the appropriate place.***

Allocation of anchorage	Recruitment of the 2/O
Position monitoring at anchor	Reliance on anchoring equipment

1. Anchoring procedures

1.1. Bridge procedures during anchoring

The master ordered the anchor to be dropped when he was content that the *Astral* was clear of another anchored vessel in the area. The *Astral*'s position was not plotted until after 7 shackles of cable had been veered, the anchor position was not determined, and no bridge swinging circle was produced.

1.2. _____

Over the 2½ days the *Astral* was at anchor, none of the watchkeepers attempted to determine the anchor position or draw a bridge swinging circle. The 2/O was monitoring the position of the vessel solely by radar, observing and recording the range and bearing of Nab Tower as indicated by the cursor display on the radar. This method did not alert him when the *Astral* started to drag anchor and valuable time was lost which could have been used to get the ship underway.

2. Response to the deteriorating weather

2.1. Response to the weather forecast

On 10 March, as the weather forecast deteriorated, the master directed that another shackle of cable be veered. The master was of the opinion that if the vessel dragged anchor, he would have sufficient time to start *Astral*'s engine, recover the anchor and manoeuvre clear from the danger.

2.2. Night orders

A more detailed set of night orders might have prompted the OOWs to inform the master as soon as it became clear that the weather conditions were likely to deteriorate.

2.3. Main Engine Readiness

The master considered that with the duty engineer resting in his cabin, the time taken to start the engine would be sufficient, provided that he was advised early of the dragging anchor. Had the main engine been running or been at immediate readiness, and therefore available to the master 10 minutes earlier, it is possible the grounding could have been averted.

2.4. _____

The master was expecting the anchor to hold in conditions above its designed limits and, should it drag, for the windlass to be able to recover it in those conditions. The master was either unaware of the vessel's anchor system limitations, or chose to ignore them in the hope the anchor will hold.

3. Performance of the 2/O on watch

3.1. _____

Following the 2/O's ***endorsement*** by the manning agency, Veritas undertook no confirmatory checks that could have identified potential weaknesses in his performance, particularly his experience and aptitude for operations in the coastal waters of the Baltic and North Sea.

3.2. Monitoring of the 2/O

The master regarded the 2/O as a ***"deep sea"*** officer, experienced on larger vessels, but whose performance was weak and required monitoring and assistance when navigating in confined waters. Although the master had found it necessary to assist and monitor the 2/O during sea watches, the same level of supervision was not provided at anchor and he had not, therefore, identified that the officer was not effective in conducting an anchor watch.

3.3. Conduct of the anchor watch

The 2/O was monitoring the *Astral*'s position using the radar EBL and VRM to observe the range and bearing of Nab Tower, which he was recording in the log. The 0700 range and bearing differed significantly from the previous record, but while the 2/O convinced himself that this was because the cable was stretching, he did not plot the vessel's position to check this was the case. Had he done so, the ***discrepancy*** with the previous fix would have been immediately evident. As the weather deteriorated, the two vessels closest to the *Astral* dragged anchor. This did not alert the 2/O to the significance or the vulnerability of *Astral*'s situation. When the VTSO called the *Astral* by VHF to check the OOW was happy with the vessel's position, the 2/O was not alerted to the possibility that the vessel was dragging, nor that he should be concerned. Believing that he needed to be "sure" that the vessel was dragging before calling the master, the OOW gave no answer when the VTSO called the *Astral* again to request confirmation the vessel was not dragging. The 2/O showed uncertainty and lack of appreciation of the proximity of danger.

4. Emergency response

Thirty five minutes elapsed between *Astral* starting to drag anchor and her grounding. In this period, the OOW took 20 minutes to appreciate the situation, alert the master and initiate engine readiness. The engine starting process and transfer to the bridge took the anticipated 11 minutes, leaving the master only 4 minutes to attempt to avoid grounding once engine power was provided.

5. Safety management

ISM and Navigational Audits had been carried out by one of the company's ex masters. However, the procedure for 'navigation at anchor' was not fully checked, so the audits had not detected that *Astral*'s master and OOWs were not following the requirements of the *Shore Management Bridge Standing Orders*.

6. VTS

6.1. _____

The Nab anchorages at the approaches to the Solent are provided for use by waiting vessels. Although advised by VTS, there is no requirement for vessels to accept the given anchorage or to remain there. The master did not question the proposed anchorage.

6.2. Information flow and advice

On the morning of the accident, the VTSO's enquiries into *Astral*'s circumstances were delivered in a conventional, ***but understated manner***. While ***the inference*** of the VTSO's language would normally be understandable to a native English speaker, ***the implications*** of the operator's questioning were not recognised by the Filipino 2/O, and vital minutes were lost before he took effective action. During the investigation, it had been apparent that many foreign mariners expect VTS operators to use clear, plain language in their communications. This finding is consistent with that of Australian Transportation Safety Bureau's *Pasha Bulker* report. The appropriate terminology that is suggested and that would likely have stimulated the 2/O with a more rapid and positive response is: *"WARNING vessel Astral, VTS radar indicates you are dragging your anchor. Check your condition and confirm your intentions."*

7. Knowledge and awareness of safe anchoring procedures

In all of the *Pasha Bulker*, *Young Lady* and *Astral* accidents, the masters elected to remain at anchor, off a lee shore with poor or moderate holding ground, and only get underway once their vessels were dragging anchor. In this, they showed a fundamental lack of understanding of the limitations of their vessel's anchoring systems, the forces and dynamics involved, and the practices of good seamanship. In *Astral*, an absence of basic navigational practices by the deck officers made them unable to detect any dragging in sufficient time for remedial action to be taken.

B. *Now that you have the whole picture, answer the following comprehension questions (the words/phrases in blue italics in the texts above will help you spot the answer).*

1. What difference is there between a "deep-sea" experience and "confined waters" experience?
2. The 2/O had low "assertiveness", according to the personality traits report issued by the manning agency. How is this important in relation to the way the accident evolved?
3. Why didn't the Filipino officer fully understand the VTS operator's questions?
4. Why didn't he call the master immediately? How did he justify (to himself) the discrepancy between each previous position fix?
5. The 2/O was endorsed by the manning agency. Why wasn't this enough?

4. Safety issues identified / recommendations made

Action taken / Recommendations

Veritas Tankers has:

- Introduced written procedures recommending that masters depart anchorages prior to the onset of heavy weather that may make the anchorage untenable.
- Introduced new procedures to interview all officers, in addition to the manning agency requirements, prior to their employment.

Local harbour authorities are recommended to:

- Provide guidance to their VTSOs on the language and terminology used, particularly to non English speakers, in communicating with ships' masters and officers to minimise the possibility of misunderstanding or confusion and, where appropriate, to issue masters with clear instructions.

Rederi AB Veritas Tankers is recommended to review its SMS instructions and enhance its auditing procedures to ensure that masters and ships' officers:

- Are provided with, and are familiar with, correct and clear anchoring procedures.
- Understand the limitations of their vessel's anchoring systems.
- Understand the company's emergency response procedures and are implementing these plans effectively.

The report conclusions have been split into two. Match the two halves to make full sentences.

1. The implications of the VTS operator's language	☐ that anchoring practice on board the *Astral* fell short of the Shore Management Bridge Standing Orders.
2. Had the master arrived on the bridge earlier	☐ but was not suitable during storm force winds from the south.
3. *Astral's* dragging her anchor would have been determined with accuracy	☐ were not understood by the second officer, who was a non-native English speaker.
4. The anchorage was appropriate when the *Astral* anchored	☐ had a swinging circle been generated.
5. Audits had not detected	☐ he could have used the main engine more effectively once it became available

UNIT 1

Effective Communication

1. *Maritime English: the importance of a common language*
2. *Miscommunication as a cause of accidents*
3. *Cultural norms of different nationalities*
4. *Cultural difference at sea*

Round-up

1. Maritime English: the importance of a common language

A. *Read the article and answer the following questions.*

- What are the operations/circumstances where problems are faced due to insufficient command of Maritime English?
- The use of the SMCPs is not as widespread as one would expect judging from their importance. Why does this happen?

***The IMO Standard Marine Communication Phrases – a communicative Survival Kit*[1]**

Investigations into the human factor regarding disasters at sea, which focused on communication behaviour, revealed that one third of accidents happen primarily due to insufficient command of Maritime English.

In VTS (Vessel Traffic Service) controlled areas, for instance, communicatively relevant factors contribute up to 40% of collisions involving the human element; most of them caused by failures in radio communication even in routine conversations, but some also through face-to-face communication deficiencies.

Port State Control inspectors often encounter problems in getting elementary information from ships' officers due to their substandard English. Pilots frequently voice their concern in this respect too and multi-ethnic officer staffs occasionally fail to communicate effectively when managing panicking crowds on board distressed vessels, etc.

More than 86% of all SOLAS vessels are presently crewed with multilingual personnel who, for diverse reasons, are frequently unable to render the Maritime English skills required, risking and even causing damage to lives, property and the environment.

This eventually made IMO re-consider how to minimize Maritime English communication problems. In 2001, IMO adopted the Standard Marine Communication Phrases (SMCP) and via STCW 95 they became a mandatory part of the education of officers at all white-listed training institutions.

The phrases provide a sort of Survival Kit; they include all essential safety-related communicative events where spoken English is required. Being trained in the use of the SMCP, officers will definitely encounter less communication difficulties managing safety-related situations, performing navigational duties, and organizing or supervising cargo operations.

The SMCP have been available since 2001. It is therefore understandable that only those generations of officers having graduated after 2001 are familiar with them, and they do not represent the majority of active officers yet.

However, IMO strongly recommends using the SMCP in preference to other wordings; in this way, combined with an efficient system of instruction, they will become an efficient safety language.

1. Prof. Peter Trekner, principal author IMO SMCP, article from *The International Maritime Human Element Bulletin*, Issue No. 14, May 2007, www.he-alert.org.

B. ***The phrases in the left column below come from an actual communication in a collision incident[2].The vessel (Japanese) was in a close-quarters situation and trying to avoid collision. Make the exchanges clearer using the SMCP. Match to an appropriate phrase suggested by the SMCP listed on the right.***

1. *We'll slow down.*	☐ **Stay clear of me.**
2. *I am doing about 5 knots.*	☐ **What are you intentions?**
3. *Try to avoid me.*	☐ **I am reducing speed.**
4. *I just smacked into your bow.*	☐ **My present speed is 5 knots.**
5. *Do you wish to slow down or to cross our bow?*	☐ **I have collided with your vessel.**

C. ***Fill in the following words in the gaps.***

facilitates	competence	instructions	mishaps	error	codified

"**English rules the waves**"

English – or rather "Maritime English" – is the language of maritime operations. The IMO (1) …… English as the official language of seafarers and adopted the *Standard Marine Communication Phrases* to standardize safety terms and phrases such as the gem: "I am sinking. Please proceed to my assistance. What is your ETA at our distress position?"

Having a common language at sea is important (just ask the passengers on the ***Costa Concordia*** who couldn't understand the crew's Italian (2) ……..…..……., or for that matter the crewmembers who didn't speak Italian). Like any accepted set of standards, a common language (3) ……..…….. safe interaction and commerce. According to recent IMO statistics "80% of accidents taking place at sea are caused by human (4) ……..……., with half due to poor communication." Undoubtedly some of these (5) ……..…… are due to language comprehension difficulties – not a surprise if you can imagine trying to understand a heavily accented, non-native speaker trying to communicate something in a panic.

The IMO has studied requiring a standardized Maritime English-language (6) ……..…….. …….. test as an amendment to its Convention on Standards of Training, Certification and Watchkeeping, but so far has only posted guidelines.

D. ***What do you think of an English language test for all seafarers? Do you think it is a good idea?***

2. Miscommunication as a cause of accidents

KEYWORDS: **Language competence / miscommunication**

- Language competence (or competency); the knowledge that enables you to produce and comprehend a language

2. The incident is reported from the Canadian Safety Board.

• Miscommunication: the lack of adequate or clear information. Miscommunication can be the result of lack of a common language shared by the people involved.

A. *The following extracts come from research papers on the causes of maritime accidents. Do you agree with the points they make?*

People panic in their own language.	
	Fact: 80% of accidents at sea are caused by human error, with half due to poor communication.
Deficiencies in Maritime English cause accidents: one cause of human error at sea is competency in English.	
	English language competency of seafarers is one of the major problems which has contributed to many accidents and incidents at sea.

B. *Read the following accident reports. What type(s) of communication is each case related to?*

a) external communications (ship to ship / ship to shore) in emergency situations
b) bridge communications / Pilot-Master (manoeuvring a vessel under pilotage)
c) SAR communications

[1]
Serious Casualty: Grounding caused by lack of effective team management.
What happened?
[…] The passenger vessel, with a pilot on board, narrowly avoided collision with a berthed vessel and gained speed and steerage. However, due to an apparent miscommunication resulting from a foreign language being spoken on the bridge, the vessel grounded.
Why did it happen?
[…] The use of a foreign language on the bridge resulted in miscommunication and misunderstandings on the bridge.
(IMO MSC Report, Lessons Learned for Presentation to Seafarers, March 2011)

[2]
Ever Obtain 1993
EVER OBTAIN was a Chinese vessel which had trouble in the Red Sea. It suffered an engine room flood and loss of power. In order to obtain tug assistance, Stavanger Radio was called via Inmarsat. The Rescue Co-ordination Centre was unable to understand the English spoken by the officer on board the EVER OBTAIN. After the initial distress call had been received the RCC tried to contact the vessel by Inmarsat and Telex but both methods were unsuccessful. The ship had to contact its own company headquarters in Taipei to request assistance which was initially provided by a US Navy missile destroyer, prior to the arrival of a Greek salvage tug. The principal issue in this incident was the breakdown in communication, despite the fact that the vessel had the latest Inmarsat approved satellite communication equipment on board (*MARCOM report*)

[3]
Very Serious Casualty: Capsizing and Sinking.
Why did it happen?
[…] The abandon ship was incorrectly done. The crew had poor competency in the English language and therefore poor communication with the rescuers.
What can we learn?
The rescuers had difficulty in communicating with the crew since the crew had difficulty with the English language.
(IMO MSC Report, Lessons Learned for Presentation to Seafarers, March 2011)

[4]
Two vessels, one British and one foreign, were approaching one another in fog, and the latter used VHF radio to call for a "red-to-red" passing. Unfortunately the command of English of the Officer on Watch in the foreign ship was limited, for what he actually intended was to pass starboard to starboard. The call was acknowledged by the British ship, but neither vessel made use of the phrases in the *Standard Vocabulary* or paid regard to the danger in the use of VHF in collision avoidance. Both ships were seriously damaged.
(Marine Guidance Note, Maritime and Coastguard Agency, UK, 2002)

C. *Read the text and fill in the missing phrases.*

A. …that most accidents are caused by human error

B. …because multilingual crews will continue to exist

C. …or even because of different religious beliefs

D. …according to preliminary reports

E. …people panic in their own language

F. …the master and crew were Russians

"Onboard communication problems"

Onboard communication problems due to language barriers have been affecting maritime safety during the past years. This problem is found on board ships having multilingual crews and a lack of a common language. It increases during emergency situations when people must react as fast as possible under conditions of extreme pressure. Somebody said once that (1) …….. After the Flag of Convenience criteria was adopted by shipowners, multilingual crews became very common on board all kind of ships, and language and even cultural problems, which seldom used to happen, started to take place.

In the special case of passenger ships, the lack of a common language can make emergency situations become critical. Reviewing the "Scandinavian Star" and "Estonia" disasters, examples of on board communication problems because of failures in the use of the English language can be clearly found.

People who are involved in maritime activities have heard, and surely more than once, (2) …… The percentage varies but 80% is the figure most usually heard and the most widely accepted. Language barriers that usually lead to communication problems among crew members are a contributor to the so called "human factor". Even though statistics are not accurate with

regards to language issues, there are indeed a large number of accidents that justify the fact that language difficulties might be considered to seriously harm maritime safety.

Furthermore, language barriers on board are not only a matter of understanding orders or reading instructions properly; other kinds of situations concerning the social and cultural aspects may take place on board. It is not only the language itself which can create problems within multilingual crews. Socially conflictive situations may arise because of different nationalities or different cultures, (3) ……..

On 15 February 1996, the 147,273 dwt oil tanker "Sea Empress", carrying crude oil from the North Sea, went aground at the entrance of Milford Haven in South Wales. (4) ……, the responsibility was on the side of the pilot and the way he performed the approach to the port. 70,000 tonnes of oil spread along 190 km of the coast of Wales and reached marine nature reserves where several bird colonies were affected and hundreds of oiled sea birds died. At the time of the disaster, the "Sea Empress" was managed by a British company, owned by a Norwegian company under the Liberian flag. (5) ……..…… Commentators said later that there were some language difficulties on board between the British pilot and the crew, because the last ones were not able to speak English.

There are more examples of cases where the lack of a common language on board resulted in incidents of diverse magnitude. Nevertheless, (6) ……..., there will always be the need for a common language. English has largely proved to be the language of the maritime industry by customary practice, and should be accepted as the common language to be used on board vessels having mixed crews. Furthermore, seafarers being proficient in English will find themselves in a much better position to get jobs at sea. English should be considered as an opportunity for seafarers that will give them a competitive advantage in the maritime business, and many maritime institutes have adopted this way of thinking.

D. *Answer the following questions.*

- How are Flags of Convenience related to communication problems?
- When does the lack of a common language become more critical?

E. *Write up the words.*

D _ _ _ _ _ _ _ _ y: lack, fault, imperfection
I _ _ _ _ _ _ _ _ _ _ n: communication
M _ _ _ _ _ _ _ e: size, importance
P _ _ _ _ _ _ _ _ t: competent or skilled in doing or using something
B _ _ _ _ _ r: an obstacle that prevents communication

F. *Match to make collocations.*

1. Flag	tongue
2. Customary	under pilotage
3. Serious	of Convenience
4. Bridge team	practice
5. Mother	casualty
6. Manoeuvring	management
7. Contributory.....	advantage
8. Competitive	factor

3. Cultural norms of different nationalities

A. *Read the text and fill in the table below to summarize the main points.*

Typical Examples of Cultural Differences[3]

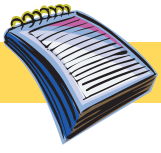
Intercultural competence is the ability of successful communication with people from other cultures. One must be sensitive to cultural difference and have awareness that in different cultures behaviour and ***gestures*** are ***interpreted*** differently:

- Shaking the head in a horizontal direction in most countries means "no", while in India it means "yes", and in Hindi language the voice lowers in pitch at the end of a question.
- Showing the thumb held upwards means in Latin America, especially Brazil, but also in many other countries "everything's ok", while it is understood in some Islamic countries as well as Sardinia as a rude sexual sign. Furthermore, the sign of thumb up may signify the number "one" in France and a few other Central European countries.
- "Everything ok" is shown in western European countries, especially between pilots and divers, with the sign of the thumb and forefinger forming an "O". This sign means in Japan "now we may talk about money", in southern France the contrary ("nothing, without any value"). In Spain, Latin American countries, Eastern Europe and Russia it is an ***indecent*** sexual sign.
- In North America as well as in Arabic countries the pauses between words are usually not too long, while in Japan pauses can give a ***contradictory*** sense to the spoken words by the meaning of pauses. Enduring silence is ***perceived*** as comfortable in Japan, while in Europe and North America it may cause insecurity and embarrassment. Scandinavians, by Western standards, are more ***tolerant*** of silent breaks during conversations.
- Laughing is connoted in most countries with happiness - in Japan it is often a sign of confusion, insecurity and embarrassment.
- If invited to dinner, in many Asian countries and Central America it is ***well-mannered*** to leave right after the dinner: the ones who don't leave may indicate they have not eaten enough. In the Indian Sub-Continent, European and North American countries, this is considered rude, indicating that the guest only wanted to eat but wouldn't enjoy the company with the hosts.

Cultural difference - different interpretation of:

Gestures	***Behaviour***
Shaking head horizontally	Pauses

B. *Use the words highlighted in the text to fill in the glossary. One is done for you as an example.*



Glossary

___ interpreted _____ explained (to explain the meaning of something)

3. From The Centre of Intercultural Competence, http://www.cicb.net/en/home/examples.

_____	(of/towards somebody/ something) able to accept what other people say or do even if you don't agree with them
_____	movements that you make with your hands, your head or your face to show a particular meaning
_____	having good manners, polite
_____	containing or showing a lack of agreement between statements, facts, opinions or actions
_____	understood or thought of in a particular way
_____	thought to be morally offensive

C. ***Use the words in the glossary above to complete the following sentences (use the correct form). One is done for you as an example.***

1. He waved his arms goodbye in a melodramatic _____ .
2. The other visitors were too _____ to complain about the noise.
3. The speaker expressed two apparently _____ opinions.
4. In some countries, it is considered _____ for couples to be seen to be intimate in public.
5. Risks are _____ differently by different people.
6. He has a very _____ attitude towards other religions.
7. The results of the investigation must be ____interpreted_____ cautiously.

D. ***Listen to someone talking about common gestures easily misunderstood in different cultures. Write the country where this might happen in the table below (the first one is done for you).***

"V"	in Australia and England
Displaying your palms	in
Thumbs-up	in
Beckoning by curling your index finger	in
Patting on the head	in
One-handed giving	in

4. Cultural difference at sea

A. ***Do you think it is necessary to train seafarers on cultural differences at sea? Look at the following case.***

Cultural Factors:
insufficient verbal co-ordination between officers and ratings

The problems of misunderstanding due to differences in the interpretation of words and expressions between people of different cultures have contributed directly and indirectly to accidents. The following is an example:

The second officer of a German chemical tanker manned with German officers and a Filipino crew gave orders to prepare the cargo handling equipment for loading chemicals. For this procedure it was necessary to open some valves. The instructions were detailed and clear. After he had given the orders the officer asked a crewman, whether he had understood and knew what to do. The seafarer gave an affirmative reply. Later he opened the wrong valves and was injured by mechanical parts moved by compressed air. The analysis of the accident showed that the man had not understood what he was instructed to do. It was more of a cultural problem for him to admit that he did not know what to do or to ask for a demonstration, this was aggravated by a lack of English skills.

B. *Find in the text above the words defined in the sentences below. Then use them to fill in the example sentences given.*

An _____ word or reply means "yes" or expresses agreement.

He gave an _____ response to the question.

To _____ is make a bad situation (an unpleasant situation or an illness) worse.

The goalkeeper _____an old shoulder injury during the win against Liverpool.

C. *Summarize the key points of the following article in writing.*

- Skim the text (*skim: to read something quickly so as to note only the important points*) and underline the main arguments that are presented.
- Keep notes for the idea(s) of each paragraph. In your summary, write the main idea (the "gist") one will remember after reading this article, and some supporting ideas as well.

Start like this:

This article presents the findings of a research study on .....

How to succeed in making multinational crews live and work together.[5]

Crews that can talk to each other, laugh together and – importantly – joke together are likely to work safely and happily irrespective of the mix of their nationalities. The ability to communicate in a common language is the crucial factor determining the success of a multinational crew, regardless of what nationalities are on board, or how many. The more seafarers can understand each other, the more likely they are to run not just an efficient and safe ship, but a happy ship on which personal and working relationships can be built up.

These findings emerge in a three-year study ***conducted*** by the Seafarers' International Research Centre into how multinational crews function as miniature societies.

Although mixed crews have been common for centuries, they are now "consciously" put together, with crew members of different ranks and from different parts of the world assembled by networks of agencies. "The modern seafarer commonly sails in ships with multicultural crews whose cultural/nationality mix may ***vary*** from year to year or even from one voyage to the next," says the report. But provided the crew can talk to each other, the arrangement can work as well as single nationality crews.

5. Getting along at sea, www.itfseafarers.org.

A typical response from a seafarer when asked whether there were any good aspects about working with different nationalities was that he "learned different kinds of customs". Asked whether there were bad aspects, he replied: "No. Well, some of the guys don't really speak good English, and you can't understand them. Otherwise nothing."

There is little evidence to support suggestions that cultural differences ***have any bearing on*** behaviour such as taking the ***initiative***, submitting to authority and following rules. Rather, the ***attitude*** of the master, in terms of ***stamping on*** racism, encouraging the use of a common language and managing the social side of life on board, has a much greater effect. If masters encourage social events, such as parties or sports tournaments, the crew is more likely to get to know each other.

Controversially, the report concludes that total bans on alcohol, as operated by some companies, tend to ***stifle*** all social life, which can lead to feelings of social isolation or even mental problems. "Not only do complete bans on alcohol discourage the scheduling of communal events such as barbecues – they also encourage ***solitary*** drinking behind closed (cabin) doors."

Fluency in English (or the working language of the ship) is important for both officers and ratings. "The shipping community has mainly focused on the importance of English in emergency situations and for ship-shore communication. [But] fluency in English has far bigger significance than this for seafarers and, indirectly, for the safe operation of multinationally crewed vessels." Even if standard communication phrases are used for VHF radio and GMDSS messages, good general English is needed to enable the ship to function as one society, rather than a gathering of ***disparate*** groups. "The social side of shipboard interaction is critical to… good ***morale***, which in turn ***impacts on*** the safe operation of vessels."

In their study on board 14 ships of all kinds from gas carriers to ferries, spending a total of 289 days on board and conducting interviews with 258 seafarers of 31 nationalities, the researchers uncovered examples of practical and emotional problems caused by communication breakdown and – less commonly – examples of racism and poor people management by masters. For instance, the crew on a ship whose officers were Swedish greatly resented the officers talking to each other professionally and socially in Swedish. The Filipino third officer could not understand the conversation between the master on the bridge and chief engineer in the engine room, and felt professionally isolated and ***uninvolved***.

D. ***Use the words highlighted in the text to fill in the glossary. One is done for you as an example.***

Glossary

_____	the confidence or enthusiasm a person or a group has at a particular time
_____	to organize and do a particular activity
have a bearing on	to have a relationship to something
_____	to change or be different according to the situation
_____	not taking part in something; not connected with somebody/something, especially on an emotional level

_____ to have an effect on something/ somebody;

_____ the ability to decide and act on your own without waiting for somebody to tell you what to do

_____ to stop something from happening or stop somebody from doing something, especially by using force or authority

_____ to prevent something from happening, being expressed or continuing

_____ the way that you think and feel about somebody/something; the way that you behave towards somebody/something that shows how you think and feel.

_____ different in every way; made up of people or parts that are very different from each other

_____ done alone; without other people

E. *Use the words in the glossary above to complete the following sentences (use the correct form). One is done for you as an example.*

1. Port Police _____ a search of the ship.
2. All attempts at modernization were _____ on by senior officers.
3. She enjoys long _____ walks.
4. Results can _____ greatly from year to year.
5. Regular exercise has a direct *bearing* on fitness and health.
6. My sister was distant and cold and very _____ in my life.
7. He managed to _____ a yawn.
8. The union strike in the port could _____ on the delivery dates of the containers.
9. The team was suffering from low _____.
10. He acted on his own _____ and wasn't following orders.
11. If you want to pass your exams you'd better change your _____!
12. This organization includes people of _____ backgrounds and beliefs, and everyone is always welcome.

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to become aware of...

- ☐ the issue of miscommunication as a cause of maritime accidents
- ☐ the cultural norms of different nationalities/differences in types of non-verbal communication
- ☐ the need of common English requirements for all seafarers
- ☐ what "summarizing skills" are and to summarize the key points of a long text in writing

B. Class Project.

It is required by STCW (2010, Manila Amendments: Regulation I/14) that

"Each Administration shall ... require ... every company to ensure that:
at all times on board ships there shall be effective communication"

How can effective communication be achieved/ensured on board? What are the components that make up effective communication, in your opinion? Make a presentation on effective communication, and make some proposals to ship management on this issue. Also, look at the following opinion. Do you agree?

> *Training programs, safety committees, reporting systems, 'no blame culture', regular meetings on board and seminars ashore, free e-mail access and telephones – all these elements create effective ship communication.*
>
> *(A shipmaster's view)*[6]

C. Fill in the gaps (the first letter is given).

1. The Rescue C_____ Centre was unable to understand the English spoken by the Officer on W_____ of the vessel in d_____ .
2. 80% of accidents at sea are caused by human e_____, with half due to poor communication.
3. English language c_____ of seafarers is one of the major problems which has contributed to many accidents and i_____ at sea.
4. Language b_____ on board are not only a matter of understanding orders or reading i_____ properly.

D. Find the missing words in the following word explanations, the first and the last letters are given.

1. to give someone a signal using your finger or hand, to tell them to move nearer or to follow you; to b _ _ _ _ n someone
2. he said yes; he gave an a _ _ _ _ _ _ _ _ _ e reply
3. accidents very different in importance (some very important, others less important); accidents of d _ _ _ _ _ e magnitude
4. it has no relation, no relevance to this issue; it has no b _ _ _ _ _ g on this issue
5. an initial report, written before the final one: a p _ _ _ _ _ _ _ _ _ y report

E. Draw arrows to match the words to their definitions.

1. Well mannered	see
2. Perceive	morally offensive
3. Contradictory	polite
4. Aggravate	explain
5. Interpret	conflicting
6. Indecent	worsen
7. Impact	affect
8. Stifle	suppress

6. www.he-alert.org Issue No. 14, May 2007, The International Maritime Human Element Bulletin, "A shipmaster's view".

UNIT 2

Preparing For Sea / Arrival In Port

1. *Anchoring, Berthing / Unberthing*
2. *Pilotage*

Round-up

1. Anchoring, Berthing / Unberthing

I. Bridge Checklists: preparing for sea / arrival in port

a) Fill in the missing words in the following information on "Preparation for arrival in port".

warnings	arrangements	hand	aware	lines
exchange	updated	services	required	

1. The passage plan must be _____ following receipt of the Shore to Ship Pilot/ Master _____ form and all the latest navigational _____.
2. The ETA must be sent with all relevant information _____ by local regulations, e.g. details of hazardous goods carried.
3. Equipment such as mooring winches and _____ must be prepared and checked.
4. A pilot card must be completed and the pilot embarkation _____ must be in _____, these are necessary for the safe embarkation of the pilot.
5. If there are any special berthing requirements that the ship may have, the port must be made fully _____ of them.
6. VHF channels for the various _____ (e.g. VTS, pilot, tugs, berthing instructions) must be noted.

b) Describe procedures for arrival in port. Use the "Preparation for sea" checklist and mention 5 key actions that must be done before arrival in port. Use "must" as in the exercise above.

- ☐ **Has a passage plan for the intended voyage been prepared?** (see section 2)

Has the following equipment been checked and found ready for use?

- ☐ anchors
- ☐ bridge movement book/course and engine movement recorder
- ☐ echo sounder
- ☐ electronic navigational position-fixing systems
- ☐ gyro/magnetic compass and repeaters
- ☐ passage plan entered into integrated bridge system
- ☐ radar(s)
- ☐ required AIS data inputs made, speed/distance recorder
- ☐ clocks

Has the following equipment been tested, synchronised and found ready for use?

- ☐ **bridge and engine room telegraphs, including**
  - ☐ rpm indicators
  - ☐ emergency engine stops
  - ☐ thruster controls and indicators, if fitted
  - ☐ controllable pitch propeller controls and indicators, if fitted

- ☐ **communications facilities, including**
  - ☐ bridge to engine room/mooring station communications
  - ☐ portable radios
  - ☐ VHF radio communications with port authority
- ☐ **navigation and signal lights, including**
  - ☐ searchlights
  - ☐ signalling lamp
  - ☐ morse light
- ☐ **sound signalling apparatus, including**
  - ☐ whistles
  - ☐ fog bell and gong system
- ☐ **steering gear, including manual, auto-pilot and emergency changeover arrangements and rudder indicators** (see annex A7)
- ☐ **window wiper/clearview screen arrangements**

Is the ship secure for sea?

- ☐ cargo and cargo handling equipment secure
- ☐ all hull openings secure and watertight
- ☐ cargo/passenger details available
- ☐ stability and draught information available

II. Anchoring gear

a) Read about two accidents similar to the Astral grounding incident. Match the highlighted terms/phrases to the explanations below. One of them has been done as an example.

Pasha Bulker

On 23 May 2007 the Panamanian Registered bulk carrier *Pasha Bulker* anchored along with more than 50 other bulk carriers to await **berthing** to load coal in Newcastle, on the east coast of Australia. At midday on 7 June the master **veered more cable** on receipt of a gale warning. During that evening seven ships were **put to sea**. At midnight, the first of 49 ships at anchor started to drag its anchor as the weather deteriorated and the wind increased to gale force, with 8m seas, onto the lee shore of Nobbys beach.

Pasha Bulker aground

At 0625 on 24 May, *Pasha Bulker* started to drag anchor and the master decided to **weigh anchor**. Once underway, in 45kt winds, the master tried to turn the ship away from the coast, but was unable to control the turn. The master then turned towards the coast, only 8 cables away, and with insufficient sea room to complete the turn, and with significant leeway, the vessel grounded.

Young Lady

On 26 June 2007, the 105,000 tonnes deadweight crude oil tanker *Young Lady* dragged her anchor in Tees Bay, at a wind speed in excess of 40kts and a heavy swell. The master decided to weigh anchor and depart, but during the operation the windlass hydraulic motor exploded and the **cable ran out to the bitter end**. The vessel dragged her anchor for an hour, during which the anchor **flukes temporarily snagged** a gas pipeline, until she passed over a shoal patch and the anchor held. The pipeline was out of action for over 2 months.

Deck officers should:
- be skilled in navigation planning for anchoring, including the construction of **swinging circles, holding ground**, and position monitoring while at anchor.
- be aware of the strengths, weaknesses and limitations of vessels' anchoring systems.
- practise safe anchoring, taking into consideration wind and tide effects, yawing, actions to take to prevent dragging, and actions to take when dragging is detected.

1.	no more cable remained to be let go	5.	the capacity of the sea bottom to provide a secure anchorage
2.	let out cable in a controlled way	6.	take up (raise) the anchor when ready to get underway
3.	docking, mooring a vessel in its allotted place at a wharf or dock	7. put to sea	left the anchorage area to proceed to the open sea
4.	a circle on a chart centered on the position of the anchor, with a radius equal to the length of the chain let out plus the length of the ship	8.	the part of the anchor which digs into the bottom ground momentarily became caught on something and tore it

"to the bitter end": *(idiomatic)* used to indicate one will continue doing something until it is finished, no matter how unpleasant or difficult that is, e.g. *They were prepared to fight to the bitter end for their rights*.

The ***windlass hydraulic motor*** mentioned in the text is part of a vessel's anchoring system. What other components do you know? Read the following text about anchor and mooring gear[1]. Then do the exercises below.

The purpose of the anchor gear (or ground tackle) is to fix the position of a ship in shallow water by using the sea-bed. In general, seagoing vessels are equipped with **stockless** anchors (stocked anchors, such as the Admiralty type, are now old fashioned): two bow anchors, a stern anchor for manoeuvring the ship when it is "dredging anchor", and a spare anchor. Anchors can be:
– Conventional anchors (for instance, common conventional anchor types are Spek and Hall).

1. Source of pictures and selected descriptions: *Ship Knowledge*, 5th ed. "Anchor and mooring gear", pages 218-226.

– HHP anchors (high holding power) (for instance, AC14 and Pool).
– SHHP anchors (super high holding power).

1. crown/shackle
2. shank
3. flukes
4. crown pin
5. crown plate
6. anchor chain with swivel

Hall anchor (conventional anchor)

Anchor chain

The anchor chain runs from the **chain locker**, through the **spurling pipe**, via the **gypsy wheel** of the windlass through the **hawse pipe**, to the anchor. The anchor chain consists of **links** with **studs** to prevent kinks (=twists) in the chain (stud link chain). The anchor chain is composed of lengths (shackles), each with a length of 15 fathoms (15 x 1,83 = 27,5 meters). The joint between two lengths of 15 fathoms is also called a shackle, and it is often painted white, so that the number of shackles that are out can be determined. A **D-shackle** connects the anchor and chain. A **swivel** is usually fixed on the chain and allows the anchor to rotate independently. The swivel can also be connected directly to the anchor.

Hawse pipes and anchor pockets

The **hawse pipe** is a tube that leads from the shell plating to the forecastle deck. A water spray in the pipe cleans the chain during heaving of the anchor. Anchor **pockets** or **recesses** are sometimes made in the bow into which the anchors can be completely retracted.

Chain stopper / cable stopper

The **chain stopper** absorbs the pull of the chain by diverting it to the hull. In most types of chain stoppers, the chain runs over a roller, sometimes equipped with a **tensioner**. The actual stopper is usually a heavy bar laid over the flat link and secured with a strong pin.

Winches

Anchor winches are used to heave in and pay out the anchors and anchor chains in a controlled way. The same winch can be used to operate a **mooring drum**. A clutch is used to connect/disconnect the **gypsy wheel** or the mooring drum to the main shaft. We can heave in the anchor when the gypsy wheel is coupled to the main shaft. The winch turns either the gypsy or the mooring drum or both.

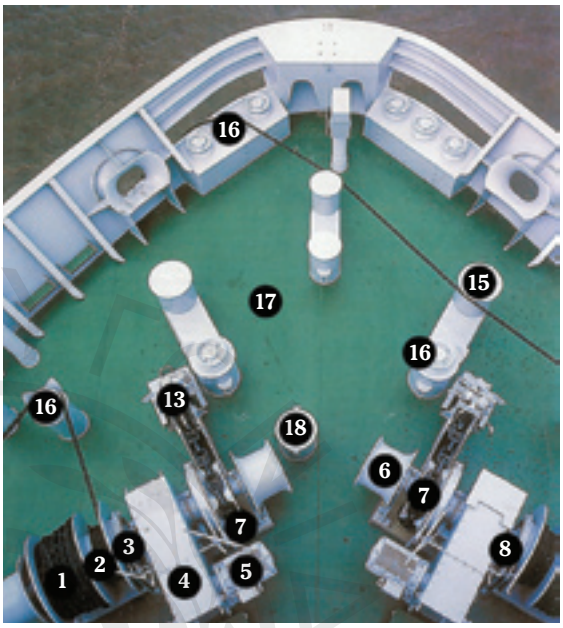
Chain locker

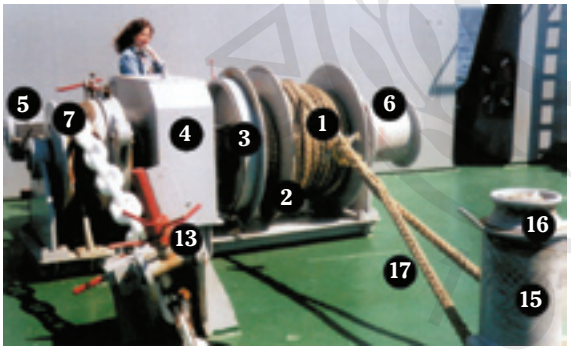
The anchor chain enters the chain locker via the **spurling pipes**. Chain lockers are high and narrow, making them self-trimming. This means that the stacked chain can not fall over in bad weather. The end of the cable, the **bitter end**, is connected to an end connection in the chain locker, with a release possibility outside the locker. On very large ships, the connection is often a weak link, which breaks when the chain runs out accidentally. This way the chain locker and forecastle deck will not be damaged, because a heavy chain, when running, cannot be stopped.

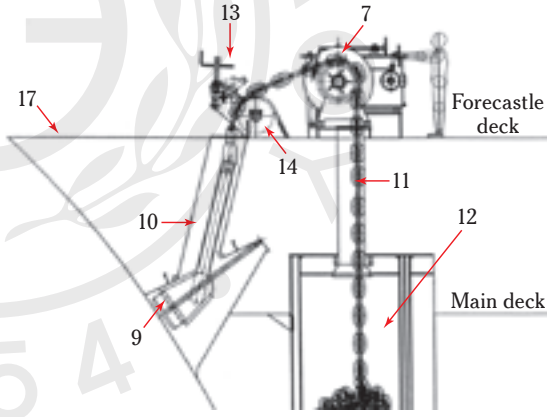
b) An anchor windlass with mooring drum and warping head is shown in the following pictures and the drawing. Fill in the missing words.

gypsy wheel	hawse pipe	bollard	anchor	motor	stopper	locker

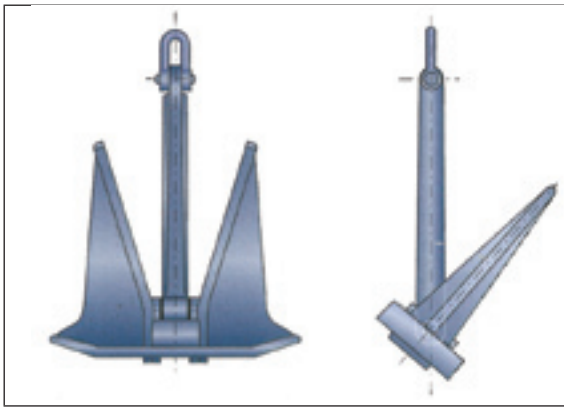
1. Storage part of the mooring drum
2. Working part (pulling section) of the drum
3. Break band
4. Gear box
5. Electro-hydraulic _____
6. Warping head
7. Chain in the _____
8. Dog clutch
9. _____
10. _____
11. Spurling pipe
12. Chain _____
13. Chain _____ with security device
14. Roller guide
15. _____
16. Roller guide
17. Forecastle Deck
18. Hatch to chain locker







c) Read the following advertisement and write up the missing words.

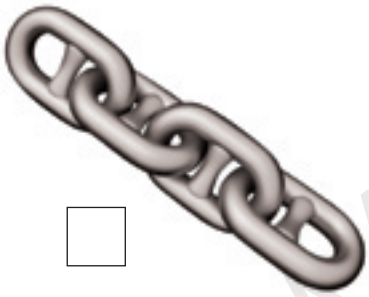


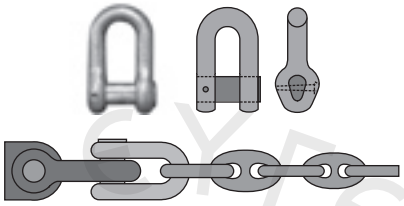
AC-14 anchor

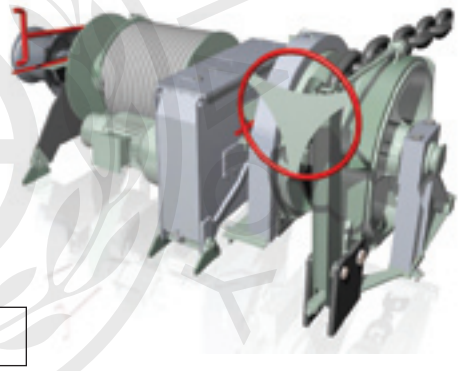
This is a high h _ _ _ _ _ g p _ _ _ r anchor.
The f _ _ _ _ s are shaped to ensure an immediate grip into the seabed. Its increased efficiency over
c _ _ _ _ _ _ _ _ _ _ l anchors is maintained on most sea b _ _ _ _ _ s including clay and pebbly sand.

d) Match the titles to the pictures. Write the correct number in each box.

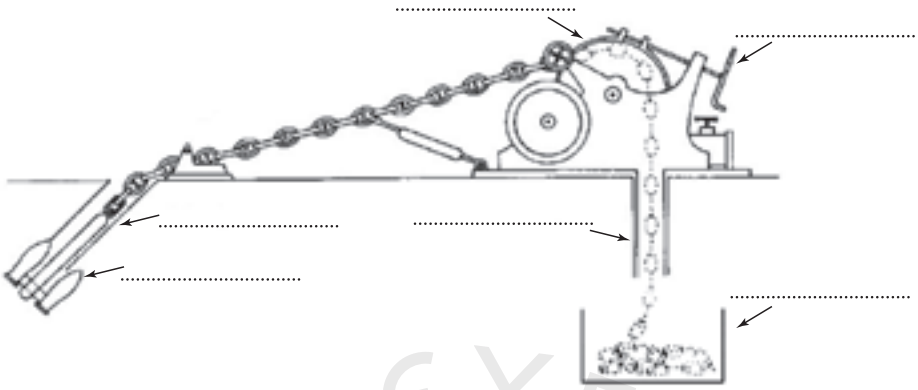
1. bitter end connection (ring)
2. hawse pipe (with water spray installation)
3. stocked Admiralty anchor
4. stud-link chain
5. anchors in pockets
6. hydraulic anchor-mooring winch
7. chain stopper
8. D-shackle and one way of connecting the anchor to the chain







e) Use the following diagram to describe the passage of the anchor cable from the chain locker to the hawse pipe. Write the terms related to anchor gear shown on the diagram by arrows.



III. SMCP for anchoring and berthing

a) Fill in the correct preposition: at, on, of, in, at, up

1. This is Rotterdam VTS. You must anchor clear _____ fairway.
2. You are _____ anchor _____ a wrong position.
3. Have your crew _____ stand by for heaving _____ anchor when the pilot embarks.
4. You have permission to anchor _____ 1200 UTC until the tugs arrive.

b) Anchoring (On-Board Communication) - Match the two halves to make full sentences.

1. Check the anchor position ...	☐ ... up and down.
2. Switch on ...	☐ ... the anchor ball.
3. Hoist ...	☐ ... and dredge it.
4. We will let go port anchor ...	☐ ... every 15 minutes.
5. The cable is leading ...	☐ ... the anchor lights.

c) What do the following verbs/orders mean? Match.

Heave up	Walk out	Walk back	Veer out	Let go

1. ..... the anchor	⇨ reverse the action of the windlass to ease the cable of the anchor
2. ..... the anchor	⇨ let loose the anchor
3. ..... the anchor	⇨ reverse the action of the windlass to lower the anchor until it is clear of the hawse pipe and ready for dropping
4. ..... the anchor	⇨ pull the anchor up
5. ..... the anchor	⇨ let out a greater length of cable

d) Supply the missing orders/questions in the following exchange.

How is the cable leading?	Put the windlass in gear.
How is the cable growing?	How much weight is on the cable?

We are leaving the anchorage. Stand by for heaving up. How much cable is out?	
	Three shackles are out.
1.	
	The windlass is in gear.
2.	
	The cable is leading to port.
3.	
	No weight is on the cable.
4.	
	The cable is tight.
Stop heaving. Slack out the cable.	

e) Berthing commands. Fill in the missing words.

clear	lead	tension	instructions	ashore
fast	tight	alongside	fenders	

1. What are my berthing _____? Your orders are to berth on Berth No 4.
2. Your berth will be _____ at 1230 UTC.
3. Have _____ ready fore and aft. We will moor _____.
4. Do you have _____ winches?
5. Send heaving line _____.
6. Use Panama _____.
7. Keep lines _____. Your vessel is in position – make _____.

2. Pilotage

I. SMCP for Pilotage

a) Pilot request. Fill in the gaps with the words in the box.

transfer	resumed	present	compulsory	exempted	suspended

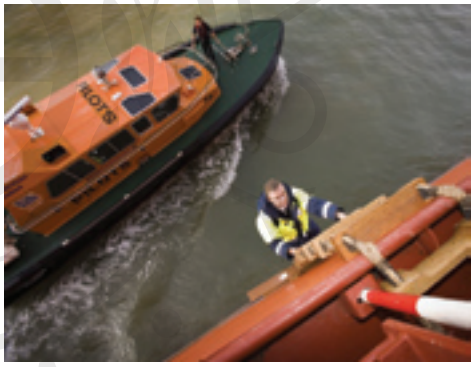
1. Must I take a pilot? Yes, you must take a pilot – pilotage is _____.
2. I do not require a pilot – I am holder of Pilotage Exemption Certificate.
3. You are _____ from pilotage.

4. Stop in _____ position and wait for the pilot.
5. Stand by on VHF channel 14 until pilot _____ is completed.
6. Pilotage at Frazer River Pilot station has been _____ until 1200 local time today. It will not be _____ until that time.

b) Embarking/disembarking pilot. Write up the missing words. The first and last letters are given.

1. R _ g the pilot ladder on port side 5 meters a _ _ _ e water.
2. The pilot ladder is u _ _ _ _ e. What is wrong with the pilot ladder?
3. The pilot ladder has b _ _ _ _ n spreaders.
4. Rig the accommodation ladder in c _ _ _ _ _ _ _ _ _ n with the pilot ladder.
5. C _ _ _ _ _ t the list of the vessel.
6. Make a l _ e on your port side.
7. Make a b _ _ _ _ _ _ g speed of 5 knots. Put h _ _ m hard to port.
8. A _ _ _ r course – the pilot boat cannot clear the vessel.
9. Embarkation is not possible. Boarding a _ _ _ _ _ _ _ _ _ _ s do not comply with SOLAS r _ _ _ _ _ _ _ _ _ s.

c) What boarding arrangements can you see in the pictures? What are the proper means and procedures for pilot boarding/disembarking?



d) Pilot on the Bridge. Match the two halves to make full questions asked by the pilot.

1. Do you have bow ...	☐ twin propellers?
2. Is the turning effect of the propeller ...	☐ thrusters?
3. Is the radar ...	☐ very strong?
4. Have you changed to ...	☐ relative head-up?
5. What notice is required to reduce from full speed to ...	☐ switched on?
6. Do you have single or ...	☐ manual steering?
7. Are navigation lights ...	☐ manoeuvring speed?

e) In pairs, simulate the master/pilot exchange, asking questions about the information on the card "SHIP TO SHORE Master/Pilot Exchange" on the next page.

SHIP IDENTITY

Name | Call sign | Flag

Ship's agent | Year built | IMO No

Cargo type | Ship type | Last port

ADDITIONAL COMMUNICATION INFORMATION

Fax | Telex | Other

PILOT BOARDING

Date/ETA (UTC/LT) | Freeboard

Boarding station (if there is more than one)

SHIP PARTICULARS

Draught fwd | Draught aft | Draught amidships (salt water)

Air draught | Length | Beam

Displacement | Dwt | Gross | Net

ANCHORS

Port anchor | Stbd anchor (length of cable available)

MANOEUVRING DETAILS AT CURRENT CONDITION

Full speed | Half speed

Slow speed | Min. steering speed

Propeller direction of turn (left / right) | Controllable pitch (yes / no)

Number of propellers | Number of fwd thrusters | Number of aft thrusters

MAIN ENGINE DETAILS

Type of engine (motor / turbine / other)

Max. number of engine starts | Time from full ahead to full astern

EQUIPMENT DEFECTS RELEVANT TO SAFE NAVIGATION

OTHER IMPORTANT DETAILS e.g. berthing restrictions, manoeuvring peculiarities

II. Welcome on board Mr. Pilot

a) Which greeting is more formal? Why?

Welcome on board, Mr. Pilot. I am the 2nd Officer, I will escort you to the bridge. This way please.	Hi, Mr. Pilot, I'll take you up to the bridge, follow me.

Language Register. Language register is the level of formality with which you speak. Look at the following two examples of greeting people.

- **What's up? It's awesome that you came to visit!** ⇨ *(you are talking to your friend, in an informal register)*
- **Good morning Mr. President. We appreciate your visit**. ⇨ *(you are talking to the company president, in a formal register)*

Look at the five types of register or language characteristics:

Register	**Greeting** in different registers	**Parting** in different registers
Frozen, or static; *language that does not change, like in a Charter Party*	I want to welcome all participants to the Safer Seas Conference, sponsored by BIMCO.	Farewell, and godspeed.
Formal; *impersonal language used in formal settings, like in speeches, announcements*	Good morning. May I speak to the crew manager please?	Goodbye. We look forward to seeing you again.
Consultative; *when strangers meet, teacher to student, professional discourse*	Hello Mr. Davis. How are you doing this morning?	Goodbye. Have a good weekend.
Casual or informal; *language that has a conversational tone,used by peers or friends*	Hey, Nick. What's up?	Bye now – take care.
Intimate; *between couples, close family members, private language, not used in public speech*	How's my little darlin'?	Later, darlin'.

b) What is the register used in the following announcements?

- All passengers are requested to proceed to their assembly stations immediately.
- Would you all please go to your assembly station right away.

c) What is the register used in the following requests?

- Please submit the information at your earliest convenience.
- Could you possibly look this up for me by tomorrow?

Note:
One can usually transition from one language register to an adjacent one without encountering repercussions. However, skipping one or more levels is usually considered inappropriate and even offensive, e.g. using an intimate register in a business e-mail might be considered inappropriate, or using a formal register with your friends might be considered funny or strange.
The appropriate register depends on the situation and the participants – it depends upon the audience (who), the topic (what), purpose (why) and location (where). In English, register is a key element in expressing degrees of formality. In Greek, formality can be signalled through the formal / informal "you" (εσύ – εσείς).
When you write in formal register, use transition words/phrases like *nevertheless, however, in addition, as a result of, although*, (do not use *and, so, but, also),* and complete words, no contractions (e.g. use "have not", not "haven't").

d) What is the register used in the following texts?

Notes of Protest, professional e-mails, marine investigation reports, blogs, personal e-mails, IMO conventions, P&I Club Prevention Bulletins

e) Which of the following introductions are formal / informal?

1. Mr. Davis, may I introduce the DPA, Capt. Trotter.
   How do you do, Capt. Trotter?
2. Jim, meet Fiona, my teacher. Fiona, this is my colleague Jim.
   Hi, Jim. How are you?
3. Mark, this is Jeff.
   Hello, Jeff.
4. How do you do? My name is Mr. Jones.
   Pleased to meet you Mr. Jones.

f) How would you introduce yourself to someone from the shipping company office in a seminar you are attending?

- How would you greet a PSC Inspector?

g) A Pilot from the Port of London talks about his experience[2]. Listen and answer the following questions.

1. After boarding, the pilot is usually met by a foreign crew member, a junior officer. What is the phrase he is greeted with?
2. What is the most challenging part of his job?
3. Do pilots nowadays feel the responsibility to get the ship to its berth on time under commercial pressure?
4. How has the use of advanced radar made the work different?

2."The work of a pilot on the tidal Thames", Port of London Authority, October 2010.

III. Good BRM saves the day

a) In the "Pilotage" checklist in Bridge Procedures Guide, we can find the following three questions.

- Have the responsibilities in the bridge team been explained and clearly understood?
- Is the language to be used agreed upon?
- Are the manoeuvring techniques being monitored by the Master and the OOW?

What is the significance of these points? What can happen when they are not followed?

b) An investigator presents the time sheet of a maritime accident and gives advice on how such accidents can be avoided[3]. Listen and fill in the missing words.

1. The Pilot had ordered "hard to port" but the _____ executed "hard to starboard."
2. At 0941 the vessel _____. Fortunately, its hull was intact and it was _____ with the rising tide.
3. Nobody on the bridge was _____ that the pilot's orders were executed properly and so the errors were not detected in time.
4. Roles and responsibilities of every member of the bridge team should be clearly _____ and agreed.

c) This piece of advice is given in most recommendations/guidance to master manuals. Why is the integration of the pilot in the bridge team important?

Make the pilot a member of your bridge team.

d) Read the following text[4]. Are the statements below true or false?

- ☐ The writer of this article has worked both as a pilot and as a ship's master.
- ☐ Language is an important factor to the success of BRM.
- ☐ The exchange of information between master and pilot shifts the responsibility for the safety of the vessel from the master to the pilot.
- ☐ The "closed loop" cannot ensure there are no misunderstandings.

3. Maritime Pilotage, by AMSA, Australian Maritime Safety Authority.
4. "Is the pilot a part of the bridge team" by Capt. Erik Blom, abridged.

Hopefully gone are the days when the Captain – with a capital C – took all the decisions without discussing with anyone, and not listening to advice from others. On bigger ships the master now has a team around him on board to support him in his decisions: the bridge team. The Bridge Team's (BT) responsibility is to ensure a well-functioning Bridge Resource Management (BRM). One of the main objectives of BRM is to help bridge team members interact with and support the master and/or the pilot.

Communication can not be overrated. It is the most vital part of bridge team management. A crucial point of contact is when the OOW uses the VHF to report to Vessel Traffic Service (VTS) or pilot station. Most stations are very friendly and helpful, but others do not reply at all when ships try to comply with the compulsory rules to report the required number of hours before arrival. The OOW has been informed via passage plan that he must get in touch with the pilot station by a specific time otherwise the ship might be delayed. If there is no reply he will continue with repeated calls on all possible means, dive back into the publications to double check the passage plan information and take the focus away from his main duty – to navigate. This increases the stress level within the BT.

Eventually the pilot is on the bridge. Being a former Norwegian pilot myself, I know that how the master and the pilot meet and greet each other is the key to how the rest of the passage will be. A lot of information has to be exchanged between the pilot and the master in a relatively short time, when the master normally has "the conn" and the ship is moving in confined waters (to have "the conn" is to have sole responsibility to control, or direct by order, the movements of a ship, i.e. to give proper steering and engine orders for the safe navigation of the ship).

Typically the following information is to be exchanged between the pilot and master during the approach: ship details; originating authority; manoeuvring details; propeller details; main engine details and equipment defects; berth and tug details; local weather and sea conditions; details of passage plan, including navigational hazards, abort points and emergency plans; local regulations, including VTS reporting, maximum allowable draft, etc.; ship's agent; year built; IMO number; cargo type (IMO codes if dangerous cargo); last port; etc. At this stage it is very important that the chemistry between the pilot and the master is good. Otherwise it might lead to dangerous situations.

The next step is transition of "the conn" from the master to the pilot. I have met pilots coming on the bridge and, without acknowledging anyone, giving the helmsman orders based on the ship's heading when they left the pilot boat, not realising we were on the correct heading for the approach. *After* the exchange of information summarised above I always clearly inform my bridge team with the phrase "Pilot has the conn" and in turn my OOW and helmsman acknowledge the information: the closed loop.

The "closed loop" is a communication protocol where information is given, repeated by the receiver and normally confirmed by the issuer. This is the only way one can be sure an order is being followed and is a vital part of the bridge team management. Having observed this from all sides, it is obvious to me that you can minimise the risk of misunderstanding if the "closed loop" is working. In a Canadian study where 200 accidents were related to human error, 84 (42 per cent) involved misunderstanding between pilot and master and some could probably have been avoided if the "closed loop" protocol had been used.

Based on my experience, most pilots speak more than good enough English, but as a pilot conning a ship heading for Mongstad oil terminal I have experienced that my helm orders had to be translated into three different languages before they were executed by the helmsman. In that situation it was difficult to establish a closed loop. Provided a few essential premises are taken care of, the pilot is a very vital part of the bridge team. In my opinion, fatigue, language barriers, lack of chemistry, an open loop and, last but not least, cell phone calls from the pilot's family are threats to ships' safety.

"Welcome on board, Mr. Pilot. Coffee or tea?"

e) Read the following report[5] and fill in the glossary below.

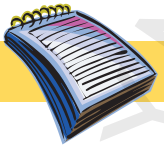
Good BRM saves the day

The vessel was proceeding to an anchorage area under pilotage on a heading of 025 degrees. At the time, there were many ships anchored on the vessel's port side, the closest only about one cable away. At a point where the vessel was to alter course to port to enter the anchorage, the pilot ordered 315 degrees. The Master, who was present and monitoring the pilot's actions as well as all rudder and engine movements, immediately realised the order was incorrect. He countermanded the course order and instructed the helmsman to remain, for the time being, on 025 degrees.

A short discussion with the pilot ensued. The pilot admitted the error and corrected the course to steer, ordering 015 degrees.

Lessons learned

Under pilotage, the vessel's crew have a duty to closely monitor and interact with the pilot. Anyone can make a mistake. Good BRM means mistakes by one member of the team are spotted and stopped early and consequences are reduced.



Glossary

_____ cancelled the original command and gave a new one
_____ followed, came as a result
_____ communicate, talk to

f) Which recommendations in the guide[6] below are applicable to the incident described above? Underline the sentences which refer to the points followed successfully by the master.

1.0 Principles for the safe conduct of pilotage

1.1 Ship's personnel, shore based ship management and the relevant port and pilotage authorities should utilise the proven concept of "Bridge Team Management". Establishment of effective co-ordination between the pilot, master and other ship's personnel, taking due account of the ship's systems and the equipment available to the pilot is a prerequisite for the safe conduct of the ship through pilotage waters.

1.2 The presence of a pilot on the ship does not relieve the master or officer in charge of the navigational watch from their duties and obligations for the safe conduct of the ship.

2.0 Master pilot information exchange

2.1 The ICS Master/Pilot Exchange Forms (Annexes A1 and A2 of the ICS Bridge Procedures Guide) or the company equivalent format, should be completed by both the master and pilot to help ensure ready availability of the information and that nothing is omitted in error.

5. Report from MARS, Mariners Alerting and Reporting System, The Nautical Institute, www.nautinst.org.
6. MASTER/PILOT RELATIONSHIP, from "International Best Practices for Maritime Pilotage", published in A Master's Guide to Berthing.

2.2 Contingency plans should be made which should be followed in the event of a malfunction or a shipboard emergency, identifying possible abort points and safe grounding areas. These should be discussed and agreed between pilot and master.

3.0 Duties and Responsibilities

3.1 The pilot, master and bridge personnel share a responsibility for good communications and mutual understanding of the other's role for the safe conduct of the vessel in pilotage waters. They should also clarify their respective roles and responsibilities so that the pilot can be easily and successfully integrated into the normal bridge management team.

3.2 The pilot's primary duty is to provide accurate information to ensure the safe navigation of the ship. In practice, the pilot will often conn the ship on the master's behalf.

3.3 The master retains the ultimate responsibility for the safety of his ship. He and his bridge personnel have a duty to support the pilot and to monitor his actions. This should include querying any actions or omissions by the pilot (or any other member of the bridge management team) if inconsistent with the passage plan or if the safety of the ship is in any doubt.

4.0 Conduct of passage in pilotage waters

4.1 It is essential that a face-to-face master/pilot exchange (MPX) results in clear and effective communication and the willingness of the pilot, master and bridge personnel to work together as part of a bridge management team. English language; or a mutually agreed common language; or the IMO Standard Marine Communication Phrases should be used, and all members of the team share a responsibility to highlight any perceived errors or omissions by other team members, for clarification.

4.2 The master and bridge personnel should, within the bridge management team, interact with the pilot providing confirmation of his directions and feedback when they have been complied with.

g) Write the derivatives.

Verb	*Noun*	*Adjective*	*Noun*
clarify		willing	
integrate		available	
omit		effective	

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to...

- ☐ identify anchoring equipment correctly from diagrams
- ☐ understand procedures for arriving to port and preparing for sea (preplanning, using a ship to shore master/pilot exchange form)
- ☐ become familiar with vocabulary used in SMCP for anchoring, berthing, pilotage
- ☐ understanding the dynamics of the relationship between pilot and bridge team, as well as the concept of BRM
- ☐ become aware of language register in selecting appropriate expressions to greet visitors on board

B. Class Project.

- Types of modern ship anchor and criteria for anchor selection: present to class their names, advantages and disadvantages, etc.
- What is dynamic positioning? Which vessel types employ DP? How can one become a DP Operator? Compare anchoring and dynamic positioning as position-keeping options, giving advantages and disadvantages.

C. Fill in the gaps with the words in the box.

locker	kinking	ground	snagged	check	awash
aweigh	open	berth	windlass	foul	put out to

1. _____ tackle includes the anchors, chains, shackles and stoppers necessary for anchoring operations.
2. An anchor is hoisted (raised) and lowered by a _____.
3. The chain _____ is where the chain is kept.
4. The anchor is said to be _____ the moment it leaves the sea bottom, when it is no longer attached to the bottom.
5. The anchor is said to be _____ when it is clear of the water.
6. Anchor chains are made of stud-links or _____ links. The studs are for strength and prevent the cable from _____.
7. We have to weigh anchor and _____ sea before that storm gets here.
8. The vessel had left its _____ when the agent arrived.
9. To _____ the cable means to regulate the motion of a cable (wire, rope) when it is running out too fast.
10. The anchor is _____ when it has its own cable twisted around it, or it has _____ an obstruction.

D. Fill in the gaps with the correct derivative of the verbs in brackets.

The exchange of information regarding pilotage and the passage plan should include:

1. _____ [clarify] of roles and responsibilities of the master, pilot and other members of the bridge _____ [manage] team
2. navigational _____ [intend]
3. local conditions including navigational or traffic _____ [constrain]
4. _____ [expect] weather conditions

UNIT 3

Safety and Risk On Board

1. *The ISM Code*
2. *Bridge Checklists*
3. *Risk Assessment*
4. *Maintenance work: selection of materials and tools*
5. *Safe working practice and accident prevention*

Round-up

1. The ISM Code

Lead-in: key words. How well do you know the following words/phrases?

Designated Person Ashore / Risk assessment / Incident investigation / Audit / Implementation / Policy / Deficiencies / Emergency response / Non-conformities / Near-misses / Root cause / Corrective action / Valid document

I know the word / phrase. I can explain and use it in different contexts.	I recognize the "gist" of it, but I'm not sure I can use it correctly.	The word / phrase is unknown to me. I don't understand it.

A. *Read the following texts and fill in the glossary below.*

The International Safety Management Code

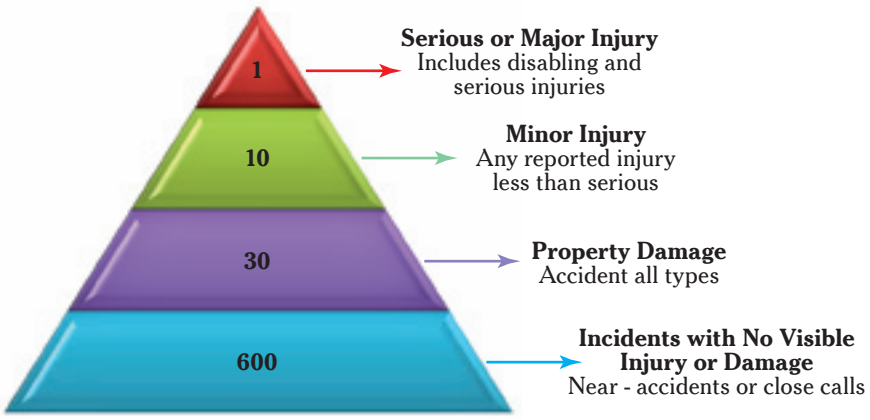
The high number of maritime incidents prompted IMO to produce a unified safety management code called the ISM code. The ISM guidelines were developed to provide a framework for the proper development, implementation and assessment of safety and pollution prevention management in accordance with industry best practices. The ISM code is often linked to litigation cases involving maritime incidents.

A Safety Management System (SMS) meeting the requirements of the ISM code requires a company to document its management procedures and record its actions to ensure that conditions, activities and tasks that affect safety and the environment are properly planned, organised, executed and checked. An SMS clearly defines responsibilities, authorities and lines of communication. An SMS allows a company to measure its performance against set criteria, hence identifying areas that can be improved. The increase in Safety Management skills improves morale and can lead to a reduction in costs due to an increase in efficiency and a reduction in claims.

Near-misses

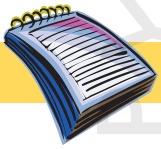
A near-miss is defined as an extraordinary event that could reasonably have resulted in a negative consequence under slightly different circumstances, but actually did not. Essentially, a near-miss is an accident that almost happened. It has been estimated that for every accident, there are about 600 near-misses.

Near-misses and accidents have the same causes, so studying near-misses can help us understand safety problems and make corrective changes before an accident takes place. In addition, since near-misses do not result in full-blown casualties, studying near-misses can help us learn how to develop early-warning systems to detect when conditions have become non-normal and also can show us what steps to take in order to avoid the accident.



The safety management system should include procedures ensuring that non-conformities, accidents and hazardous situations are reported to the Company, investigated and analysed with the objective of improving safety and preventing pollution.

Near misses, accidents and incidents shall be reported by everyone without the fear of punishment. Companies should welcome incident reports in order to understand the precursors to events that were detrimental to safety and the marine environment. In this way companies promote a "no blame culture" in order to improve the management of safety on board.



Glossary

_____	cause someone to take a course of action
_____	the process of making or defending a claim in court
_____	as a consequence; for this reason
_____	something that you are trying to achieve, a goal
_____	harmful, damaging

B. ***Study the following notes on key notions from the ISM Code and write up the missing words.***

The ISM Code in a nutshell	
ISM Purpose • E _ _ _ _ _ _ _ h a Safety Management System • Promote safe/pollution-free ship management • Safeguard Master in performing safety duties • A _ _ _ y safety management at all levels ashore and afloat • M _ _ _ _ _ _ e/avoid poor decisions/ human error	***Reports and analysis of non-conformities, hazardous occurrences*** • SMS has procedures for reporting non-conformities, accidents, incidents and hazardous situations (near misses) to the Company • These must be reported, i _ _ _ _ _ _ _ _ _ _ d and analyzed (including possible root causes) • Recommendations for corrective and preventive actions must be t _ _ _ n

Designated person(s)

The designated person ashore provides a l _ _ k between Company and ships and has direct a _ _ _ _ s to Managing Director.

DPA Responsibilities

- Check SMS effectiveness / implementation
- Monitor one or more ships for SMS matters
- Assure that sufficient resources and shore-based support are provided
- Forward accidents, incidents, non-conformities and propose for SMS improvements
- V _ _ _ _ y implementation of corrective and preventive actions required/proposed
- Control SMS documentation
- Organize office meetings for SMS matters
- S _ _ _ _ _ _ _ e internal audits

What is a safety audit?

An Audit is a systematic, objective, independent and documented evaluation of the effectiveness of a safety activity and its component parts. An auditor performing a safety audit aims to

- communicate deficiencies to management
- i _ _ _ _ _ _ y weaknesses in safety system and practices
- ensure compliance with company policies/procedures
- assess effectiveness of safety activities
- a_ _ _ _ s individuals

2. Bridge Checklists

A. *Do you agree?*

"The ISM Code is important for the working of the vessel. There may be times when it is difficult to implement, and, of course, there is more paperwork, more procedures and checklists; but, I think that if this leads to better safety, then it can only be good. If the Chief Mate, for example, has to go through five or six checklists at the start of the working day, then so be it; checklists are important for our safety, for everyone onboard and should be done in a proper way."

(A shipmaster's view)[1]

1. www.he-alert.org Issue No. 14, May 2007, The International Maritime Human Element Bulletin, "A shipmaster's view".

B. ***Look at the phrases used in Bridge Checklists[2] and try to explain them in English. For extra help, use the list of explanations below and match. The vocabulary is from the following Checklists.***

⇨ Preparing for Sea
⇨ Arrival in Port
⇨ Navigation in Heavy Weather or in tropical storm areas
⇨ Anchoring & Anchor Watch
⇨ Pilotage
⇨ Navigation in Ice
⇨ Calling the Master

planned, proposed	create worry, anxiety	establish exactly by calculation	becomes worse	become less
the carrying out of orders, the act of performing the orders	direct the pilot's attention to it	available, you can find and use it easily	fails to work correctly	distinguishable, that can be recognized
described accurately, stated exactly	relevant regulations that apply in the particular case	unsure, uncertain, undecided	enough, adequate	suitable, correct for the particular circumstances
begins	take	keep	inform	are faced
plenty of time, more than enough	portable radio, VHF radio, etc	in agreement with, in conformity with		

Bridge Checklist Phrases / Idioms; Standard vocabulary in alphabetical order	***Explanation / Translation***
1. Taking into ***account***	1. Consider something along with other factors before reaching a decision
2. Speed reduction in ***ample time***	2. .....
3. ***Applicable*** regulations	3. .....
4. Make port fully ***aware*** of any special berthing requirements the ship has.	4. Let them know, make them realize
5. For the helmsman to become ***accustomed*** to manual steering	5. Familiar with
6. ***As appropriate***	6. .....
7. Traffic conditions are ***causing concern***	7. .....
8. When ***circumstances permit***	8. The conditions connected with a situation or event allow sth to happen
9. Before manoeuvring ***commences***	9. .....
10. ***Communication facilities***	10. .....
11. Have the responsibilities within the bridge team been ***defined***?	11. .....
12. If visibility ***deteriorates***	12. .....
13. ***Deployment*** and use of tugs	13. Bringing into effective action
14. ***Determine*** and plot the ship's position	14. .....
15. ***Execution*** of orders	15. .....
16. Difficulties are ***experienced*** in maintaining course	16. .....
17. ***In accordanc***e with the master's instructions	17. .....

2. International Chamber of Shipping *Bridge Procedures Guide* (2007, 4th ed.).

18. If ***in any doubt***	18. .....
19. Are the pilot embarkation arrangements ***in hand***?	19. .....
20. Are the pilot disembarkation arrangements ***in place***?	20. ready, prepared
21. Readily ***identifiable*** shore objects	21. .....
22. Has the passage plan for the ***intended voyage*** been prepared?	22. .....
23. ***Issue*** instructions on particular matters	23. formally send out or make known
24. ***Maintain*** proper lookout	24. .....
25. If the radio equipment ***malfunctions***	25. .....
26. Has speed been ***moderated***?	26. .....
27. ***Notify*** the master	27. .....
28. ***Obtain*** soundings	28. .....
29. ***Refer the pilot to*** the wheelhouse poster	29. .....
30. In ***sufficient*** time	30. .....

C. *Which checklist do the following instructions/orders/phrases belong to? Draw arrows to match.*

Instruction	*Checklist*
1. Take into account type of seabed.	⇨ Preparation for sea
2. Have safety lines/hand ropes been rigged where necessary?	⇨ Pilotage
3. Test and find ready for use window wiper/clearview screen arrangements.	⇨ Anchor watch
4. Agree on the Language to be used on the bridge.	⇨ Navigation in heavy weather

D. *Useful abbreviations used in Bridge Checklists. Find the missing words.*

VRM: Variable _____ Marker
DOC: Document of _____ (under the ISM Code)
ARPA: Automatic _____ Aid
DSC: Digital _____ _____
GOC: _____ Operator's Certificate (for GMDSS)
IBS: _____ Bridge _____
SOPEP: _____ Oil _____ Plan
UMS: _____ Machinery _____

3. Risk Assessment

A. *Find out about risk assessment and answer the following question.*

• What are the criteria that determine whether a risk is tolerable or not?

Risk Assessment

Risk assessment is an effective means of identifying safety risks and determining the most cost-effective means to reduce them. Risk assessment uses a matrix that has ranges of **consequence** and **likelihood** as the axes.

RISK ESTIMATOR

Likelihood	Consequence: Slightly Harmful	Harmful	Extremely Harmful
Highy Unlikely	Trivial Risk	Tolerable Risk	Moderate Risk
Unlikely	Tolerable Risk	Moderate Risk	Substantial Risk
Likely	Moderate Risk	Substantial Risk	Intolerable Risk

The combination of a consequence and likelihood range gives an estimate of risk, for instance:

RISK SCORE

- ***LOW – Tolerable:*** Monitor and Manage
- ***MEDIUM*:** Monitor and maintain strict control measures As Low As Reasonable Practicable (ALARP)
- ***HIGH:*** Review and introduce additional controls to mitigate to ALARP
- ***EXTREME:*** Intolerable, STOP work and immediately introduce further control measures

Dealing with safety risks includes:

- Avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk
- Accepting or increasing the risk in order to pursue an opportunity
- Removing the risk source
- Changing the likelihood
- Changing the consequences
- Sharing the risk with another party or parties
- Retaining the risk by informed decision

The key to risk management is to identify risks that are intolerable and to mitigate them to a tolerable level.

B. A Guide to Risk Assessment[3]. *Listen and fill in the missing words.*

1. The _____ of hazards is the first and most important step, since everything that follows depends on it.
2. The risks associated with each hazard are evaluated in terms of the _____ of harm and the potential _____.
3. Risk should be reduced to a level that is as low as is reasonably _____ (ALARP).
4. The people chosen to undertake risk assessments should be those most familiar with the area, and who have most experience of the task to be assessed.

3. A Guide to Risk Assessment in Ship Operations, IACS, (June 2012) www.iacs.org.uk.

5. The process must be systematic, and in order to make it so, it may help to categorize areas and activities as in the following example.

Activity:	Tank cleaning
_____:	Toxic atmosphere or lack of oxygen
Risk (before controls):	_____ (likely and extremely harmful)
Recommended Controls:	Atmospheric testing, _____, use or availability of breathing apparatus

6. The best safeguard against accidents is a genuine safety culture, i.e. safety _____ and constant _____ on the part of all those involved.

4. Maintenance work: selection of materials and tools

A. *Fill in the missing words.*

rollers	imperfections	anti-foul	finishing	chipping hammers	preparation

Routine maintenance includes:

1. identification of any deterioration of deck areas, machinery and fittings
2. cleaning of areas of the vessel
3. repairs of minor faults and _____ in painted surfaces
4. identification of faulty equipment or fittings and arranging for repair or replacement
5. restoration of weathered surfaces
6. _____ of marine surfaces prior to the application of the prescribed marine coating
7. selection and application of appropriate marine paints for particular surfaces

The paint system applied to protect the cargo tanks will have to do a different job from the one which is protecting the deck areas or the underside of the ship's hull.

8. A vinyl-based primer can be applied on most situations on board ship.
9. A(n) _____ paint is only to be used for underwater hull protection.
10. A(n) _____ paint adds decorative quality to the protective coating on the exterior surfaces.

Maintenance tools and equipment may include:

11. hand tools, including _____ and scrapers
12. electric power tools/pneumatic power tools, such as grinders, sanders and drills
13. paint application equipment such as brushes, spray guns, _____
14. rinsing and storing equipment

B. *You will read some maintenance jobs from the ship's Planned Maintenance System (PMS). Four of them are shown in the following pictures. Which ones? Write the correct number in the boxes.*

Monthly maintenance carried out:

1. Gangway control box derusted and painted
2. Falling grease cleaned off crane masts
3. All roller fairleads overhauled
4. No 4 hold tank top derusted and painted
5. All grabs derusted, painted and restenciled
6. Fore and aft mooring bitts derusted and touched up

Before **After**

C. *Read the following text on maintenance on board and do exercises (i) and (ii) below.*

The surface to be painted must be thoroughly cleaned and prepared first. Applying paint to rusty, oily, greasy, dirty or flaky areas is a complete waste of paint and effort.

CLEANING

- First remove loose paint and hard particles from the areas to be painted. Scraping must be done at this stage to make sure there is no loose paint and then the edges must be smoothed down to reduce surface roughness.
- Then, attack the next enemy: grease and oil. Suitable detergents must be used to thoroughly scrub the surface where grease remains. Another wash with fresh water follows.
- The often unseen enemy is attacked next, salt deposits; fresh water in the required quantities must be used to remove salt deposits because any salt deposit remaining will cause the new paint to detach from the surface soon after drying.

SURFACE PREPARATION

- The biggest enemy of all is rust; unless it is removed, rust produces more rust under the paint and the steel will not be protected.
- Flat surfaces are best prepared by a disk sander or by a mechanical wire brush. Take care when using a mechanical wire brush as it may polish the steel surface preventing good paint adhesion; use light strokes to get rid of all the rust.
- Smaller surfaces are best prepared by a wire brush or needle gun. When a needle gun is used, this should be held firmly and the rust attacked gradually. Heavy use of the needle gun may produce spikes on the surface of the steel which will protrude from the surface of the paint and start rusting immediately breaking off the newly painted area.

PAINT APPLICATION

- Choose the application tools carefully. The first two coats of primer must be applied by brushes or airless spray guns to achieve good penetration and the required wet coat thickness.
- Smaller areas, awkward inaccessible spots and edges should always be done by brushes. This is a slow process but an essential one so that the recommended coat thickness is achieved. The use of brushes ensures that the paint is worked well into the surface and all corners.
- The best method of applying primers is spraying with airless spray guns. The recommended pressure and size of the nozzle should be checked before spraying. Spraying should be done evenly at an angle of 90° and from a distance of 30-60 cm from the surface.
- Once the primary coats are dry the finishing coats can be applied. Once again, for speed and evenness of coat thickness, the recommended method of application is the spray gun. But for sharp edges, corners and wedges brushing is the best method.
- In some cases the application of a finishing coat can be done using paint rollers. The disadvantage of using rollers is that they only produce a very thin and uneven layer requiring the application of several coats which is of course time consuming. Using the roller to apply primary coats should not be considered for this reason.

i. Write the correct tool that is recommended in the text.

Tool	Stage	Area
1.	Paint application (primers and finishing coat)	Smaller areas, awkward inaccessible spots, sharp edges and corners
2.	Paint application (primers)	"Open", unhindered areas
3. Spray gun (and rollers)	Paint application (finishing coat)	"Open", unhindered areas
4.	Surface preparation	Flat surfaces
5.	Surface preparation	Flat surfaces
6.	Surface preparation	Smaller surfaces
7.	Surface preparation	Smaller surfaces

ii. Give the reasons for each piece of good practice. Match.

Good practice	Why?
1. When entering the paint store make sure it is well ventilated	a. Delays create more expensive problems in the long run.
2. The paints must be mixed thoroughly by a mechanical mixer.	b. You end up having to apply more coats to achieve the same paint thickness.
3. Do not add thinners to primers before application.	c. This will make sure the solvents and the pigment are evenly mixed.
4. Do not use paint rollers for the application of a finishing coat or a primer coat.	d. These tools produce a thin and uneven layer, so you need to apply several coats.
5. Paint application should be done on a warm sunny day.	e. If any remain they will cause the new paint to detach from the surface soon after drying.
6. An early detection of developing problems will help in the war against corrosion.	f. Paint and solvents create flammable and toxic vapours.
7. Use fresh water to clean salt deposits.	g. You must avoid moisture, which will cause the coating to detach later.
8. Use brushes for edges and hard-to-reach areas.	h. The paint is worked well into the surface and all corners.
9. Use airless spray guns for paint application.	i. The coat is even and it can be achieved quickly.

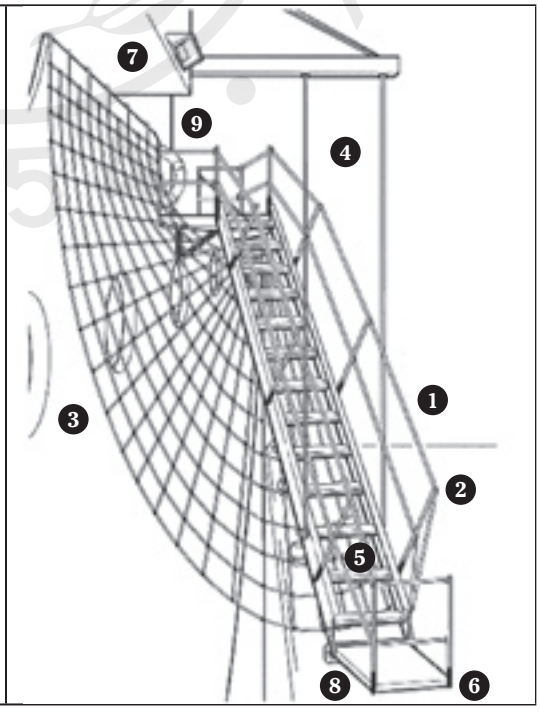
5. Safe Working Practice and Accident Prevention

A. ***Use the poster below to give warnings/advice on how to enter an enclosed space.***

B. ***Look at the safe rigging of the accommodation ladder. Write the correct number for each sentence.***

The following items must be confirmed to ensure safe access to the ship:

- [2] Stanchions free of distortion and in place
- [ ] Lifebuoy with light/line available
- [ ] Safety net positioned between ladder and ship
- [ ] Steps free of oil, grease and ice
- [6] Bottom platform level
- [ ] Lighting arrangements positioned effectively
- [ ] Rope guardrails tight
- [8] Base clear of obstructions
- [4] Hoisting arrangements clear of head height



C. ***Use the picture above and make a presentation on how to rig the accommodation ladder safely so as to prevent occupational accidents.***

Useful vocabulary: maintenance

D. ***Look at the following poster and...***

- explain the maintenance requirements of the deck cranes
- give some warnings and some advice on safe working practice

to describe the CONDITION of machinery / materials	VERBS for maintenance activities
There is (heavy) **damage / wastage / deterioration / cracking / corrosion / wear / metal fatigue**. There are **holes / structural problems / missing components**.	**replace / renew / repair / derust / touch up**

E. ***Use the following poster and explain the maintenance requirements of the anchor windlass.***

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to...

- ☐ discuss aspects of safety and risk in the workplace
- ☐ discuss safety management procedures
- ☐ explain maintenance requirements for deck machinery and give reasons for the use of appropriate tools
- ☐ deliver a presentation on accident prevention on board ship
- ☐ give warnings and advice concerning safe working practice on board

B. Class Project. Find out more and present to class.

- Safety management and the role of the Safety Officer in promoting safety awareness.
- What are the audits that a ship has to undergo? At what intervals must they be carried out?

C. Fill in the gaps with the words in the box.

touching up	solvents	nutshell	stenciled
cost-effective	implementation	practice	objective
sufficient	deficiencies	thoroughly	root

1. The main _____ of this meeting is to give more information on our plans.
2. Is $ 200 _____ for your expenses?
3. To put it in a _____, we're bankrupt.
4. These paints are handy for _____ small areas on deck.
5. A "flammable" warning notice is _____ on the door of the paint store.
6. Before you start with paintwork, you must _____ clean the surfaces, remove all the dirt, oil and grease, and scrape off and remove all the rust and loose paint.
7. _____ and thinners should be used for cleaning the brushes and spray guns after use.
8. Correct labelling of the paint stores is part of good _____.
9. One of the goals of risk assessment is to determine the most _____ means of reducing risks.
10. An auditor performing a safety audit tries to identify any _____ and non-conformities and communicate them to the management.
11. The DPA verifies the _____ of preventive actions required according to the SMS.
12. Near-misses must be analyzed, trying to determine the _____ causes of each incident.

D. Fill in the gaps with the correct derivative of the words in brackets.

1. When the risk of an activity is assessed as being _____ [tolerate], the activity should be stopped at once.
2. Before paint _____ [apply], check the atmospheric conditions because large areas of the coating will detach if moisture was present during painting.
3. The anchor windlass is in good condition, without damage or missing components. After visual inspection it seems to be in good order, without _____ [corrode].
4. Surface _____ [rough] is needed if we want the paint coating to have good "anchoring" (adhesion).
5. To reduce a safety risk, you should try to change the _____ [likely] of risk occurrence.

E. Write the term.

1. _____: an accident that almost happened.
2. _____: evaluation performed by an auditor.

3. _____: person who provides a link between the company and the ship.
4. _____: system followed by a company to document that it meets the requirements of the ISM Code.
5. _____: the identification of hazards, their potential consequences and the likelihood of harm related to each hazard.

F. Match to make collocations (found in this unit).

1. missing _____
2. metal _____
3. good _____
4. paint _____
5. disk _____
6. early _____
7. surface _____
8. planned _____

maintenance system
component
practice
fatigue
sander
application
detection
preparation

UNIT 4

Safe Navigation

1. *Safety Communications*
2. *Commands for safe navigation during heavy weather conditions*
3. *What is the latest ice information?*
4. *Survival at sea*

Round-up

1. Safety Communications

I. Meteorological information

a) Look at the ship's weather forecasts in the Astral case study.

> The Met Office sea area forecast for the 24 hours from 0500 UTC Sunday 9 March 2008 for sea area Wight predicted:
>
> *Westerly 5 to 7 backing southerly 7, occasionally Gale 8, perhaps severe Gale 9 Later. Moderate or rough increasing very rough or high.*
> *Showers then rain. Good becoming moderate or poor.*
>
> The Navtex weather forecast received on the bridge of *Astral* at 1800 on 9 March predicted *south west winds 8-9 later* for the Wight area.

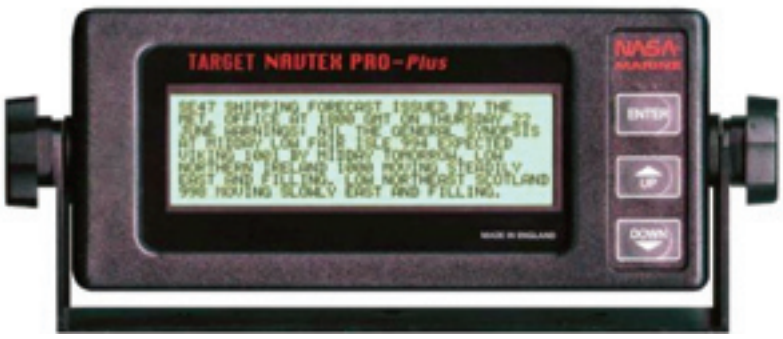
What does each piece of information given in the weather forecast refer to? Underline in the text then note down below the following:

wind direction ➡ sea state ➡
wind force ➡ weather conditions ➡
visibility ➡

b) Vocabulary review on safety communications and meteorological conditions (SMCP A1/3.1). Circle the correct alternative of the words/phrases in blue.

1. Gale warning *in effect/in execution/in operation.*
2. A wind with a force 6 on the Beaufort scale is described as strong *breeze/storm/air.*
3. The meteorological chart depicts a hot *forepart/forehead/front* in the Mediterranean.
4. What wind is *expected/awaited/anticipated* in position ….?
5. Ice warning. Iceberg *spotted/reported/noticed* in area around lightship P9.
6. What is sea state in your position? *Violent/rogue/rough* sea – *heavy/big/strong* swell in my position.
7. Area around Eurobuoy No1 temporarily *closed/shut/sealed* to navigation.
8. Message received on NAVTEX:

> SHIPPING FORECAST *ANNOUNCED/ISSUED/PUBLISHED* BY THE MET OFFICE AT 1800 ON 22 JUNE. WARNINGS: *NULL/NOTHING/NIL.*
> THE GENERAL *SUMMARY/SYNOPSIS/STATUS* AT MIDDAY: …



II. Navigational Warnings

a) Look at an original navigational warning[1]. Note its layout and try to understand the message. Explain the circled keywords by answering the questions.

NAVIGATION WARNING / Number: 0888/14	
Type:	NAVAREA I
Date:	0717 UTC Apr 14, 2014
Warning:	NORTH SEA, Norwegian Sector. Chart BA 274. 1. Seismic survey in progress by M/V Atlantic Explorer towing 6 x 6700 metre long cables within area bounded by: 58-00N 001-56E, 58-13N 002-39E, 58-05N 002-40E and 57-54N 002-02E. 5 mile berth requested. Working VHF Ch77. Guard vessels in attendance. 2. Cancel Navarea I 048/14

1. What is a **NAVAREA**?
2. What is "**in progress**"? What type of operation is in progress here?
3. What is "**bounded by**"? What is/lies within these boundaries?
4. What is "**berth requested**"? Who requests it? How big is it?
5. What is to be "**in attendance**"? Who is actually in attendance in the particular case?
6. What does "**cancel**" refer to?

b) Navigational warnings (SMCP A1/3.2). The following messages are navigational warnings involving various dangers. What is each message about? Match.

Message	*It involves....*
1. Light-buoy C3 in position... unlit.	☐ *[sea bottom characteristics]*
2. Buoy B2 temporarily discontinued.	☐ *[defect in seamark]*
3. Buoy B1 established in position ...	☐ *[offshore installations]*
4. Derelict vessel adrift in vicinity of position...	☐ *[alteration in seamark]*
5. GPS satellite unusable Mon 18 August from 0200 to 0700. Cancel one hour after time of restoration.	☐ *[drifting object]*
6. Uncharted shoal reported in position...	☐ *[new seamark]*
7. Platform 71 removed from position...	☐ *[electronic navigational aid]*

1. From UK Hydrographic Office.

c) In what situations will you receive a navigational warning? Fill in the missing words.

derelict	laying	mine	survey	ordnance

1. _____ clearing operation
2. _____ platform being removed
3. _____ vessel towing seismic cable
4. _____ exercises
5. Cable _____ operation
6. Pipeline operation

d) Fill in the safety communications / instructions.

wake	waste	co-operate	booms
fouled	recover	dispersants	off
leeward	dumping	lock	polluter

1. Stop _____ chemicals.
2. _____ with oil-clearance team.
3. _____ your fishing gear. Fishing gear has _____ my propeller.
4. Located oil spill in your _____. Can you stop spillage? What kind of assistance is required?
   I require floating _____ and oil _____.
5. Located a vessel incinerating _____ in position... I can identify the _____ – it is MV Charisma.
6. _____ 5 is defective; it cannot be used for entering the canal.
7. LPG tanker Krone leaking gas in position... Avoid passing to _____.
8. Buoy 6 _____ station.

2. Commands for safe navigation during heavy weather conditions

I. Bridge Checklists / Heavy Weather Plans

a) Read carefully the IMO report below.

i. Try to guess the missing adverbs and write them up (some letters are given).
ii. Answer the following question:

What are the correct safety measures that should be taken to prevent such types of accidents?

Try to pinpoint the appropriate preventive measures/actions

- in terms of good seamanship – ship handling
- in terms of use of safety equipment – PPE

FATALITY AND INJURY[2]

Very serious casualty: fatality and injury caused by excessive rolling of a large container ship during a typhoon.

What happened?

The about 95,000 gt, p _ _ t _ _ _ _ y loaded, container ship rolled s _ v _ _ _ _ y at sea during a typhoon. As a result, several crew members on the ship's bridge lost their footing, including the Master, the helmsman and the lookout. The helmsman managed to regain his footing, but the Master and lookout were thrown v _ _ _ _ n _ _ y across the wheelhouse. The lookout s _ b _ _ q _ _ _ _ _ y died and the Master suffered serious injuries, necessitating in his medical evacuation. Four more seamen suffered minor injuries.

Why did it happen?

The vessel had to leave port r _ _ _ d _ y due to an approaching typhoon. C _ _ s _ _ _ _ _ _ _ _ y, it had not finished loading and had an exceptionally high GM (7.72 m). After departing the confines of the port, the ship encountered a violent wave from starboard just as it rolled to starboard. Due to the proximity of land, the Master was unable to take a heading which would have lessened the rolling effect of the swell. The vessel's design, coupled with its low speed at the time of the incident, resulted in poor *roll damping**. As a result, the ship rolled an estimated 44° over about 10 seconds. The size of the ship and the subsequent height of the wheelhouse contributed to the violent motions experienced in the wheelhouse. Furthermore, the wheelhouse was very large and there were few grab-rails or handholds for the crew to hang on to in the event of violent weather.

What can we learn?

The dangers of operating a vessel with a high GM ("Stiff Ship"), e _ _ _ c _ _ _ _ y in heavy weather conditions with limited sea room in which to navigate.

Decreasing the vessel's speed below a critical value may lead to dangerous deterioration of the dynamic roll damping characteristics of the vessel.

A risk assessment of working spaces and working areas, should take adverse weather conditions into account. Grab rails, lifelines and seat harnesses may need to be considered.

Consider the use of hard hats and non-slip footwear, even in work areas such as wheelhouses which may be considered "safe" – especially in severe weather conditions.

Be aware of the hazards in heavy swell p _ r _ _ _ _ _ _ _ _ y in spaces located high in the vessels' structure, such as bridges on large container ships.

** "Roll damping" is to reduce the amplitude of rolling motion. Roll damping systems, such as passive anti-roll tanks, reduce excessive motions during the operations of ships at sea.*

b) Look at the heavy weather checklist. Would the accident have been prevented if the checklist had been followed? Which points are the most appropriate?

- ☐ Navigation in heavy weather or in tropical storm areas
- ☐ Have the master, engine room and crew been informed of the conditions?
- ☐ Have all movable objects been secured above and below decks, particularly in the engine room, galley and in storerooms?

2. IMO MSC Report FSI 19/19, Annex I: Lessons Learned for Presentation to Seafarers, March 2011, p. 1.

☐ Has the ship's accommodation been secured and all ports and deadlights closed?
☐ Have all weather deck openings been secured?
☐ Have speed and course been adjusted as necessary?
☐ Has the crew been warned to avoid upper deck areas made dangerous by the weather?
☐ Have safety lines/hand ropes been rigged where necessary?
☐ Have instructions been issued on the following matters?
☐ Monitoring weather reports
☐ Transmitting weather reports to the appropriate authorities or, in the case of tropical storms, danger messages in accordance with SOLAS

c) Give commands to the crew using the checklist above. Use the following verbs: secure, rig, close, avoid.

E.g. Secure movable objects in the galley.

The following exercises are based on the ***Contingency Manual: Emergency Situation Plans*** of a container vessel. The ***Heavy Weather Plan*** checklists describe the actions of each officer.

d) Match the appropriate verb for each phrase.

The actions of the OOW:

1. Inform	☐ steering control to manual
2. Put	☐ radar (if not used)
3. Switch on	☐ the ship's position
4. Raise	☐ the general alarm
5. Determine/Plot	☐ the master

e) The Master is liable for the following actions. Read the actions and do the exercise below.

Actions	***Liable***
Assesses immediate possible dangers: • ***Capsizing due to excess listing*** – Alerts crew and have them mustered - Carefully reduces the list using the Heeling tanks at the beginning, followed by ballast tanks if necessary • ***Flooding of vessel due to shell damage:*** Starts ballasting the opposite side tanks in order to bring the hole higher than water lever – Orders crew to close all watertight doors/openings	Master
Adjusts sailing conditions (course-speed) to reduce wind and sea effects on the ship and on the deck where the crew are going to work and/or to re-secure the cargo	Master
Orders crew to re-secure shifted/remained cargo as far as possible	Master
Obtains weather report/forecast regularly	Master

If situation becomes critical: • Informs other ships in the area to be on stand-by – MRCC – Coastal authorities and Company giving necessary details/prospects **• Briefs the crew about the situation** • Tries to make it into the nearest port Exercises his Overriding Authority to request and or accept any kind of assistance deemed absolutely necessary to save his ship and crew	Master
If situation becomes manageable: • Determines vessel's seaworthiness / ability to proceed his voyage as scheduled • Informs standing-by ships and releases them • Informs company – MRCC for the situation and his intentions **• Issues Navigational warning if cargo adrift and dangerous to navigation**	Master
Arranges (through Company) Class survey if necessary at the first port of call.	Master
Collects all information evidence and data required to reconstruct sequence of events. For details consult "The Master's Role in Collecting Evidence"	Master

You are the Master. Imagine ***you have lost 5 containers at sea due to heavy weather.*** There are some ***lashings to be re-secured on deck.*** Look at the actions in red bold letters in the Heavy Weather Plan and ...

- give the command to the crew orally
- make an announcement to the crew
- give a navigational warning in writing

f) Imagine you are the Chief Engineer. Look at the list below and fill in what you must say to perform actions 1-4.

	Engine room team actions	***Liable***
1	Performs roll call of team members – Briefs team about situation	Ch.Engineer
2	Establishes communication with the bridge advising readiness and all present	Ch.Engineer
3	Activates diesel generators	2nd Engineer/ Electrician
4	Prepares bilge and ballast pumping system	2nd Engineer
5	Checks visually for leakage in the Engine room	Ch.Engineer
6	If no immediate danger exists, undertakes necessary repairs in co-operation with Ch.Officer	Ch.Engineer

1. Attention engine room team, I have an important _____. We have lost 5 containers at sea _____ to heavy weather. The bridge team is now assessing the _____.
2. This is a roll call, I will now call out your names. When you hear your name, answer loudly "_____".

3. Bridge, this is the engine room, I have performed roll call, all _____ and standing _____.
4. Second Engineer, _____ diesel generators and report.
5. Second Engineer, _____ bilge and ballast pumping system and _____.

g) There is capsizing due to excess listing. *You are the Master, do the following.*

- Alert crew and have them muster. Attention all crew..... Go to.....
- Ask for the latest weather report. What.....
- Order the 2nd Officer to keep record in scrap log book of all facts, actions, orders.
- Order the 2nd Officer to prepare a distress message and be ready to transmit it.

h) Match the appropriate verb for each phrase.

1. Arrange	☐ all data/evidence
2. Inform	☐ photographs of the damage
3. Issue	☐ class survey
4. Collect	☐ MRCC of intentions
5. Take	☐ navigational warning

i) Fill in the missing words.

implements	cuts	tightens	fastens	lays	slack

Actions of the CHIEF OFFICER	
1	Checks if required equipment is on the spot and ready to be used.
2	Checks ship in entity for damages, re-secures _____ equipment, moving very carefully around decks. Informs Master on situation.
3	On Master's order leads his team to re-secure shifted cargo: _____ man-ropes where possible to reach deck area safely. _____ team members together when on deck. Proceeds to area and cargo with utmost care considering crew's safety first. _____ off loose, hanging parts of cargo / previous lashing. Puts new or _____ existing lashing.
4	Sounds all tanks, bilges and cofferdams informing the bridge and keeping records. Notes changes of water levels alerting the bridge for changes.
5	_____ Abandon Ship, Fire and SOPEP Plans if ordered.

II. Accident prevention for working on deck in heavy weather

a) Looking back at the heavy weather plan checklists, which actions are related to working on deck in heavy weather? Imagine you ask the crew to relash containers, what else must be done? Tick ☑ the appropriate actions.

☐ Adjust sailing conditions to reduce wind and sea effects on the deck of the intended work.

☐ Close watertight bulkhead doors.
☐ Keep records of changes in soundings.
☐ Lay manropes.
☐ Fasten team members together.
☐ Establish communication with bridge.
☐ Inform stand-by vessels of intentions.
☐ Check crew are dressed well and wear lifejackets.

b) Listen to recommendations on "Working on deck in heavy weather"[3].

i. Decide whether the following statements are true or false.

☐ Rogue waves can have a different direction from the wave pattern experienced at the particular moment.
☐ The necessity of the work is one of the factors the risk assessment should take under consideration.
☐ In the first case study, there were no lifelines rigged.
☐ In the first case study, risk assessment had taken into account that waves could break on the poop deck as the weather deteriorated.
☐ In the second case study, although no one was washed overboard, one person lost his life due to severe injuries caused by the breaking wave on deck.

ii. Listen again and note down five important recommendations to avoid the risks of an accident when working on deck in heavy weather.

1. ..... work authorized by master.....
.....
2. .....
.....
3. .....
.....
4. .....
.....
5. .....
.....

c) Deliver a presentation on accident prevention during heavy weather work. Based on this unit's material from checklists and recommendations, keep some notes and give a presentation in class.

3. Working on deck in heavy weather, Risk Alert, Steamship Mutual Loss Prevention Bulletin 704, December 2013.

3. What is the latest ice information?

I. Ice-breaking operations

Lead-in: The following statement comes from a News Report.

"Thick ice affects the shipping industry every year."

- How does ice affect the shipping industry?
- What are the routes mostly affected by ice?
- What operations are available to help vessels in this respect?

a) Listen to the News Report entitled "US Coast Guard Ice-Breaker Deploys to Help Shipping Industry" (15 Jan 2014). Answer the following questions.

- The Ice-breaker (Mackinaw) deploys in a particular area. Which area is that?
- What is special/unusual about the way Mackinaw breaks the ice? How do most ice-breakers break the ice?

b) Listen to the News Report entitled "Ships Trapped in Frozen Azov Sea" (15 Feb 2012) and answer the following questions.

1. How thick is the ice on the surface of the sea?
   a. half a metre b. 12 to 17 cm
2. Ice-breaker ships have been deployed but they...
   a. got trapped too b. are making slow progress
3. How many ships are stranded at sea?
   a. dozens b. hundreds

Ship Trapped in frozen Azov Sea

The Sea of Azov in Black Sea

c) Fill in the words for the following SMCP communication regarding ice-breaker operations, towing / assistance for convoy.

draw by	fast go ahead	present keep	along resumed	receiving conditions	reverse reduce	letting suspended

1. I am _____ in ice in position X. I require ice-breaker assistance.
2. Ice-breaker assistance is _____ until favourable weather conditions.

3. Ice-breaker assistance will be _____ at 0800 hours UTC.
4. Ice-breaker assistance for convoy will start now. Your place in convoy is number 3. MV Melisandre will follow you. You will follow MV Bravos. _____ and follow me.
5. Proceed _____ the ice channel.
6. _____ your engines.
7. _____ a distance of 3 cables between the vessels.
8. _____ the distance between the vessels to 1 cable.
9. Stand by for _____ towing line.
10. Stand by for _____ go towing line.
11. Stop in _____ position.
12. Ice-breaker assistance for convoy finished. Light ice _____ ahead. Proceed _____ yourself.
13. We are offering ice-breaker assistance in close-coupled towing: I am starting to _____ your bow into the stern notch of the ice-breaker.

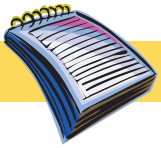
II. Ice navigation and ice damage

a) Study the text and identify the type of ice shown in the pictures below.

Types of sea ice[4]

Sea ice is divided into two main types according to its mobility. One type is **drift ice**, which is reasonably free to move under the action of wind and current; the other is **fast ice**, which does not move.

1. Floating ice in which the ice concentration is 4/10-6/10, with many leads and where the floes are generally not in contact with one another, is called **open ice**.
2. Floating ice in which the concentration is 7/10 to 8/10, composed of floes mostly in contact, is called **close ice**.
3. Any fracture or passage-way through which sea ice is navigable by surface vessels is called **lead**.
4. **Pancake ice** comprises of predominantly circular pieces of ice from 30cm to 3m in diameter, and up to about 10 cm in thickness, with raised rims due to the pieces striking against one another.
5. **Bergy bits** are pieces of floating glacier ice generally showing 1-5 m above sea level (a bergy bit is a large piece of ice that breaks off from an iceberg).



Glossary

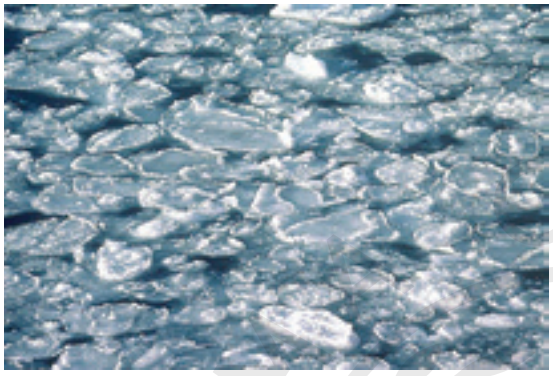
concentration — the ratio in tenths describing the amount of the sea surface covered by ice
floe — any relatively flat piece of sea ice 20m or more across
rim — the edge of something in the shape of a circle (also, wheel rim)

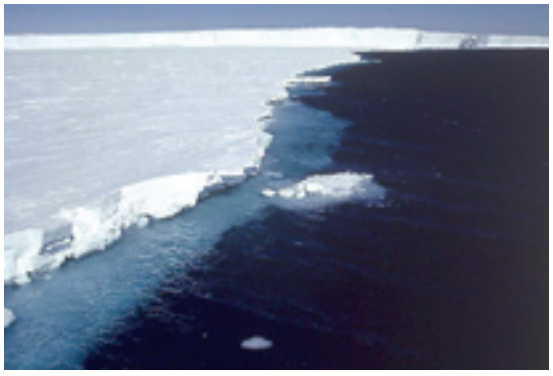
4. Text and pictures from The Mariner's Handbook 100, Chapter 6 "Ice", pp. 123-148.

glacier — a mass of snow and ice continuously moving from higher to lower ground or, if afloat, continuously spreading

Use the following titles for the pictures below: (write the correct letter in each box)

a) Lead b) Open ice c) Pancake ice	d) Bergy bit with very open ice e) Close ice f) Fast ice (with ice shelf cliffs in the background)



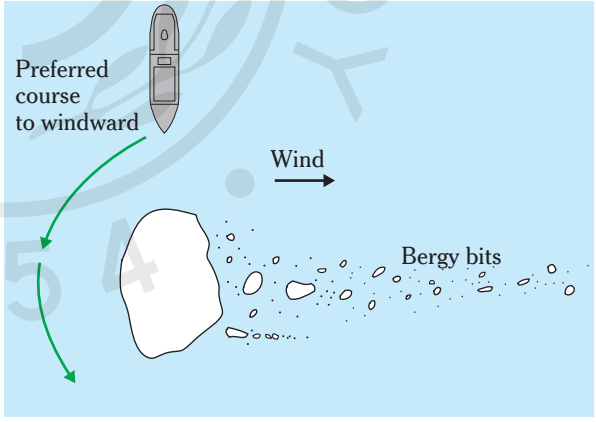


b) The following notes provide advice for ice navigation[5]. Read them and give an appropriate ship handling instruction for each of these points.

Speed / Stopping the propeller / Going astern / Ballasting
e.g. *speed*: Maintain a slow speed.

The following notes on ship handling in ice have proven helpful:

- Excessive speed is the major cause of damage to ships by ice. Do not underestimate the hardness of ice and its potential of inflicting damage. The main reasons of damage are hits by ice floes. Do not allow the speed to increase to dangerous levels when in leads or when navigating in close ice conditions.
- The first principle of successful ice navigation is to avoid stopping or becoming stuck in the ice. Experience has shown that non-ice-strengthened ships with an open water speed of about 12 knots can become hopelessly **beset** in heavy concentrations of relatively light ice conditions, whereas ice-strengthened ships with adequate power should be able to make progress through ice of 6/10 to 7/10 concentrations. In concentrations of 6/10 or less, most vessels should be able to steer at slow speed around the floes in open drift ice without coming into contact with very many of them. To free a beset vessel it is necessary to loosen the grip of ice on the hull; go ahead and astern at full power while alternating the helm from port to starboard, which has the effect of levering the ice aside. Care must be taken when going astern to ensure that no ice goes through the propeller(s).
- Keep the propeller turning slowly as it is less susceptible to ice damage than if it were completely stopped; blocks of ice will also be prevented from jamming between the blades and the hull. Propellers and rudders are the most vulnerable parts of the ship; ships should go astern in ice with extreme care, and always with the rudder amidships.
- **Ramming** is particularly effective when attempting progress through ice that is otherwise too thick to break continuously. Ramming should not be undertaken by vessels that are not ice-strengthened and by vessels with bulbous bows.
- All forms of glacier ice (icebergs, bergy bits) should be given a wide berth. It is advisable to move windward of icebergs to avoid bergy bits. The closer the ship passes from an iceberg the more likely the encounter with bergy bits.
- Light and partly loaded ships should be ballasted as deeply as possible, but excessive trim by the stern is not recommended, as it cuts down manoeuvrability and increases the possibility of ice damage to the more vulnerable lower area of the exposed bow.



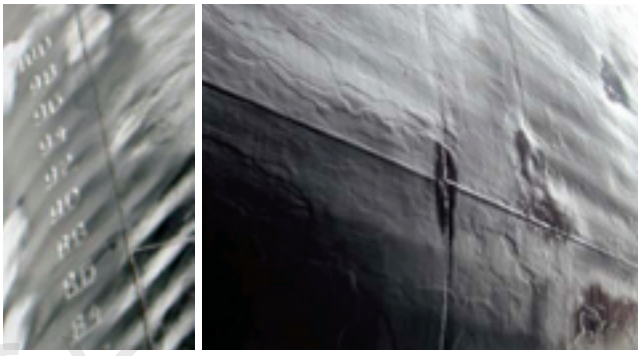
c) How can you describe damage caused by ice? The following notes describe damage caused to ships by ice[6]. Fill in the glossary with the words in bold highlighted in both texts above and below.

Ice damage caused by ship-ice interaction is not only *structural damage* (hull, plating, frame damage), but also *propeller or rudder damage*.
Damage consists of small **dents** on the plating, **fractures** (especially if there were initial de-

5. From Canadian Coast Guard "Navigation in Ice-covered Waters".
6. From Finnish Maritime Administration "Incidents and Accidents in Winter Navigation in the Baltic Sea".

formations and corrosion of the plating due to bad maintenance), **cracks,** bilge keel **ruptures** (even resulting in leakage), distortion of the shape of the bulbous bow (which is a sensitive area), permanent **deflection** of the plating (damaging plating thickness).

Bilge keel rupture



Dents in the bow area

Damage can be caused for the following reasons:

- High speed in ice. If the ship strikes an ice edge with full speed, damage may occur in the bow area.
- Damage during ice-breaker assistance. A collision with an ice-breaker may occur in short lead assistance, when the ice-breaker gets stuck in ice.
- Backing in ice. In heavy ice conditions ships often get stuck in ice. Then the ship has to back. Backing in ice may damage aft ship areas, especially the rudder and the propeller.

And the damage found is:

- Dents on the plating, frames. These are often cumulative.
- Fractures. Cracks and ruptures occur most often on the plating. The reason of ruptures is often that plating has worn out, due to bad repair in drydock. Cracks are usually observed in a junction of plate and frame below water line level.
- Wear in the ship's painting due to ice abrasion. This can be clearly seen at the water line level, but also in the bilge and the bottom areas.
- Bilge keel damage and ruptures.
- Propeller, rudder and thruster damage. The most common reason is backing in ice or manoeuvring in port. Propeller damage is either blade damage or damage in the control system of CPPs (Controllable Pitch Propellers).

Glossary

..... a slight hollow in a hard even surface made by pressure or a blow
..... a line on the surface of something where it has broken but not split into separate parts
..... a break in a hard material
..... ship unable to move in any direction because of ice surrounding it
..... under a load (not to the point of breaking, only "bending")
..... attempting to break ice by repeatedly sailing the ship as far forward as possible, backing the ship out and repeating the process
..... an instance of breaking or bursting suddenly and completely

distortion vs **deformation** (*in mechanics*)
↙ ↘
(material changes shape) (material changes shape, size and/or orientation)

d) Look at the picture. Your vessel has been damaged by ice. Which part is damaged? How extensive is the damage? What type of repair is needed? Write a short report on the ice damage to send to the office.

Damage consists of...
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

4. Survival at Sea

I. First aid treatment for emergencies related to cold

a) Read the text to find out about the proper first aid for cold victims. Then, give some first aid advice on...

- how to treat a frostbite
- how to treat a victim who has been in cold water and is unconscious
- how to treat a victim whose feet are red, sore, swollen, with wounds from cold

Exposure to cold: Effects on the Body[7]
General information

In severe low temperatures, action must be taken to protect the body and its ***extremities***. It is most important that minor injuries be treated immediately to avoid complications. Minor cuts and ***skin abrasions*** provide a ready entry for frostbite.

Skin contact with metal objects should be avoided. Contact with steel at temperatures of –7°C and lower will cause instant blistering.

Feet should be protected from blisters, frostbite and "immersion foot" – a condition of painful swelling with inflammation and open lesions caused by prolonged exposure to low temperatures and moisture. Immersion foot may be avoided by keeping the feet warm and dry, which is also the

7. From *The Mariner's Handbook*, NP 100, 7th edition, 1999, pp. 158-160.

only treatment possible for it. When treating the feet, do not rapidly re-warm them, and take care to avoid damaging the skin or breaking ***blisters***; the feet should not be massaged.

Frostbite

Low temperatures cause freezing of the fluid in the tissues and this results in frostbite. Its initial stages are painless and may only be detected by a companion noticing the typical white patch on the skin or by the person affected feeling a hard spot on his face; the usual parts of the face affected are the nose, cheek bones, chin or ears. Such patches, can easily be cured by warming them with the hand until the frozen fluid is melted, but it should be realized that it will only be a matter of time before the trouble will ***recur*** unless precautions such as using a hood or wind shield for the face are taken. Care should be taken not to let the hands get wet with petrol or oil.

The feet are also liable to frostbite and this is more serious as they cannot be seen and the person affected will only be warned after a while by the lack of feeling; immediate action should be taken to ***restore*** the circulation. A frostbitten part should never be massaged or rubbed with snow.

Immersion

Without an immersion suit, even short periods of immersion in extremely cold water can be fatal. Arrangements for abandoning ship should make provisions therefore for entry into lifeboats or liferafts by scrambling nets or other means without entering the water.

The clothing worn, morale, physical fitness, injury or loss of body heat at the time of immersion may cause wide variations in the times of survival from unconsciousness or from death. Approximate likely times of survival of those immersed in light clothing are as follows:

Water Temp (°C)	*Survival Time*
0°	20 minutes to 1 hour
5°	30 minutes to 2 hours
10°	1 hour to 4 hours

Rescuers of victims of drowning in cold water must ***persist*** with resuscitation attempts for even longer than after warm water drowning. One or two hours is recommended. Signs of life are harder to detect because cold slows all the body's functions, and a cold victim has more chance of surviving a long period before the heart is restarted. It is not uncommon for survivors, apparently unharmed when rescued from the sea at low or even moderate temperatures, to die subsequently from heart failure attributed to hypothermia.

b) Fill in the glossary with the words in bold in the text.

Glossary

..... a damaged area of the skin where it has been rubbed against something hard and rough

..... the parts of your body that are furthest from the centre, especially your hands and feet

..... swelling on the surface of the skin that is filled with liquid and is caused, for example, by rubbing or burning

..... to continue to do something despite difficulties or opposition (in a way that can seem unreasonable)

..... bring back a condition, situation, feeling etc. that existed before

..... happen again, or a number of times

c) Use the words from the glossary above to fill in the blanks.

1. The Master tried to _____ order by making a further announcement to reassure the passengers that everything was under control.
2. The coastguards' decision to _____ with the rescue operation even when chances of retrieving the casualties seemed low, gave their families hope.
3. Cold _____ and a hot head are the first signs of the fever.
4. He suffered cuts and skin _____ to the face.
5. The safety boots have given me _____ on my toes
6. Alcohol abuse among members of the crew is a problem that can _____ several times, despite strict company policy on the matter.

II. Incident Report Writing

a) Read the report written by the Master on the following incident[8]. While you are reading, underline all the verbs which help you note the sequence of events (the first ones have been underlined for you). What tenses are used to report an incident and describe a sequence of events in the past?

Castaway recovery by M/T *Maria*

On 22 December 2012 at 16:36LT, ***as vessel was proceeding*** to her destination Galveston Lightering Area ***we received*** a message on Inm-C station, from MRCC Cape Town, requesting to verify our position and to proceed for assistance of yacht "YUMAPI" in distress. At 17:25LT ***we contacted*** MRCC Cape Town and confirmed our own position together with last known yacht in distress position. We received info from MRCC Cape Town that the yacht had to be abandoned and the crew were on a life raft. At 17:03LT in position Lat: 29 06.2S Long: 007 08.5E the vessel *Maria* altered course to 014° and proceeded to distress position to offer assistance.

On 23 December 2012 at 00:20LT we had visual contact with the life raft. A parachute rocket was activated from our side in order to verify the approximate distance and to confirm that the castaway was conscious and could see us approaching. A parachute rocket was activated from the life raft in response. Vessel's Engine Stand By, proceeding to life raft's position. At 03:23LT the life raft was approached and the castaway Skipper Mr. Rousseau Vinny, French nationality, was recovered, with no injuries, in good health condition, in position Lat: 27 29.53S Long: 007 40.5E. We contacted MRCC Cape Town and informed them regarding the successful rescue operation. Then we proceeded to Cape Town for castaway's disembarkation.

25 December 2012 at 08:00LT, the *Maria* reached in rendezvous position Lat: 33 52.8S Long: 018 13.9E, waiting rescue boat "Station 3" to approach for castaway evacuation. At 08:36LT castaway Mr. Rousseau Vinny safely disembarked.

(All times LT=UTC+2)

b) Summarize the incident orally. What are the key points in this report that you need to mention in your summary? Underline them in the text. Make sure you answer the following basic questions: When did it happen? Where did it happen? Who was involved? What happened?

8. *The Gazette*, Winter edition 2013.

c) Imagine the health condition of the castaway was not good and you needed a helicopter. Put the following sentences in the correct order to recreate a communication regarding Helicopter Operations, according to the SMCP.

- I am taking off.
- ~~You are identified~~.
- Indicate the landing area.
- ~~I am ready to receive rescue basket.~~
- Operation finished.
- Helicopter is on the way to you.
- ~~I require a helicopter to pick up castaway.~~
- I am making identification signals by smoke.
- The landing area is on deck.
- I will use rescue basket.
- I am starting operation.

Vessel	***Helicopter***
1. I require a helicopter to pick up castaway.	
	2.
3.	
	4. You are identified.
	5.
6.	
	7.
8. I am ready to receive rescue basket.	
	9.
	10.
	11.

d) Imagine you have recovered a castaway suffering from hypothermia who needs hospital transfer by helicopter. Write a detailed report of the incident.

Remember to...
i. describe the sequence of events in the past.
ii. give factual information about the location, time and circumstances of the castaway recovery.
iii. mention the first aid given to the victim.
iv. describe the helicopter evacuation.

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to...

- ☐ give commands for safe navigation during adverse sea/weather conditions using bridge checklists
- ☐ give navigational warnings
- ☐ become familiar with vocabulary used in SMCP for Safety Communications (meteorological conditions, ice-breaking & helicopter operations)

- ☐ deliver a presentation on accident prevention on board during heavy weather work
- ☐ describe incidents / write reports of incidents
- ☐ report damage caused by ice at sea
- ☐ describe procedures for survival at sea and correct first aid treatment for medical emergencies.

B. Class Project. Find out more and present to class.

- Visit the webpage of the Canadian Coast Guard on "**Navigation in Ice Covered Waters**" (use the following link: http://www.ccg-gcc.gc.ca/Icebreaking/Ice-Navigation-Canadian-Waters/Navigation-in-ice-covered-waters). Study the information given and present to class *basic ship handling rules / methods of towing / methods of ice detection* for ice navigation. Also, if you have any ice experience yourself, bring to class your own pictures of ice building up on upper deck areas and/or crew trying to remove it.
- What are roll damping systems? Find out more about active/passive roll damping systems, and more generally on motion control (stabilization) systems for ships and present your findings in class.

C. Fill in the gaps with the words given in the box.

berth	deploy	thickness	vicinity	average
morale	bounded	footing	interaction	liable
beset	plating	underestimated	dent	ruptures

1. The victim's _____ is an important factor determining the time of survival.
2. I lost my _____ and fell.
3. Pipeline operations by MV Dox in _____ of position 50°28'N 003°29'W from 0900 to 2100. Wide _____ requested. Contact via VHF channel 13.
4. Mine clearing operation from 0700 to 1300 in area _____ by...
5. Ice-breakers _____ in the Great Lakes area all around winter, they create a path for ships to use.
6. With temperatures below _____, and extreme frosts experienced in many northern routes, the _____ of ice is becoming an increasingly alarming problem for navigation.
7. Continuous ice contact resulted in small cracks on the shell _____.
8. The vessel was _____ by ice and had to be freed by two ice-breakers.
9. _____ of oil pipelines were reported due to extensive wear and corrosion.
10. There was a large _____ in the plating caused by the crane hitting on it accidentally.
11. The way ice affects the vessel and vice versa is called ship-ice _____.
12. I didn't realize how serious the situation was; I _____ the potential problems.
13. The officer _____ for performing a roll call is the Chief Officer.

D. Match to form complete sentences.

1. Lay	☐ equipment is ready to be used
2. Check if	☐ tanks and cofferdams
3. Inform	☐ manropes
4. Sound	☐ records
5. Keep	☐ changes of water levels
6. Note	☐ team members together
7. Fasten	☐ lashings
8. Redo	☐ Master on situation

E. Write the noun.

1. deteriorate ➡ .....
2. adjust ➡ .....
3. seaworthy ➡ .....
4. implement ➡ .....
5. abrade ➡ .....
6. recur ➡ .....
7. distort ➡ .....
8. rupture ➡ .....

UNIT 5

Joining Ship

1. *Travel arrangements for joining ship*
2. *Procedures at international airports*

Round-up

1. Travel arrangements for joining ship

Lead-in: vocabulary group

JOINING SHIP
join, rejoin, new joiner
joining and repatriation (travel expenses)
signing on/off
(work) **contract**
to be on leave
(in) **rank** (of… master)
serve on… (bulk carriers)
handover (n), (also, to hand over watch)
employ – employee – employer – employment

Choose words from the *vocabulary group* to fill in the text below from the analysis of the *Astral* grounding case study (use the correct form of verbs).

Astral deck officers

• ***The master***

The 49 year old master had been in _____(1) for 8 years, the last 3 years with Veritas. The master had _____(2) exclusively on smaller tankers during his 26 years at sea. The master rejoined *Astral* in Amsterdam, a few days prior to the accident, when he took command following a half day _____(3) from his predecessor. The master had been on _____(4) for 4 weeks prior to joining. During his previous _____(5) he had noted that the 2/ON (Second Officer – Navigator) on watch at the time of the accident, required careful monitoring in some navigational duties, and spent time on the bridge with him when he perceived the need to assist the officer.

• ***The previous master***

The master of *Astral* prior to the vessel's departure from Amsterdam was not usually _____(6) by Veritas and had been retained on a temporary basis. During his time on board *Astral* he maintained a "hands on" approach with the bridge team, remaining on the bridge whenever he felt it necessary to monitor the navigation of the ship.

• ***The chief officer***

The chief officer held an STCW II/2 certificate of competence and had 10 years experience on tankers; he _____ (7) Veritas in June 2007 as chief officer on board *Astral*.

A. ***Listen to an employee describing her job. The speaker works for a shipping company. What is her position?***

1. She works in the crew management department.
2. She works in the ship operations department.
3. She works in the logistics department.

B. *Fill in the table with the information she gives about her job.*

• how many vessels? •	• every day tasks? • .....
• company branch based where? •	• how many officers? • .....

C. *Look at the FAQ (frequently asked questions) in a shipping company website. Match the questions to the answers given.*

In crew management, we make travel arrangements for seafarers who join ship or are repatriated.
Here, we try to answer frequently asked questions/inquiries made by new joiners.

1. Do I have to pay for travel expenses?
2. How much baggage can I carry with me?
3. Do I have to book my own flight?
4. Do I have to pay for accommodation while traveling?
5. What if something goes wrong? Don't I need some extra guarantee, for extra expenses, for instance?
6. What documents/other important things do I need to have with me to join the ship?

☐ There is a 40kg baggage permissible weight (23kgs max single bag) for most airlines.

☐ No, we book flights for you (there are competitive rates for seafarers with most airlines, and it is our job to track them down).

☐ All travel expenses to join the assigned ship are paid by the shipping company. The same goes for repatriation, under the MLC (Maritime Labour Convention, 2006). Repatriation costs are paid by the shipowner when the contract length has been fulfilled.

☐ We supply our seafarers with a letter addressed "to whom it may concern" with which we guarantee to cover all expenses due to delays, etc.

☐ It depends on your position and ranking if hotel expenses (for overnight stays to catch an early flight for instance) are covered, or any additional expenses are reimbursed.

☐ A valid passport, all relevant visas required, your Seaman's Book, a credit card and some cash for out-of-pocket expenses.

D. *Read the following information given to seafarers travelling to join ship and try to guess the missing words.*

- International seafarers travelling to Canada to j _ _ n ships as crew members require a v _ _ _ d passport for entry as well as a seafarer's identity document. They also require a t _ _ _ _ _ _ _ y resident visa, unless they are citizens of a country that is exempt from the requirement.
- You need a *Letter of E _ _ _ _ _ _ _ _ t* or *Letter of Introduction*; this is the most important document, as you will need it to request a visa, to show the airline when departing to join the a _ _ _ _ _ d ship, to show the local authorities the p _ _ _ _ _ e of your travel, to show to the hotel upon a _ _ _ _ _ l and to present to the local agent at the time you b _ _ _ d the ship.

E. *Read the text to understand the meaning of the underlined words. Then, match the words to their definitions (draw arrows).*

I work for the financial department of a shipping company. I joined the company last year. I am responsible for payments, in other words I make sure that wages for seafarers are remitted to their bank account. Also, I see to it that any extra accommodation expenses made by our officers are reimbursed.

remit	repay a person who has spent or lost money
join	send money (in payment)
reimburse	become an employee or a member of

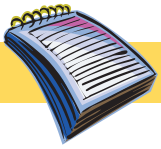
F. *The following advice on* joining ship *is given to first trip cadets from an experienced British seafarer. Was your first time joining ship similar? Would you give any different advice?*

The first thing you're going to receive is an official notification from your company about where and when they want you to join, and what ship. Depending on the type of vessel you're working on, this notification could be anything from a month to a day's notice. Once you have confirmed that you are able to join at that time, then your job is pretty much done. Your company will normally liaise with their travel section, arrange some flights for you to get there, notify the agent that you're coming and arrange for them to transport you to the vessel. Once all of this is sorted, the details and letters of introduction will be sent through to you. When you reach the airport ensure that you have your seaman's book and letter of introduction available as some airlines will ask to see it.

Once you arrive and have got yourself through customs/immigration, you will be collected by the agent. Then, you'll either be escorted directly through port immigration to go straight to the vessel or you'll be shipped off to a hotel. Sometimes ships are delayed and it can be cheaper for you to stay in a hotel overnight than it would be to send you to the vessel via a service boat. When you get around to actually joining the vessel, then the agent will normally first take you to an immigration department. There is normally one based at the port. Basically, because you are now joining the ship, technically you're leaving their country, so they need to stamp you out. Depending on where you are it can take either 5 minutes or a couple of hours. Once that's been done, then you're in the port and being taken to the vessel. Normally your agent will take you directly to the ship and gangway.

Once you arrive on the ship, make sure you tell the gangway watch who you are. Normally you'll have to go past them as you board, but they will let the Master know you've arrived and will let you know where to go (if you're lucky, then another of the deck crew will come along and guide you to the accommodation block and your cabin). If you're in port, then chances are the Master will be a rather busy man with port officials, customs officials, loading masters, agents, etc, all wanting to talk to him at once, so it might be a good idea to wait until he is free and then go along to him and give him your documents. As you're joining the ship and its crew, there are a few legal requirements that the ship's company as your new employer has to complete. The first will be the safety tour. Normally the Bosun or 3rd Mate will come along and give you a complete tour of the vessel, advise you of where your muster station is and what your duties during a fire drill will be. Make sure you pay attention. You will also need to officially "sign on" the vessel. This is simple, at some point the 3rd or 2nd Mate will come along and put the "Ship's Articles" in front of you. All you have to do is fill in your name, address, next of kin and sign the articles and then you will have officially joined your vessel.

G. ***The language of the text is informal and colloquial. It contains idioms, phrasal verbs, etc. Which words in the glossary below are informal? Write "informal" next to them, as is done in a dictionary.***



Glossary

liaise	work closely with somebody and exchange information with them
pretty much	almost, almost completely
sort something	to resolve a problem or difficulty; to deal with a problem successfully
ship somebody off	to send somebody to a place where they will stay *(disapproving)*
get (a)round to (doing)	to find the time to do something, deal with a task in due course
chances are...	it is likely that
come along	to go somewhere with somebody
next of kin	the closest living relative(s)

H. ***Fill in the correct word/phrase from the glossary (use the correct form of verbs).***

1. I need your help. I can't deal with this problem now, I'm rather busy – can you _____ it?
2. He phones home _____ every day. He'll spend a fortune on phone calls by the end of this trip!
3. I might _____ sending my updated CV to the company next week. They've asked me a hundred times.
4. The stowaways were _____ to a refugee camp before the local authorities could decide what to do with them.
5. I'm glad you _____. I didn't want to go by myself.
6. The marine accident investigator had to _____ directly with the Port Authorities while writing the report.
7. He's late again. _____ he overslept this morning.
8. I had to fill in "names of _____" in my application form.

I. ***Match the verbs to the phrases.***

1. give	☐ flights for your new crew
2. advise	☐ the vessel
3. receive	☐ straight to the vessel
4. sign on	☐ attention
5. go	☐ past the gangway watch
6. go	☐ the agent
7. pay	☐ you through port immigration
8. notify	☐ you of where your muster station is
9. escort	☐ you a tour of the vessel
10. arrange	☐ official notification about your assigned vessel

itinerary – timetable – schedule

- *The DPA's **itinerary** included a visit to two vessels at anchor in Singapore.*
- *We will send you an **itinerary** of all the travel arrangements from your repatriation port in Rizhao to Athens.*
- *We have drawn up a **schedule** for crew training on security levels*
- *I have a very busy **schedule** in winter.*
- *I need some information on airline **schedules/timetables**. I need to book a flight for tomorrow.*
- *This is your **timetable** for the classes in the Academy this semester.*

Itinerary

- A planned route or journey
- A travel document recording a route or journey

Timetable

- A chart showing the departure and arrival times of trains, buses or aircraft
- A plan of times at which events are scheduled to take place, your classes in the academy

Schedule

- A plan for carrying out a process or procedure, giving lists of intended events and times
- your day-to-day plans or timetable
- a timetable

schedule or timetable?[1]

In *British English* your **schedule** is a plan that lists all the work that you have to do and when you must do each thing and a **timetable** is a list showing the fixed times at which events will happen: a *bus/train timetable*. In *North American English* these are both called a **schedule**.

5. ***You received this e-mail about your upcoming trip. Study it carefully and fill in the times in the timetable below.***

Re: Travel arrangements/ itinerary

ASSIGNED SHIP:	MV SIREN
JOINING DATE:	23/07/2015
PORT OF JOINING:	PORT of LIVORNO (Italy)
NAME & CONTACT DETAILS OF LOCAL AGENT:	Paolo Braggi, tel. +39 347 6211007

Attached you will find a letter of employment that certifies you are employed by our company. The original will be sent by courier to your address. Here is your travel itinerary:

Travel itinerary

1. Flight A3650, Aegean Airlines
   Departs ATH-Venizelos 15:25
   Arrives Rome Fiumicino 16:40

2. Train # 3321 Leonardo Express
   Departs Fiumicino Airport 17:38
   Arrives Roma Termini 18:10

3. Train #9784 Frecciabianca
   Departs Roma Termini 18:27
   Arrives Livorno Centrale 20:45

1. Usage note from *Oxford Advanced Learner's Dictionary*.

Since you are arriving on the previous night before the day you join the assigned ship, we have reserved a hotel for you (Hotel *Stazione*, close to the train station, the number is +39 0586 429504). We have informed the local agent and the hotel about the time of your arrival.

Your timetable for that day:

1330 airport for check-in
____ depart Athens
____ arrive in Rome
____ catch train to Rome Central Station
____ catch train to Livorno Central Station
____ arrive in Livorno, met by agent

K. ***Your flight to Rome has been delayed for 1 hour. As a result, you'll have to take a later train to your final destination. Look at the available schedules for trains[2], and circle the most convenient. Is it a direct train, or do you have to change? Does it take longer than the one originally arranged for you? Then, go back to your timetable above, cross the times and write the new ones.***

AVAILABLE SCHEDULES FOR: FIUMICINO AEROPORTO TO ROMA TERMINI

Rail Service	Departs	Arrives	Travel Time	Connections
3319 LEONARDO EXPRESS	17:08	17:40	00hr32min	0
3321 LEONARDO EXPRESS	17:38	18:10	00hr32min	0
3323 LEONARDO EXPRESS	18:08	18:40	00hr32min	0
3325 LEONARDO EXPRESS	18:38	19:10	00hr32min	0
3327 LEONARDO EXPRESS	19:08	19:40	00hr32min	0
3329 LEONARDO EXPRESS	19:38	20:10	00hr32min	0
3331 LEONARDO EXPRESS	20:08	20:40	00hr32min	0
3333 LEONARDO EXPRESS	20:38	21:10	00hr32min	0

AVAILABLE SCHEDULES FOR: ROMA TERMINI TO LIVORNO CENTRALE

Rail Service	Departs	Arrives	Travel Time	Connections
2346 Regionale Veloce	18:12	21:55	03hr43min	0
9784 FRECCIABIANCA	18:27	20:45	02hr18min	0
23658 Regionale	19:12	22:31	03hr19min	1
Tratta urbana non FS	19:41	22:31	03hr20min	1
2348 Regionale Veloce	20:12	23:55	03hr43min	0
12272 Regionale	23:27	03:06	03hr39min	1

L. ***Act out the following conversation according to the instructions.***

Student A: Call the local agent to inform him of the new arrival time.
Student B: You are the local agent. You can't meet the seafarer later that night. Tell him/her to take a taxi and go straight to the hotel, where you can meet him/her in the morning. Extra expenses are covered by the company.

M. ***Call the hotel receptionist to confirm your hotel reservation and inform them that you will arrive later than expected.***

2. Train schedules from italiarail.com, by trenitalia.

N. ***This is an e-mail you are sending to a friend while waiting for your flight. You are writing about the new travel arrangement. Write up the missing words.***

There's been a change of plan.

My flight's been d _ _ _ _ _ d, so I'll arrive to Rome one hour later than e _ _ _ _ _ _ d. I was supposed to take the d _ _ _ _ t train from Rome to Livorno, which takes around 2 hours, but unfortunately now I have to take another one which takes much l _ _ _ _ r, since there is a c _ _ _ _ _ _ _ _ n. Also, the local agent was supposed to c _ _ _ _ _t me at the train station and drive me to the hotel, but now he said I should just take a taxi to the hotel, which is not very far, and he will meet me there in the morning. I'll pay for the new train tickets and the taxi myself (good thing I have some c _ _ h on me) and the fare will be r _ _ _ _ _ _ _ _ d by the company.

2. Procedures at international airports

A. ***Match to make compound words related to air travel.***

1. hand _____	**gate**
2. boarding _____	**check-in**
3. self _____	**check**
4. domestic/international _____	**terminal**
5. connecting _____	**flight**
6. security _____	**shop**
7. duty-free _____	**seat** (on the plane)
8. departure/arrival _____	**monitor(s)**
9. aisle _____	**flight**
10. flight information _____	**luggage** (esp. in British English) / **baggage** (esp. in American English)

B. ***Fill in the gaps with the following air travel key words.***

Stop over	Immigration	Land	Take off	Declare	Customs

1. _____: the place at an airport or port where the passports and other documents of people coming into a country are checked
2. _____: the place at an airport or port where officials check incoming goods, travellers or luggage
3. _____: to tell customs officers (at the border of a country) that you are carrying goods on which you should pay tax
4. _____: (for a plane) to come down through the air onto the ground on the runway
5. _____: to stay at a place for one night or a few nights on the way to somewhere else.
6. _____: to become airborne, to leave the ground and start to fly

C. *Match the verbs to the phrases.*

1. Renew	☐ from jet lag
2. Miss	☐ your passport
3. Fly	☐ business/economy class
4. Have	☐ your connecting flight
5. Pay	☐ a twelve-hour stopover in Hong Kong
6. Recover	☐ the plane
7. Get off	☐ for excess baggage

D. *Here are some questions you will probably hear at the airport if you are taking a flight. Match the questions to the example answers.*

Check-in	
1. How many pieces of luggage do you have?	☐ Yes, I have one bag.
2. Did you pack your luggage yourself?	☐ No, they haven't.
3. Has anyone given you anything to take on the flight?	☐ Only one.
4. Do you have any hand-luggage?	☐ Yes, I did.

E. *Write the appropriate answers yourself.*

Immigration / Customs	
1. May I see your passport please?	
2. Where did you fly from?	
3. What is the purpose of your visit, business or pleasure?	
4. How long are you planning to stay?	
5. Have you ever been to (America) before?	
6. Do you have anything to declare?	

F. *Look at the following instructions of what you must do at the airport. Circle the correct word.*

1. Find the international *terminal/terminus*.
2. Find a *tray/trolley* to load your luggage.
3. Go *through/from* security check.
4. Have your luggage X-rayed and *checked/analyzed*.
5. Join the customs *line/lane*.
6. Never leave baggage *unescorted/unattended*.
7. Look at the boarding gate *closure/completion* times.

G. ***The following words describe the status of a flight on the flight monitor. Put them in the correct list for arrivals or departures.***

cancelled	boarding	delayed	gate closed	on time
last/final call	landed	re-timed	expected 21:00	

Departures	*Arrivals*

H. ***Listen to the PA announcement. What is the update on your flight? Tick ☑.***

☐ Your flight is now boarding.
☐ Your flight has been cancelled.
☐ Your flight has been delayed.
☐ The departure gate has been changed.

I. ***Imagine you are at an international airport and you are flying out. You have asked for instructions on the procedures for international flights. Put the following instructions in the correct order. Write the correct number in each box.***

☐ You will then need to go to the counter of the airline you are flying with. At the airline counter, you will need to "check in" which means you will need to present your e-ticket, passport and your bag that you plan to book in.

☐ After security check, you can proceed to your boarding gate for your flight.

☐ You will need to present your e-ticket and passport to the airport security guard at the entrance. On verifying, the guard will let you in to the terminal.

☐ After completing the "check in" process, you will need to fill an Immigration Form, which is easily available at the international airport help desks; the form is very basic so don't worry. It asks you for your name, address, flight number, etc.

☐ Once you arrive in your destination city, you will need to undergo Customs/Immigration clearance again, which is similar to what you underwent at your departure airport. After clearing Customs/Immigration, you will need to proceed to the Baggage Claim area where you will find the bag that you had booked in.

☐ After filling the form, you will need to proceed to Customs/Immigration where your identity will be verified and your passport will be stamped.

☐ After Customs/Immigration, you will need to undergo Security Check where you will need to get your hand baggage scanned. The weight of your hand baggage must normally be up to 7 kg. In addition, you can also carry a laptop bag as an extra item.

J. ***Look at the questions asked / instructions given by airport security check.***

tray	allowed	remove	throw
re-sealable	scanner	medication	confiscated

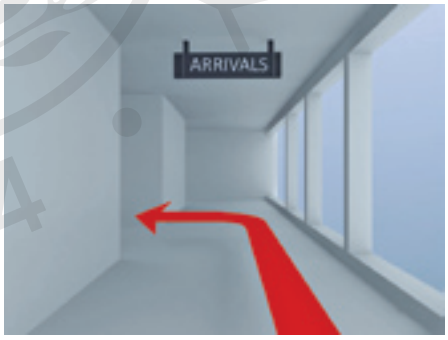
1. You are not _____ to take drinking water with you, _____ the bottle away before you get to airport security.

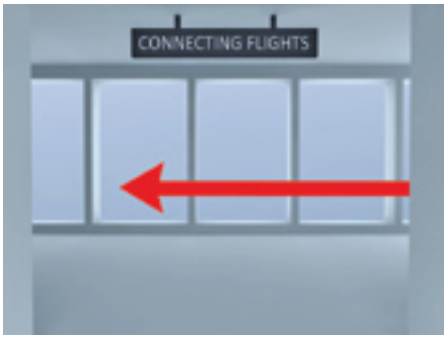
2. If you are taking liquids or gels in your hand luggage, remember that you may only take containers of 100ml or less, and they must all fit into a one-litre _____ plastic bag; if you do not comply, your liquids will be _____.
3. Please, pass through the metal detector. Put your hand luggage, your mobile phone, keys and metal objects in the _____ to be X-ray screened. Pull out your laptop to put through the _____.
4. _____ your belt, shoes and jacket as well, before going through security.
5. Are you taking any prescribed _____ or syringes with you? Each item should be in its original container and you should carry the prescription with you.

K. ***Imagine you are flying into an international airport. You must go through Customs and Immigration. Read the instructions and put the pictures in the correct order. Write numbers 1-4 in the boxes.***

1. When you exit your plane, always follow the signs directing you to international arrivals.
2. The first stop is at passport control/immigration, give your passport and immigration/customs forms to the officer (an immigration document and a customs declaration form, which you will be supplied with on the plane). They will look at it, scan it, validate it, retain any forms and return the customs forms.
3. After you clear passport control, follow the signs to baggage claim. Here you will claim your checked baggage. Check for the carousel number your flight has been assigned to, and wait for your bags to appear. Once you have claimed your bags, your next stop is customs. There is a green lane marked "Nothing to declare" and a red lane marked "Goods to declare", here you will turn in your customs forms.
4. If you have another flight to connect with, follow the signs as you leave the customs area. If you are already at your final destination, follow the exit and ground transportation signs (shuttles, taxis, rental cars, etc.).

☐ 

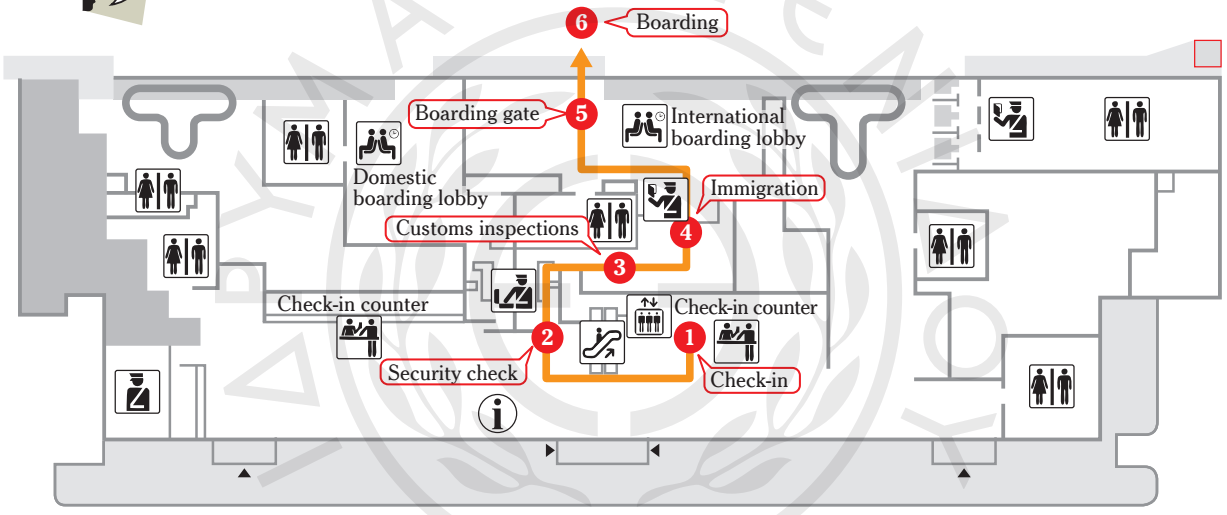
☐ 

☐ 

☐ 

A *baggage carousel* is a *conveyor belt* in an airport that delivers checked luggage to passengers at the baggage claim area.

L. ***Use the following diagram to give instructions step by step to somebody on how to board their flight through an international airport[3].***



Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to ...

☐ understand/make travel arrangements and itineraries for joining ship
☐ understand/describe procedures at international airports

B. Class Project.

- What is the **MLC 2006**? What are the main areas in which it facilitates seafarers' occupation? Also, what are the "**Ship's Articles**"? Find out more and make a class presentation.

3. Diagram from International boarding procedures guide, *Ibaraki airport*, Japan.

C. Fill in the missing words.

notice	time	pretty much	excess
connecting	check	pass	once

1. The case is _____ over.
2. They have only given me a few hours _____ to decide if I agree with their terms or not.
3. _____ you arrive on the ship, make sure you inform the gangway watch.
4. The customs officer will stamp your passport along with your boarding _____.
5. All _____ passengers to New York, please proceed immediately to gate 2.
6. I was charged for _____ baggage by the airline.
7. It was difficult to _____ in my guitar as it was "special baggage" and I had to pay extra.
8. The flight information monitor shows the flight is on _____.

D. Fill in the missing words in the following airport phrases.

1. How many pieces of …… do you have?
2. Business or ……..?
3. Do you have anything to ……..…..?
4. Would you prefer a window seat or an …….. seat?
5. The flight is about to take …… .
6. The plane was unable to …… because of the bad weather, so it stayed for an extra 30 minutes on the air.
7. Final ……., Flight 281 to New York departing Gate 12.
8. This is a(n) …….. for passengers of Flight 231 to London. The departure gate has been …… . The flight will now be leaving from gate 26.

E. Circle the correct preposition.

1. The Master is ***at/on/in*** leave now.
2. Prior ***from/by/to*** joining ship, I spent two days waiting in the port.
3. I've worked 15 years ***at/in/to*** sea, mainly ***at/on/in*** tankers.
4. She's employed ***on/at/in*** a temporary basis.
5. She works ***at/in/into*** the operations department.
6. Your country is exempt ***from/with/by*** the visa requirements.
7. ***To/At/On*** my way to the vessel, I was met by the local agent.
8. You must go ***from/at/through*** customs and immigration.
9. What is the status of the flight? It is ***on/at/in*** time.
10. Go to the airline counter to check ***by/in/at***.

F. The following are standard questions asked at the airport. Choose the correct word from the ones in bold italics.

1. Did you ***pack / fill*** your luggage yourself?
2. Has anyone given you anything to ***get / take*** on the flight?

3. Do you have ***any / some*** hand luggage?
4. Where did you ***fly / take flight*** from?
5. How long are you ***scheduling / planning*** to stay?
6. What is your ***last / final*** destination?
7. Are you catching a ***connecting / in-between*** flight?
8. What is the ***purpose / point*** of your travel?

G. Fill in the missing words.

arrangements	permissible	predecessor	claim	itinerary
book	competitive	labour	timetables	repatriation
assigned	fulfilled	notification	shuttle	verified

1. The Master arrived yesterday and took command following a short handover from his _____.
2. You don't have to pay for travel expenses or _____ your own flight. These travel _____ are made by the crew management office.
3. What is the _____ baggage weight?
4. This low-cost airline has very _____ rates.
5. He couldn't join his _____ ship due to a delay in the airport.
6. _____ costs are paid by the shipowner, provided the contract length has been _____. This is stated in the Maritime_____ Convention.
7. The superintendent's _____ included a visit to our vessel while we were in Rotterdam.
8. I need to fly to Athens tomorrow, preferably on an early morning flight. Can you do me a favour and check the _____ on line?
9. The airport security guard _____ my e-ticket and passport.
10. Follow the signs to baggage _____. I'll meet you there.
11. An airport _____ will take us to the city centre.
12. Have you received official _____ from the company about your next voyage?

REVIEW 1

Units 1-5

1. Foreign language learning / Non-verbal communication

2. Parametric rolling of ships

3. Preventing corrosion

4. Occupational accident prevention

1. Foreign language learning / Non-verbal communication

A. Language learning. Listen to some experts' advice on English language learning problems. Fill in the advice column. Do you experience similar problems as an English language learner?

I have problems with/am weak at...	*More specifically*	*What do experts say? What can I do to improve?*
LISTENING	I listen to a conversation in English and I can't follow it.	
SPEAKING	I sound "Greek-lish" rather than English; I'm embarrassed to speak.	
VOCABULARY	I can't remember new vocabulary, or use it when I need it.	

B. Summarize the text below orally. The topic of each paragraph is underlined. Give one example of each point to summarize the text. Use the following notes:

Non-verbal communication:
Display of emotions → e.g. In Middle East, open display of emotion, exuberance
Loudness →
Physical contact →
Business talks →

Non-verbal communication and cultural difference[1].

We need to go beyond verbal communication. Culture affects communication in various ways. It determines the time and timing of interpersonal events, the places where it is appropriate to discuss particular topics, the physical distance separating one speaker from another, and the tone of voice that is appropriate to the subject matter.

With regard to the display of emotions, the Anglo-American tradition is that of preserving one's calm. Typically, a North American is taught by his culture to suppress his feelings. In the Middle East it is otherwise. Where the open display of emotion is normative, the controlled Anglo-American type is likely to be regarded with suspicion - he must be hiding something, practicing to deceive. Conversely, exuberance and overt emotionality is likely to disturb the Anglo-American, cause him to writhe inwardly with embarrassment – for isn't this childish behavior? And aren't things getting rather out of hand?

How loudly one should talk? In the Middle East, men attain a decibel level that would be considered objectionable in Northern Europe or the United States. Loudness connotes strength and sincerity in Eastern Mediterranean cultures. A soft tone implies weakness or deviousness.

In Northern Europe and the US physical contact is discouraged, particularly between adult males. The most common physical contact is the handshake and, compared to Europeans, Americans use it sparingly. However, in Latin America the handshake is the most detached and impersonal form of greeting or farewell. Somewhat more friendly is the left hand placed on another man's shoulder during a handshake. Definitely more intimate and warm is the "double abrazo" in which two men

1. MARCOM project: *The Impact of Multicultural and Multilingual Crews on MARitime COMmunication*.

embrace by placing their arms around each other's shoulders. Apart from these ritualized forms of touching, there are other forms, which are especially difficult to accept by Anglo-Americans in Latin America: e.g. hand on one's arm during conversation. To the North American this is edging toward what in his culture is an uncomfortable something - possibly sexual, which inhibits his own communication.

In business talks in the U.S., participants will try to get to the point and find an agreement. In business talks in Latin America and Greece, the length of conversation manifests involvement and "good faith". In America ignoring the detail manifests "good faith": "Let's agree on the main points. The details will take care of themselves".

C. Fill in the correct prepositions.

1. The vessel started to drag anchor _____ the north.
2. The main engine was _____ 10 min notice.
3. The wind increased _____ southerly force 10.
4. I have served as second officer _____ tankers for 2 years.
5. A proper bridge watch must be maintained _____ a certified Deck Officer.
6. The Master veered more cable _____ receipt of a gale warning.
7. Due to the deteriorating weather conditions, seven ships left the anchorage and put _____ sea.
8. Weather conditions contributed _____ many of these accidents.
9. Are we clear _____ the other anchored vessel?
10. Check the radar _____ frequent intervals.
11. The PPE is _____ your disposal.
12. The DPA must assist _____ the implementation of the safety management programme.
13. Give information _____ writing or _____ audio-visual materials _____ safety.
14. The safety committee can make recommendations _____ behalf of the crew.

D. Choose the correct alternative.

1. After the occupational accident, which resulted in the AB's serious injury, the crew is suffering from low ***morale/morality***.
2. When passing through pirate infested waters, the master must ***alert/aware*** the crew to the dangers of the passage.
3. Before making the passage plan you must take into ***mind/account*** local area warnings.
4. Have measures been taken to protect the environment from pollution by the ship and to ***satisfy/comply*** with anti-pollution regulations?
5. "Deep-sea" officers, with no confined waters experience, need a lot of practice to become ***accustomed/customary*** to heavy traffic conditions.

E. Match to make correct collocations.

1. On-board _____
2. Classification _____
3. Risk _____
4. Work _____
5. Flag _____
6. Rest _____

state
training
assessment
hours
hours
society

2. Parametric rolling of ships

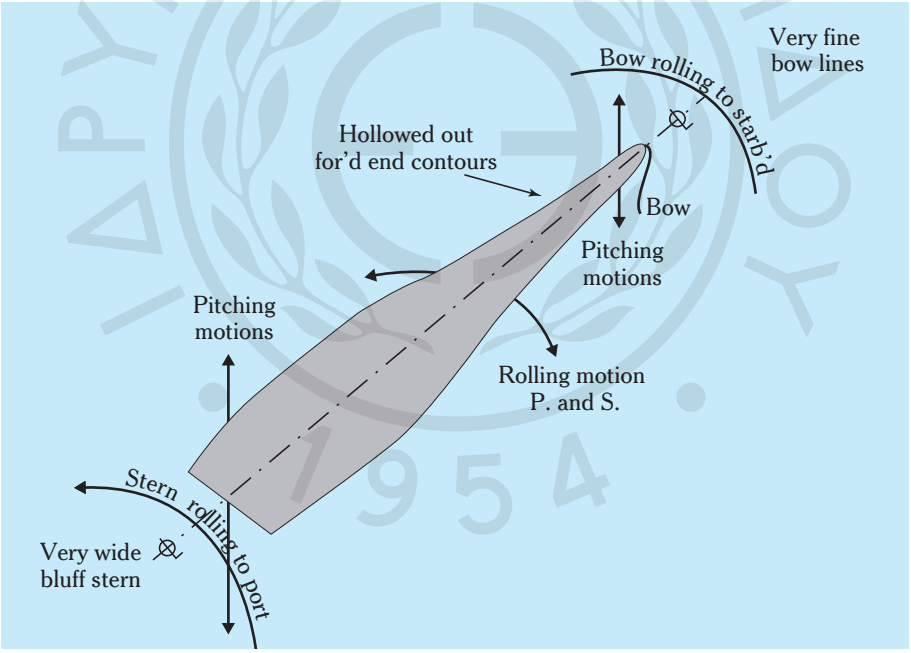
A. Read the following technical text and answer the two questions in your own words.

- What is parametric rolling and when/why is it dangerous?
- How can you reduce parametric rolling?

Parametric rolling of ships[2]

Parametric rolling is produced by pitching motions on vessels which have very fine bowlines together with very wide and full stern contours. One such ship type is the container ship. The figure below shows a ship with parametric rolling problems. The cause depends very much on the parameters of the vessel, hence the name 'parametric rolling'. It is most marked when the pitching period TP is either equal to, or half that of the vessel's rolling period TR.

As the stern dips into the waves it produces a rolling action. This remains unchecked as the bow next dips into the waves due to pitching forces. It is worst when TP _ TR or when TP _ 1/2 _ TR. In effect, the rolling characteristics are different at the stern to those at the bow. It causes a twisting or torsioning along the ship leading to extra rolling motions. If TP _ TR, or TP _ 1/2 _ TR, then interaction exists and the rolling of the ship is increased. A more dangerous situation develops because of the interplay between the pitching and rolling motions.



Pitch induced or parametric rolling on a container vessel

Parametric rolling is worse when a ship is operating at reduced speed in heavy sea conditions. Such condition can cause containers to be lost overboard due to broken deck lashings.

The IMO suggest that parametric rolling is particularly dangerous when the wavelength is 1.0 to 1.5 times the ship's length. Parametric rolling problems are least on box-shaped vessels or full-form barges where the aft and forward contours are not too dissimilar. Very little transverse and longitudinal interplay occurs.

2. Ship Stability for Masters and Mates, p. 367.

To reduce parametric rolling:

1. A water ballast could be used to alter the GMT and hence the natural rolling period TR, to a non-synchronous value.
2. The ship needs to have an anti-rolling acting stabilising system. Antirolling stability tanks that transfer water across the ship or vertically between two tanks are effective for all ship speeds. A quick response time is vital to counteract this type of rolling.
3. Hydraulic fin stabilisers would also help to reduce parametric rolling. They may be telescopic or hinged into the sides of the vessel at or near amidships.
4. Alter the ship's forward speed.
5. Alter the ship's course.

B. Write the noun.

1. assess – .....
2. enforce – .....
3. appoint – .....
4. elect – .....
5. dismiss – .....
6. recur – .....
7. commence – .....
8. receive – .....

C. Write the adjective.

1. apply – .....
2. comply – .....
3. modify – .....
4. tolerate – .....

3. Preventing corrosion

Fill in the gaps.

salt	prepared	hull	combustion
slippage	spray	coating	

How can you prevent corrosion?

One way of preventing corrosion is by _____ (1) the surface with a substance such as paint. Paint sticks closely to any surface to which it is applied and prevents corrosion. In order to ensure that the bond between the paint and the surface is good, the surface must be properly _____ (2). In particular, any cracked or flaking paint should be removed and the surface should be clean, dry and free from _____ (3), oil, grease etc.

Some of the common types of paint are as follows:

Anti-corrosive Paints – used on metal surfaces to prevent corrosion from occurring.
Fire Retardant Paints – the action of these paints is that as they burn, gases are given off which blanket the flame and slow or stop the _____ (4) reaction.
Anti-fouling Paints – used on the _____ (5) to prevent the growth of marine organisms.
Barrier Paints – used between coats of paint, for instance when using a 'high performance' paint over the top of a coat of conventional paint; the coats must be separated by a coat of barrier paint. The chemical reaction occurring in the HP paint will damage the underlying conventional paint.
Non Skid Paints – used on decks and steps to prevent _____ (6), generally around door entrances, windlass area, boarding areas and on steel step ladders.

What tools must be used to apply the paint?

Paints can be applied by brush, roller or _____ (7) gun. In all cases you

should refer to the manufacturer's instructions on the recommended procedure, materials and safety precautions. This information is usually available on the paint container itself.

4. Occupational accident prevention

Listen to a lecture about the required on-board occupational safety programme. Fill in the missing words.

The shipowner

An on-board programme should be developed by the shipowner in order to ensure continuous _____ (1) in occupational safety and health. This programme should, among other things,

- include risk evaluation, training and instruction for seafarers
- pay special attention to the health and safety of young seafarers
- ensure that appropriate personal protective equipment is being used

The master

The master should ensure, in compliance with national laws and regulations, that all crew on board have a tolerable workload, _____ (2) work hours, as well as rest hours, having special regard to work which is _____ (3), hazardous or monotonous.
The master should _____ (4) all accidents, record and report them.
The master should ensure the _____(5) of operating manuals and vessel plans, hold regular meetings of the safety committee at intervals of 4-6 weeks and ensure that the reports of the committee are given due _____ (6). Reports of accidents and near-accidents should be discussed at safety meetings in order to minimize the possibility of recurrences.

The seafarer

Seafarers should be _____ (7) to express views on working procedures adopted as they may affect safety and health, without fear of dismissal. Seafarers should have the right to remove themselves from dangerous situations when they have good reason to believe that there is a(n) _____(8) and serious danger to their safety and health. Seafarers should take care of personal protective equipment and clothing at their disposal and not _____ (9) it. Seafarers have a duty to be particularly _____ (10) during fire, lifeboat and other drills and emergency training.

UNIT 6

Maritime Security

1. *Security threats*
2. *Best Management Practices against Piracy*
3. *Stowaways*
4. *The ISPS code and maritime terrorism*
5. *Measures to prevent drug smuggling*

Round-up

1. Security threats

A. *Read about the main points covered by the* ISPS code *and fill in the gaps.*

Smuggling	Armed	Fines	Refugees	Ray	Hostage
Hijackings	Collateral	Seals	Underway	Circuit	Arson

ISPS: Maritime security threats

There are various maritime security threats, like:

- Piracy and _____ (1)Attack
- Terrorism
- Contraband _____(2)
- Stoaways and _____ (3)
  There are _____ (4) for landing a stowaway to different countries.
- Cargo Theft
- _____ (5) Damage (It can be caused when a nearby fire, explosion or attack to another ship or facility results in damage to your vessel or to the area close to your ship).

There are two types of pirate attack:

- Attack while vessel is at anchor and attack while vessel is _____ (6)

It is usual for the crew to be taken _____ (7) and the Master intimidated for cash.
The most common acts of terrorism are:

- Bombings, ambushes
- _____ (8)
- Kidnappings, hostage taking, assassinations
- _____ (9) (i.e. set deliberate fire)

Security equipment

Locks, _____ (10), Closed _____ (11) Television, Metal detectors, Explosive detectors, X- _____ (12) devices.

B. *Safety or Security? Fill in.*

1. There are _____ checks every 30 minutes by port authorities, as an anti-piracy measure.
2. For _____ reasons, there is a close circuit surveillance system in the cruise ship.

3. International _____ Management Code.
4. Maritime _____ Committee.
5. International Ship and Port Facility _____ Code.
6. Read the _____ Notice: no unauthorized personnel.
7. For your own _____, lock the door of your cabin.
8. For your personal _____, fasten your seat belt as soon as you enter the lifeboat.

C. ***Imagine a PSC inspector asks the following questions to an Officer on board. Cover the answers and try to answer on your own. Then, check if you were right and fill in the gaps. Use the following words: imminent, overriding, hidden, threaten, exceptional, executing.***

Inspection / Audit Questions on Security

What is security level 1, 2, 3?	Security level 1 is normal; 2 is heightened, 3 is _____. Level one: vessel and port facilities are operated in normal condition. Level two: there is heightened risk of security incident. Level three: there is probable or _____ risk of a security incident.
Where are the ship security alert system (SSAS), the alert push buttons and the test button located?	The SSA is located on the bridge while the first alert push button (red) and test push button (green) are located at a _____ place on the bridge. The second alert push button (red) is located at a hidden place in the Chief Engineer's cabin.
What is a breach of security?	A breach of security is any act that may _____ the security of the ship. The countermeasures that will take place will depend on the seriousness of the breach.
Is the security superseding the safety? What is "Master's discretion" for ship's safety and security?	The "security" indicates the measures to be taken in order to ensure at all times the "safety" on board the ship. The Master is not to be constrained by the Company, the charterers or any other person from taking or _____ any decision, which, in his professional judgment, is necessary to maintain the safety and security of the ship. The Master has the _____ authority and responsibility to take decisions with respect to the security of the ship and to request the assistance of the Company or of any Contracting government as may be necessary. The Master of the ship at all times has the ultimate responsibility for the safety of the ship.

2. Piracy

A. ***Fill in the correct preposition.***

Distress communication on "Armed attack/piracy"

1. I am _____ attack _____ pirates. I require assistance.

2. What kind _____ assistance is required? – I require military assistance.
3. Report damage. – I have damage _____ navigational equipment.
4. Can you proceed? – No, I cannot proceed. I am not _____ command.

B. *Fill in the missing words.*

razor	citadel	deter	hooked	skiffs	transit	evasive

The ***Best Management Practices for Protection Against Somalia based Piracy*, 2011 *(BMP4),*** includes the following advice:

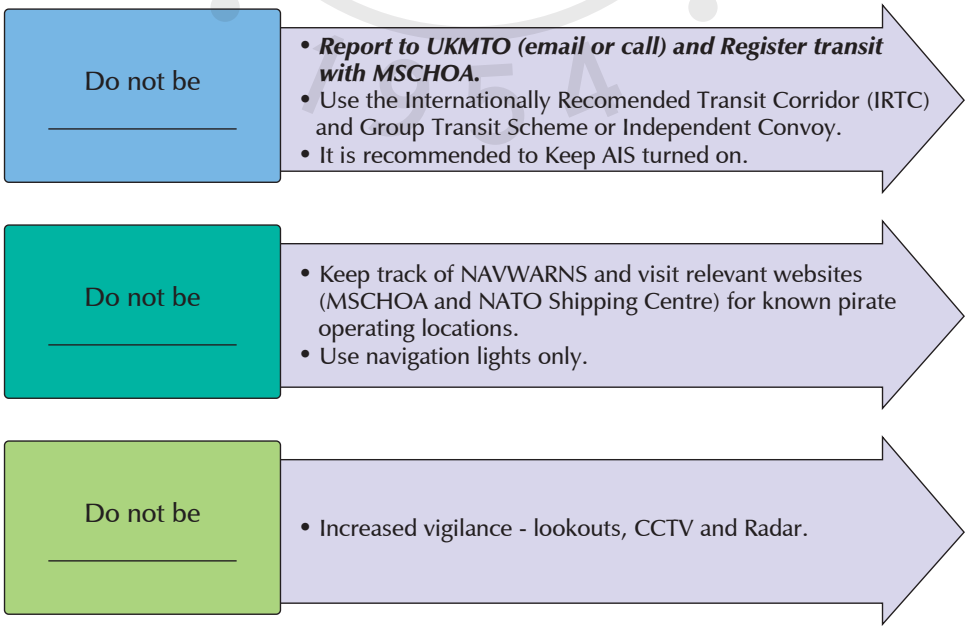
- Use the Internationally Recommended _____ Corridor and the national convoy of your country.
- Put _____ wire around the vessel and physical barriers against _____ ladders to make pirate boarding difficult.
- Go to the _____ when the pirates board the vessel and wait for military help.
- In a typical attack, the pirates are using a motherboat and two _____. If you notice them approaching, you must make _____ manoeuvres to _____ the pirates from coming alongside your vessel.

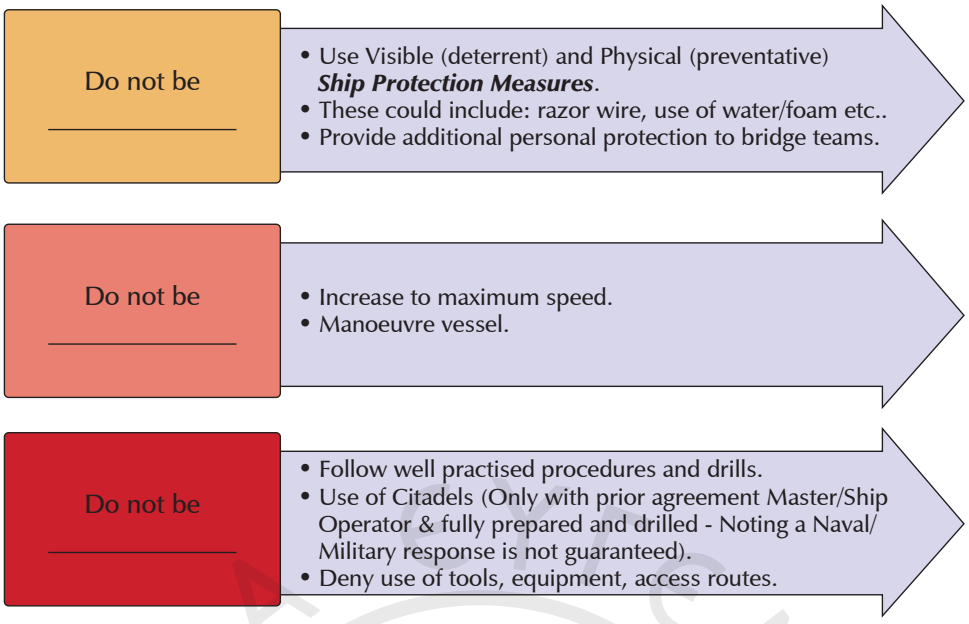
C. *Match the words to their definitions.*

1. vigilance ☐ a thing that is intended to discourage someone from doing something
2. enhance ☐ watchfulness, keeping careful watch for possible danger or difficulties
3. evasive ☐ intensify, increase, or further improve the quality or status of something
4. vulnerable ☐ directed towards avoidance or escape
5. deterrent ☐ exposed to the possibility of being attacked or harmed, physically or emotionally

D. *Fill in: Boarded – Vulnerable – Controlled – Surprised – Alone – Detected.*

Aide memoire: Avoid being a victim of piracy



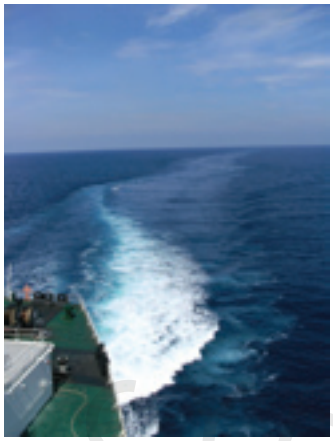


Useful Vocabulary from BMP 4

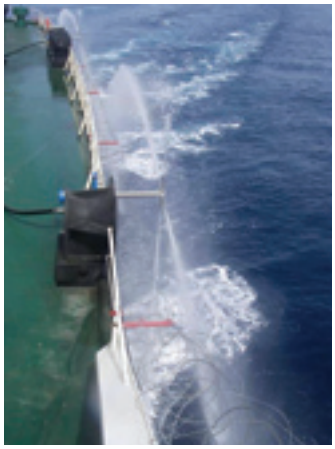
- MSCHOA: Maritime Security Centre Horn of Africa
- IRTC: Internationally Recommended Transit Corridor
- Vigilance
- Skiffs (high speed open boats) / motherships / fishing vessels
- Small fire arms / RPGs (Rocket propelled grenades): used by pirates to intimidate Masters to reduce speed and stop to allow the pirates to board / hooked ladders used to climb up
- SSA – SSP – CSO – SSO (Ship Security Assessment, Ship Security Plan, Company Security Officer, Ship Security Officer)
- Reduce maintenance and engineering work to minimum
- Make adjustments to passage plans to conform with MSCHOA advice
- National convoys
- Dummy (mannequin)
- Binoculars / night vision optics
- Enhanced bridge protection
- Control of access to the bridge, accommodation and machinery spaces / lock and secure all doors and hatches to prevent them from being opened by pirates
- Physical barriers against hooked ladders / electrified barriers
- Razor wire
- Water spray and foam monitors
- Alarms / sounding the ship's alarms
- Special evasive manoeuvring – zig-zaging
- CCTV / Upper Deck Lighting
- Safe muster point – citadel
- Unarmed / Armed Private Security Guards
- Stages of a Piracy Attack: Approach stage, attack stage, pirates take control
- Post incident reporting / Follow up report

E. ***Describe the following pictures using words from the list of the previous page. Write a title under each picture.***

a) .....



b) .....



c) .....

d) .....

e) .....

f) .....

g) .....

h) .....

F. *Imagine you are attending a seminar on BMP anti-piracy measures. Listen and keep notes. Fill in the missing words/numbers.*

- Risk assessment:
  - Freeboard – ..... meters or more
  - Speed – Full speed/ at least ..... knots not in sea state ..... and above
- use to become aware of suspicious approach → proper .....
- use to give impression of more watchmen → .....
- use of ..... is **not** an alternative to BMP / use both, not alone

G. *Read the text and do the exercises that follow.*

The safety aspect of anti-piracy measures

(from safety4sea.com, Nov 2013)

The Danish Maritime Accident Investigation Board (**DMAIB**) has issued a Safety Report regarding the pirate attack on **MV LEOPARD** which was attacked by Somali pirates appr. 200 nautical miles southeast of the coast of Oman in 2011. After the pirates had taken control of the ship and the crew, they tried in vain to tow the LEOPARD to the Somali coast. Later in the evening, the crew were transferred to the pirates' mother ship as hostages.

After analysis of the events, the report concludes the following: The attack on MV LEOPARD and the subsequent abduction of the crew on 12 January 2011 was carried out by Somali pirates who had the equipment and will to capture the ship. The pirates succeeded in boarding the ship despite the extensive anti-piracy measures implemented on the basis of the experiences gained by the crew, the operator, the shipowner and the international recommendations. The ship was not captured and had to be left in the open sea due to damage to the ship's propulsion system that the pirates had inadvertently caused during the attempt to seize the ship.

The recommendations of the Best Management Practice 3 were unclear as regards the use of unarmed guards, and left this issue to the shipowner's assessment. The BMP3 dissuaded the use of armed guards. At the time of the attack, it was under Danish law only in extraordinary circumstances that permits were issued by the authorities to have armed guards on board Danish ships.

The vessel had some unarmed guards but it was decided to disembark the guards in Salalah. It is not possible to explain why this decision was taken without understanding the operational and social aspects. The master's motive was that, because the guards were unarmed, he and the rest of the crew did not find that they contributed considerably to the ship's safety. This perception may have been reinforced by the fact that their presence on board created social tensions among some crew members. Of course, it is uncertain whether the guards' presence would have prevented an attack.

DMAIB has found that some of the measures launched affected the use of the ship's life-saving appliances, but it had no effect on the events on 12 January 2011. This problem may also be found on other ships. In general, most merchant ships have not been designed to resist attacks by pirates, and the introduction of anti-piracy measures may have an effect on the designed functioning of life-saving appliances. In this connection, it is important to notice that in emergencies unexpected events may occur, where it is not always possible to foresee the effect of anti-piracy measures on the functioning of life-saving appliances. Therefore, seemingly simple solutions, such as the fitting of wire cutters etc., may turn out to be insufficient in complex emergencies where the crew will have to improvise.

On June 13, 2012, the Danish Parliament adopted an amendment of the arms act, which entered into force on June 30, 2012. This ensures that shipowners can, faster and in a more flexible manner, acquire a general permit to use civilian armed guards on board Danish cargo ships in areas presenting a risk of piracy and armed robbery against ships, and in particular in the area off the Horn of Africa.

i. True or False?

1. _____ The report shows that security measures did not prevent the pirates from boarding the ship.
2. _____ The vessel's crew did not implement measures that met international recommendations.
3. _____ The report notes that anti-piracy measures may have an inappropriate impact on the preparation and use of ships' life-saving appliances.
4. _____ Before June 2013, the use of armed guards on board Danish cargo ships was not permitted.
5. _____ Ultimately, the report suggests, the crew has to be creative and make up solutions in order to survive complex emergencies.
6. _____ The pirates towed the vessel to Somali territorial waters.
7. _____ The pirates kept the crew on board MV Leopard as hostages.
8. _____ The crew of MV Leopard did not feel uncomfortable having the security guards onboard but they disembarked them for operational reasons.

ii. Scan the text for synonyms of the following words: (the paragraph number is given):

(par. 1) without success: _____
(*par. 2*) unintentionally, accidentally: _____
(*par. 3*) advised against, discouraged: _____
(*par. 5*) predict: _____
(*par. 6*) licence: _____

H. *"Route of fear: ships take up arms against Somali pirates" from BBC news. Listen to a news report made on board a tanker ship. Fill in the missing words or phrases.*

1. The vessel is passing through _____.
2. The suspected boats are one _____ and one skiff. The boats finally moved off and reportedly _____ another ship.

3. They spot suspected pirates dead ahead and activate the ship's _____ to make boarding more difficult, sound the _____ to tell pirates they have been spotted, and summon the onboard armed security team, who put their weapons in the air.
4. When they hijack ships, pirates demand multimillion dollar _____.
5. The crewmember interviewed, who was on another vessel that was attacked by pirates in the past, says that the pirates fired _____ and that he feels _____ because of the armed guards now.
6. Naval vessels escort _____ alongside Yemen but pirates have expanded their operations elsewhere in the Indian Ocean.
7. The armed teams fire _____ shots near the skiffs, they only use lethal force as a last resort.
8. The company _____ in the particular case is to always put armed teams on this route, and so far it has been successful. Yet, maritime piracy will continue to exist in this route until Somalia finds _____.

I. ***What is your opinion on the use of armed guards on board ships? Is it an effective anti-piracy measure? Are there any potential problems that may be caused by it? Why is it considered a "controversial issue"?***

J. ***Your vessel is transiting the Horn of Africa area. You are the SSO. Write a report informing the CSO about the anti-piracy measures you have taken. Include the following words in your report: boarding/effective/deter.***

3. Stowaways

Lead-in: What is the difference?

stowaway / political refugee / illegal immigrant

A. ***Read the text and fill in the missing sentences. Write the numbers in the gaps.***

Preventing stowaways[1]

A stowaway is a person without proper authority to obtain passage, who hides on board a ship. Stowaways might simply be trying to flee from persecution or …….. An individual who is leaving a country because he or she is being persecuted is often seeking asylum abroad. The immigration policies of some countries impose an unfair burden on shipowners and crew members. Shipowners and seafarers sometimes …… when port countries do not let stowaways disembark, even to be repatriated. Some countries ……., and the shipowners must

1. From the Nicos Vardinoyannis *Seafarers Handbook, pages 50-53.*

pay all costs associated with repatriating the stowaways. Asylum-seeking stowaways should be given the protection spelled out in international laws. Stowaways should be treated humanely. Shipowners, masters, port authorities, and governments should have measures in place for preventing stowaways from coming on board ships, and for detecting them before ships leave port.

After stowaways are found, the country ……. . should accept the stowaways. The government of this country should identify the stowaway and repatriate him with the help of the shipowner. The stowaway's apparent or claimed country of nationality should make every effort to help …….. . Countries should accept the return of their citizens or nationals. When stowaways are found, a standard procedure should be followed to return the individual to his home country. It is primarily the shipowner's responsibility to repatriate stowaways. Every ship should have procedures for handling stowaways, and these procedures should be carried out by the master or his delegates. The most humane way to deal with stowaways is to prevent them from coming on board. You can do this by …… and by checking accommodation areas.

Treatment of Stowaways When Found

If you find a stowaway or a group of stowaways, report the discovery immediately. The master needs to report the finding to the shipowners and to immigration authorities at the next port of call.
You will probably find that stowaways are …… . Whether the stowaway is seeking asylum or seeking better economic conditions, he or she is still a human being. Provide all stowaways with food, water, and protection from the weather. Also provide first aid if it is required.

Points to Remember

It is not your job to decide whether or not an asylum claim is legitimate. ***That is the responsibility of immigration authorities in the next port.*** You do have a responsibility as a crew member to take actions that …… . Keep stowaways away from critical areas of the ship and away from areas where crew members are working.

1. tired, frightened, and very hungry	5. determine the stowaway's identity and citizenship
2. where the ship is scheduled to make its next port of call	6. will avoid jeopardizing the safety of the crew or the ship
3. impose fines on ships for bringing stowaways ashore	7. they might be trying to obtain a better life in another country
4. find themselves in a predicament	8. maintaining a deck and gangway watch

B. ***Listen to information on stowaways provided by IMO and answer the following questions.***

1. Which convention covers stowaway-related matters? Circle the appropriate one.
MLC, BRUSSELS CONVENTION, FAL, STCW
2. How many stowaways were reported by IMO in 2014?

3. What type of ship is the one most commonly used by stowaways?
4. Which are the most common ports of embarkation?
5. What is the definition of "stowaway"?
6. Where do stowaways usually hide?
7. Why is the life of stowaways in danger?

C. *Fill in: combat/tightened/thoroughly.*

- Ships must be _____ searched for stowaways.
- Measures for preventing stowaways hiding on board must be _____.
- Immigration, customs, police and port authorities must co-operate to _____ human smuggling.

D. *Read the text and answer the following questions (underline the answers in the text).*

1. What are some measures that must be taken by port authorities to prevent stowaway incidents?
2. What security arrangements are recommended for ships?

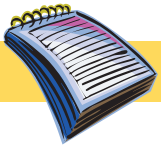
Stowaways

Ships are to be thoroughly searched for stowaways on leaving high-risk ports. Measures to prevent stowaways secreting themselves on board are to be tightened, following the adoption by the IMO of *new international standards and recommended practices* to deal with the problem. Public authorities and port authorities should co-operate in preventing stowaway incidents by: regular patrolling of port areas as well as establishing special storage facilities for cargo particularly susceptible to stowaway access, and continuous monitoring of persons and cargo entering these areas. The new standards also refer specifically to the problem of human smuggling, and call for co-operation between port authorities and other relevant authorities such as police, customs and immigration to combat the practice.

The new standards and recommendations include a list of minimum security arrangements that should be put in place by ships when calling at ports where there is a risk of stowaway embarkation. All doors, hatches and means of access to holds or stores which are not used during the ship's stay in port should be locked, access points to the ship should be kept to a minimum and areas seaward of the ship should be adequately secured. Adequate deck watch should be kept, boardings and disembarkations should, where possible, be ***tallied*** by the ship's crew and adequate means of communication should be maintained. At night, adequate lighting should be maintained both inside and along the hull. The new standards recognize and ***reinforce*** the right of stowaways that do slip through the net to fair and ***humane*** treatment. Masters are required to take appropriate measures to ensure the security, general health, welfare and safety of any stowaway while on board, including providing him or her with adequate provisions, accommodation, proper medical attention and ***sanitary*** facilities.

The IMO standards state that stowaways entering a country without the required documents are, in general, illegal immigrants, and decisions on how to deal with such situations are the ***prerogative*** of the countries concerned. Stowaway ***asylum seekers*** should be treated in compliance with international protection principles set out in relevant ***treaties***. The guidelines ***advocate*** close co-operation between shipowners and port authorities. Countries should permit the return of stowaways who are identified as being their citizens or who have a right of ***residence***, while the country where a stowaway originally embarked should normally accept his or her return. The guidelines say that every effort should be made to avoid situations where a stowaway has to be ***detained*** on board a ship indefinitely.

E. *Use the words in the text marked in bold italics to fill in the Glossary.*



Glossary

_____ count, calculate the total number of
_____ kind, showing compassion or benevolence
_____ strengthen (an existing idea), support
_____ relating to the conditions that affect hygiene and health, esp. the supply of sewage facilities and clean drinking water
_____ publicly recommend or support
_____ the fact of living in a particular place (also permission to live in a country that is not your own)
_____ a formal agreement between two or more countries
_____ a person who has been forced to leave their own country because they are in danger and who arrives in another country asking to be allowed to stay there
_____ a right or privilege exclusive to a particular individual or class
_____ officially seize and hold (goods), keep somebody in an official place, such as a police station, and prevent them from leaving

F. *Use the words in the glossary above to fill in the following sentences (use the correct form).*

1. Please, state your occupation and place of _____.
2. It is a seafarer's _____ to decline a hazardous job on board.
3. There were no proper _____ facilities on board the cruise ship and as a result a mass disease of gastroenteritis broke out.
4. These regulations ensure the _____ treatment of all refugees.
5. Such jokes tend to _____ racial stereotypes.
6. The company publicly _____ life ban from re-employment for those seafarers who test positively to drugs.
7. PSC _____ the ship in port due to serious SOLAS non-conformities.

G. ***Read a Master's incident report on a stowaway discovered on board. What did the Master do? Underline the actions taken. Did the Master take the correct actions, following the IMO recommended practices in this case?***

On the second day of our voyage from Port Elizabeth to Lagos, the Chief Officer reported to me that a stowaway was found in the engine room. I immediately carried out an investigation as to how he boarded the vessel and advised the appropriate authorities at our last port of departure.

I found out that his nationality was Nigerian, age 23. I kept all his personal documents which were valid and informed my company accordingly. I gave him proper accommodation and food and I asked him to comply with the ship's regulations while being on board. He was also given a lifejacket. I also briefed him on the lifesaving procedures and allocated a muster station and a lifeboat.

I also advised the ship's agent at our next port of call, asking them to arrange for his disembarkation on the ship's arrival.

Finally, I asked the stowaway to sign a statement before leaving the ship stating that he was well treated on board.

Passive Voice

Note: *For information on the use and form of the passive voice go to page 396.*

The passive is used in documents such as reports and formal recommendations to emphasize the action and not the person who performs the action. Study the table:

Active	*Passive*
You **must search** the ship for stowaways before getting underway.	The ship **must be searched** for stowaways before getting underway.
IMO **will adopt** a new convention on stowaways.	A new convention on stowaways **will be adopted** by IMO.
In some cases, they **return** stowaways to their port of embarkation.	In some cases, stowaways **are returned** to their port of embarkation.
They **discovered** a stowaway in the engine room.	A stowaway **was discovered** in the engine room.
They **have tightened** the measures against piracy.	The measures against piracy **have been tightened.**

a) Turn the sentences into passive.

1. The Chief Officer found a stowaway in the Bosun's store.

.....

2. I carried out an investigation.

.....

3. I will keep his personal belongings until police arrive.
.....

4. We have already informed the company.
.....

5. You must give stowaways a lifejacket.
.....

b) Turn the sentences into active. Use the subject given in each case.

1. The stowaway was given proper accommodation.
   We .....
2. Stowaways should be treated humanely.
   The crew .....
3. The stowaway repatriation expenses have been paid.
   The company.....
4. All unused doors and hatches must be locked while in port.
   The crew.....
5. The stowaway was provided with medical care.
   The Chief Officer .....

c) You are the Master of a container ship. You have discovered a stowaway on board, one day after leaving Port of Durban (South Africa). Write an e-mail to the company to inform them of the actions you have taken, how the stowaway was treated on board and what you intend to do next.

4. The ISPS code and maritime terrorism

A. Read the text and fill in the glossary below with the words in bold in the text.

The ISPS Code and Maritime Terrorism[2]

Most legislation in the maritime world is initiated by some kind of maritime disaster or accident. The MARPOL-convention came into force a few years after a serious oil pollution, caused by the grounding of the tanker *Torrey Canyon* on rocks near the Isles of Scilly. Further, despite proper rules and regulations, a very high number of accidents caused the International Maritime Organization (IMO) to implement the International Safety Management Code (ISM).

2. By Lars Bergqvist, July 15, 2014, http://cimsec.org/isps-code-maritime-terrorism/12098, abridged.

Contrary to previous conventions and codes, the creation of the ISPS-code was caused by a disaster that happened ashore, when hijacked aircraft on the 11th of September 2001 flew into the twin towers of the World Trade Center. As a response to the 9/11 attacks, the International Ship and Port Security code (ISPS) came into force on 1st July 2004, requiring merchant ships in international trade, and the ports they are calling, to be certified to a certain security standard.

Maritime terrorism before ISPS-code (before 1 July 2004)

Maritime terrorism is not ***rampant***, nevertheless there has been a steady flow of incidents during the last 50 years. More specifically, from June 1970 to July 2004, there were 212 maritime terrorism incidents. Most of those incidents were on rather low level, yet there are some significant incidents that got an extensive media coverage.

– *Achille Lauro;* In October 1985, the passenger ship, while on a cruise in the Mediterranean, was hijacked by four terrorists from Palestine Liberation Front, off the coast of Egypt. After two days of negotiation, and after they had killed an elderly American passenger, the hijackers gave up when they were promised political asylum in Tunisia. However, justice was ***swift***, as US warplanes forced the Egyptian airliner carrying the hijackers to land in Italy.
– *M/T Limburg;* In October 2002, the French owned crude oil carrier was attacked when approaching an offshore terminal off the coast of Yemen. An explosive-laden boat rammed the hull of the tanker, causing an explosion followed by fire.
– *Superferry 14;* In February 2004, a terrorist attack on Superferry 14 caused the death of 116 persons. Suicide bombers, using a boat loaded with explosives, were the perpetrators.

Maritime terrorism after ISPS-code (after 1st July 2004)

Supporters of the ISPS-code may argue that the code has been successful since there have been no serious maritime terrorist attacks since the implementation. ***Detractors*** may argue that the code did not help much in protecting seafarers against the ***menace*** of modern day piracy. Whatever opinion someone may have, the code was developed to protect the international community against terrorism, and as such it has been a success. Piracy and terrorism are different crimes, needing different approaches. And, according to conventional wisdom, the link between terrorists and pirates is very weak. Despite the positive impact on the security situation by the Code, there have been some serious incidents.

– *Don Ramon;* A maritime terrorist attack took place in August 2005 onboard the passenger ship Don Ramon in Filipino waters. Terrorists had placed a time bomb beneath gas cylinders in the ship's galley, causing the ship to sink and wounding 30 passengers.
– *M Star;* In July 2010, the Japanese owned very large crude oil carrier experienced an explosion when transiting the Strait of Hormuz. Although no craft was sighted, the explosion made a large dent in the hull, parts of the accommodation were slightly damaged and one crewmember was injured. After two days, a terrorist group claimed responsibility.
– *Yemen, level 3;* In August 2013, due to a high level of activity by Al Qaeda ***affiliated*** groups in Yemen, the Government of the United Kingdom raised the ISPS security level to level 3 for British flagged ships in Yemeni territorial waters. A serious situation indeed, since an elevation to level 3 was ***unprecedented*** since the ISPS code was introduced in 2004.
– *Cosco Asia;* In September 2013, while on transit in the Suez Canal, the Chinese-owned container vessel under the flag of Panama, was hit by a rocket propelled grenade. The ship sustained only minor damages and there were no casualties. An Islamist group claimed responsibility for the attack. Although a minor attack, it was of great concern for the Egyptian government, due to the economic importance of the Canal. To increase security, a protective wall along the Canal is in the process of being constructed.

Glossary

_____	threat or danger
_____	spreading everywhere in a way that cannot be controlled
_____	closely connected to or controlled by a group or an organization
_____	never done or known before
_____	happening quickly and immediately
_____	a person who tries to make something seem less good or valuable by criticizing it

B. *Is the ISPS code a successful way of enhancing maritime security?*

5. Drug smuggling

Lead-in: Write the nouns:
convict: ..... imprison: ..... detain: .....
confiscate: ..... interrogate: ..... prosecute: .....

A. *Read the text and ...*

i. underline the measures.
ii. answer the following questions:

1. What consequences would any potential involvement in drug trafficking have for crew members?
2. What must the crew do in relation to stevedores and repair technicians in port?
3. What can the Master do before departure if he suspects there are drugs on board?
4. Who must the Master inform if drugs are found on board?

Measures to prevent drug smuggling[3]

General

Drug smuggling constitutes a very serious crime almost anywhere in the world. Affected parties can expect extensive investigations, interrogation, detention and possibly criminal prosecution, conviction and imprisonment. Moreover, assets may be seized as security for hefty fines and penalties and ultimately confiscated and/or sold.

Measures to prevent drug smuggling

The general aim in all instances is to prevent the illegal substances from coming on board the vessel in the first place. The following are some general guidelines for precautionary measures to be taken.

3. Loss Prevention Circular No 8.09, Gard.

Before entry

- Crew going ashore should be informed of the risk that possible drug traffickers may seek to befriend them in order to achieve their co-operation to smuggle drugs. The crew must understand that, apart from violating company policy, this could be potentially dangerous for themselves, their families, fellow crewmembers etc. Moreover, local authorities are likely to act forcefully against any crewmember who is considered to be associated with drug traffickers.
- Warning posters describing the risks involved in the carriage of drugs should be clearly displayed at the point of the entry/exit to the vessel and within the accommodation areas.

Whilst in port or at anchor

- The master and crew must take all possible precautions to limit access to the vessel and monitor the surrounding area adjacent to the vessel whilst in port. Individuals who have no legitimate requirement for being onboard must not be allowed onboard. The crew should keep a log at the point of entry/exit, and the Master or Chief Officer should be informed if the watch is uncertain as to whether an individual has legitimate reasons to be onboard.
- A permanent watchman should be present in areas where stevedores or repair technicians are working onboard the ship. During hours of darkness all areas should be well lit in order to facilitate visual monitoring of activities. Any suspicious activities conducted by third parties on board should be reported to the Master. Attention should be paid to small boats approaching the ship and any suspicious activity in the vicinity of the ship which may warrant further investigation. The use of a searchlight during the hours of darkness should be considered.
- The crew should perform regular shipboard inspections throughout the duration of the port call. In ports particularly prone to drug smuggling, it should be considered to employ additional security guards from an approved supplier. When broken/missing seals for compartments, lockers, containers etc., are discovered, an investigation should be conducted and if nothing is found the seals should be replaced by the crew. A record should be made in the logbook together with a note of the outcome of the investigation/search and the relevant seal numbers.
- Once cargo operations are completed, the crew should perform a full search of the vessel. In addition to looking for illegal substances, the crew should be on the lookout for stowaways. If there are any suspicions that drugs may have been placed onboard, the Master should request a comprehensive vessel inspection, including inspection of the vessel's hull below the waterline, before departure. The most common measure is the anti-smuggling sub-aquatic survey to ascertain that no illegal substances are attached to the vessel below her waterline.

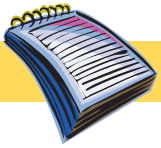
After departure

- Once the vessel has sailed and the outbound pilot has disembarked, a thorough search of all compartments should be conducted and the results recorded in the logbook.

Action to be taken if drugs are found on board

If drugs are found on board the Master should immediately take steps as set out in the vessel's Emergency Contingency Plan (as per the ISM Code) and/or the Ship's Security Plan (as per the ISPS Code), one of which should include steps to be taken with regard to notification to the local authorities. The following general guidelines can also be given:

- The drugs must not be touched.
- Photograph or video the area of the ship where the drugs were found, but leave it untouched and seal it off to prevent any unauthorised access.
- Inform the P&I insurer, the local P&I correspondent and the shipowner/manager.



Glossary

hefty	(of an amount of money) impressively large, larger that expected
assets	valuable property a company or person owns which can be sold to pay debts
adjacent	next to or near something
warrant	justify, make something necessary or appropriate in a particular situation
prone to	likely to be affected by, suffer from, or experience something bad
comprehensive	complete, full, including all the details that may be concerned

B. *Match to make collocations.*

1. legitimate .....
2. well .....
3. P & I .....
4. unauthorized .....
5. general .....
6. as per .....
7. illegal .....
8. be .....
9. outbound .....
10. anti-smuggling .....

access
insurer
sub-aquatic survey
the ISM code
on the lookout
guidelines
pilot
lit
reasons
substances

Round-up

A. Describe measures for ensuring maritime security. How well do you know the appropriate guidelines for action in each case? Tick ☑ the ones you know about, and give at least three preventive measures for/in each case.

☐ piracy ☐ drugs ☐ smuggling ☐ stowaways

B. Class Project.

- Find out more about ISPS code and present to class. Visit the site *imo.org* → *FAQ on Maritime Security*, and find out the answer to the following questions:
  - Is the ISPS code a big hindrance to international trade and shipping?
  - Can the Master be a SSO?
  - What role would AIS play? What about using AIS-derived information to target vessels?
- Choose two of the cases of maritime terrorism mentioned on pages 108-109 and find out more information to present in class.

C. Turn the sentences into passive.

1. The crew used water canons to deter the pirates from boarding. Unfortunately the method

was unsuccessful and the pirates boarded the ship at 1200 UTC.

.....

.....

2. You must display a warning sign stating clearly that the crew must not use drugs or alcohol on board.

.....

.....

3. The port authorities arrested the seafarer for suspected involvement in murder. This shocked the rest of the crew who had worked with him for years.

.....

.....

4. Stowaways are one of the threats you must assess and plan for in the Ship Security Plan.

.....

.....

D. Fill in the gaps.

secured	intimidate	warranted	hefty	adjacent	confiscated	prone

1. This is a serious crime. They could face _____ fines.
2. He tried to take pictures of the port but the security guards _____ his camera.
3. All doors and hatches providing access to the bridge should be properly _____ to prevent them from being opened by pirates.
4. Further investigation is clearly _____.
5. The two types of cargo must be segregated and should not be stowed in _____ holds.
6. They tried to _____ the Master by firing firearms in the air.
7. Working without a break makes you more _____ to error.

E. Match to make collocations.

1. conventional	authority
2. thorough.....	treatment
3. overriding	cost
4. valuable	wisdom
5. territorial	search
6. repatriation	waters
7. humane.....	assets

F. Choose the correct alternative of the words in bold italics. Must the verbs be in passive or active voice?

1. The cargo ***loaded/was loaded*** by gantry cranes on the vessel.
2. The crane ***operated/was operated*** by port crane operators.
3. The port security officers ***made/were made*** a check round the vessel.
4. The charterers ***notified/were notified*** of the delay in writing.
5. The port authorities ***informed/were informed*** us that there was no reason to ***alarm/be alarmed***.

6. The loading operations ***will complete/will be completed*** soon.
7. They ***obtained/were obtained*** the necessary certificate after taking the appropriate tests.

G. Tick ☑ the correct collocations. Cross ☒ the odd one out.

1	breach of	security contract statement
2	sanitary substance port	facilities
3	sign make tend	a statement
4	collateral vigilant extensive	damage
5	armed unprovoked predicament	attack
6	affiliated favourable humane	treatment

UNIT 7

Marine Insurance and Chartering

1. Marine Insurance

2. Chartering

Round-up

1. Marine insurance

Lead-in: Check what you know.

i. Match the terms to the concepts they are related to. Draw arrows

bareboat	salvage
no cure no pay	insurance
P&I	charter

ii. Write the name under each definition: ***charterer, underwriter, shipper, shipbroker, arbitrator.***

Quiz				
How do you call the professional who….				
covers the maritime risk by insuring it?	acts as an intermediary between shipowners and cargo owners?	settles a legal dispute after a ship is salvaged?	hires a ship?	transports their goods by sea?

I. Lloyd's of London, Underwriting and P&I Clubs

a) Look at the following extracts on marine insurance. Fill in the blue words in the glossary below.

- Offering financial protection against maritime and transit losses, marine insurance gives the shipping industry the confidence to trade. Without the shelter to risk presented by insurance, shipping transactions and operations would be severely curtailed (=reduced) as players would have to rely on their own funds to cover incidents, ***loss*** or damage[1].
- In marine insurance, the object is to ***indemnify*** the insured against losses resulting from marine adventure. If a shipowner or cargo owner wishes to be protected against losses incurred (=suffered) from war, the owner must purchase separate war-risk marine insurance or pay an additional ***premium*** to include war risk in the basic ***policy***. Most shipowners carry hull insurance on their ships and protect themselves against ***claims*** by third parties by purcha-sing "protection and indemnity" insurance[2].
- "I also hold you fully responsible and ***liable*** for any claim whatsoever from cargo interests or third parties for delaying cargo operations". (*from a Note of Protest*)
- The Chief Officer of a Panama flagged general cargo vessel of Greek interests suffered serious injuries during loading operations due to mishandling of one of the vessel's cranes by another crewmember. A lawsuit against the shipowners and ship managers was filed before the Court of Piraeus and the seafarer received full ***compensation*** for his injury as it was proven that the accident had been the result of breach of the ship safety regulations. (*from the illustrative cases presented by a law firm in Piraeus*).

1. From the book cover of *Marine Insurance* 2013, ICS publication (Institute of Chartered Shipbrokers).
2. From *Overview of Marine Insurance Law*, IMO International Maritime Law Institute, 2013.

Glossary

_____ the contract which details the conditions and circumstances under which the insured will be financially compensated
_____ the amount of money to be charged for insurance coverage
_____ to promise to compensate somebody if they suffer any damage or loss; secure someone against legal responsibility for their actions
_____ a legal demand for compensation/a demand for payment in accordance with an insurance policy or other formal arrangement
_____ legally accountable, responsible (answerable) for something
_____ money awarded to someone in recognition of loss, injury, etc.
_____ an amount of money lost by a business or organization

b) What do the following terms mean, in a nutshell? Draw arrows.

policy	money
premium	demand
liable	responsible by law
claim	contract

Claim (*noun*)

- An ***insurance claim*** is the notification to an insurance company that payment of an amount is due under the terms of the policy.
- Liability for ***Maritime Claims*** specifies limits for two types of claim - those for *loss of life or personal injury* and *property* claims, such as damage to ships, property or harbour works.
- Usage: we say *make* a claim *against*, *bring* a claim *to* court, *file* a claim *for* compensation.

The following text contains some interesting facts about the history and development of marine insurance, as well as key terms related to the subject that need to be understood:

Modern marine insurance and Lloyd's

In the late 1680s, Edward Lloyd opened a coffee house on Tower Street in London. It soon became a popular meeting place for shipowners, merchants, and ships' captains, and thereby a reliable source of the latest shipping news. Lloyd's Coffee House was the first marine insurance market. It became the place where parties in the shipping industry wishing to insure cargoes and ships met those willing to underwrite such ventures. These informal beginnings led to the establishment of the insurance market Lloyd's of London and several related shipping and insurance businesses.

The establishment of insurance companies, a developing infrastructure of specialists (such as shipbrokers, admiralty lawyers, bankers, surveyors, general average adjusters) and the growth of

The Lutine Bell at Lloyd's underwriting room. Traditionally it was rung to herald important announcements – one stroke for bad news and two for good

the British Empire gave English law a prominence in this area which it largely maintains today and forms the basis of almost all modern practice. In the 19th century, Lloyd's and the Institute of London Underwriters (a grouping of London company insurers) developed between them standardized clauses (known as the Institute Clauses) to be used in marine insurance, and these have been maintained since.

Underwriting

To underwrite is to sign and accept liability and guarantee payment in case loss or damage occurs. Underwriters ascertain the terms and conditions of the insurance cover and determine whether applications for insurance cover should be accepted. The name "underwriter" derives from the Lloyd's of London insurance market. Risks were underwritten at Lloyd's Coffee House. Financial bankers, who would accept some of the risk on a given venture (historically a sea voyage with associated risks of shipwreck) in exchange for a premium, would literally *write* their names *under* the risk information that was written on a Lloyd's slip created for this purpose. The slip of paper was circulated with a description of the ship and cargo and underwriters wrote their names underneath accepting a percentage of the risk.

Lloyd's underwriting room

c) Listen to a short presentation on Lloyd's and do the following exercises.

i. Circle the words you can hear: ***underwriters, brokers, policy, loss, claim.***
ii. True or false?
- Lloyd's is an insurance company.
- Shipowners have face to face interaction with insurers at Lloyd's.
- Syndicates are separate insurers' businesses, which compete for business.
- Lloyd's only covers maritime risks.

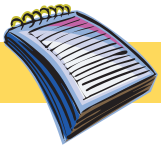
Protection and Indemnity Insurance vs. Marine Insurance

Protection and indemnity insurance, more commonly known as "P&I" insurance, is a form of mutual insurance provided by a P&I Club. Whereas a marine insurance company provides "hull and machinery" cover for shipowners, and cargo cover for cargo owners, a P&I Club provides cover for open-ended risks that traditional insurers are reluctant to insure. P&I clubs provide insurance for broader, indeterminate risks, such as third party risks which include a carrier's liability to a cargo-

owner for damage to cargo or a shipowner's liability after a collision or environmental pollution. Whereas the insured pays a premium to an underwriter for cover which lasts for a particular time (say, a year or a voyage), a P&I Club member instead pays a "call". This is a sum of money that is put into the Club's pool. If, at the end of the year, there are still funds in the pool, each member will pay a reduced call the following year; but if the Club has made a major payout (say, after an oil spillage), club members will immediately have to pay a further call to replenish the pool. Over the past years, the P&I insurance world has seen some dramatic changes with Fixed Premium P&I Cover facilities being requested by shipowners as an antidote to continuing financial exposure.

d) Answer the following comprehension questions, after reading the texts.

- Why is English law important in Marine Insurance?
- What is the principle behind having an insurance cover on a "mutual" basis?



Glossary

venture	a risky or daring journey or undertaking, an activity that involves taking risks
prominence	the state of being important, well known or noticeable
herald	signal, announce
clause	a separate article or stipulation in a bill or contract
reluctant	hesitant and unwilling
pool	money shared by a group of people that can be used when needed
replenish	make something full again by replacing what has been used

II. Salvage and General Average

Owners' liability for cargo damage after the grounding of a general cargo ship in 2007

Background

The vessel was carrying a cargo of ferrosilicon from Iceland to England when it ran aground off Swona Island. The ensuing investigation revealed that the master had implemented a bridge watch routine that did not accord with the Standards of Training, Certification and Watchkeeping Convention. In particular, a designated lookout during navigation in darkness was not always used.

Around two months before the grounding, it had been pointed out in a port state control inspection carried out in the Netherlands that the master's bridge watch arrangement did not accord with the convention. As a result, the owners' designated person ashore instructed the master to ensure compliance with the applicable rules and regulations, both by issuing a non-conformity note and by giving oral instructions to the master. Irrespective of this, the master continued the same watch system and made false entries in the deck logbook to make it appear as if a separate lookout were being used when it was dark.

In the early morning of January 2, 2007, the duty officer fell asleep and for about 45 minutes the vessel continued sailing without any lookout. A strong current brought the vessel off its track and onto rocks off Swona Island.

The vessel and cargo were **salvaged**, but both suffered significant damage. The owners declared **general average**, but the cargo interests refused to pay their contribution. The cargo interests filed suit at the Oslo District Court holding the owners liable for the cargo damage, on the grounds that the ship was unseaworthy.

Court decision

On June 6 2009 the Oslo District Court gave judgment in favour of the cargo interests. The court held that the owners - as represented by the vessel's designated person ashore, who was also technical inspector and a part of the owners' management team - had negligently breached their duties under the International Safety Management Code. The code requires that all personnel involved in the safety management system have an adequate understanding of relevant rules, regulations, codes and guidelines, and that they take timely corrective actions to correct any deficiencies found. It was held that:

- the master's repeated breach of the convention showed that he did not have adequate understanding of the relevant rules; and
- the non-conformity note issued by the designated person ashore following the port state control inspection in the Netherlands was not a timely corrective action, as he should have made further inspections or interviews to check that the master and crew actually complied with the rules and instructions given.

Court of Appeal decision

On November 15 2010, following an appeal by the owners, the Court of Appeal reversed the district court judgment. The owners argued that the designated person ashore could not have prevented the grounding. The designated person ashore had ordered the master to comply with the convention, both through oral instructions and by issuing a non-conformity note. He could not have expected that further steps were necessary.
In relation to the unseaworthiness issue, the owners argued that the vessel had a safety management system, including a bridge watch system that complied with the International Safety Management Code. The crew was experienced, well-qualified and equipped with necessary equipment, manuals and instructions to perform the voyage safely. The fact that the master did not routinely use a designated lookout during navigation in darkness did not render the vessel unseaworthy at the beginning of the voyage.

The cargo interests have appealed the decision before the Supreme Court.

Ferrosilicon

a) Scan read the text to find the answer to the following questions.

1. What was the deficiency noted by the PSC inspection in the Netherlands?
2. What did the DPA do to correct the deficiency?
3. Were the DPA's corrective actions enough, according to the District Court decision?

b) If you were the judge of the Supreme Court, would you rule in favour of the shipowners or the cargo interests? Do you think that the owners are liable for the cargo damage? Should the cargo interests pay their share of the loss under the general average?

In my opinion, the cargo interests have a legitimate claim.

I' m not sure about that...

c) Write the correct verb, looking at the text.

1. The owners _____ general average.
2. The master _____ false entries in the deck logbook.
3. The DPA _____ a non-conformity note.
4. A PSC inspection was _____ out in the Netherlands.
5. The vessel and cargo were _____ but suffered significant damage.
6. The district court thought the owners _____ their duties.

d) Match the words to make collocations.

1. designated .....
2. non-conformity .....
3. applicable .....
4. corrective .....

rules and regulations
actions
lookout
note

There are two important notions central to the case above: *salvage* and *general average*. Let's find out more about them.

Salvage

In shipping law, salvage is the compensation allowed to persons who voluntarily assist in saving a vessel or its cargo from impending or actual peril from the sea. Except for salvage performed under contract, the rescuer, known as the salvor, must act voluntarily without being under any legal duty to do so. As long as the owner or the owner's agent remains on the ship, unwanted offers of salvage may be refused. Typical acts of salvage include releasing ships that have run aground or on reefs, raising sunken ships or their cargo, or putting out fires. The salvor has a maritime lien on the salvaged property, in an amount determined by a court based on the facts and circumstances of the case. The salvor may retain the property until the claim is satisfied or until security to meet an award is given. So, the term "***salvage***" refers to the practice of rendering aid to a vessel in distress.

LOF 1995

LLOYD'S

STANDARD FORM OF

SALVAGE AGREEMENT

(APPROVED AND PUBLISHED BY THE COUNCIL OF LLOYD'S)

NO CURE - NO PAY

At sea, a ship in distress will typically agree to "Lloyd's Open Form" with any potential salvor. The Lloyd's Open Form (LOF) is the standard contract, although other forms exist. The Lloyd's Open Form is headed "**No cure — no pay**"; the intention being that if the attempted salvage is unsuccessful, no award will be made. However, this principle has been weakened in recent years, and awards are now permitted in cases where, although the ship might have sunk, pollution has been avoided or mitigated.

e) An introduction to Lloyd's Open Form of Salvage Agreement. Listen to a presentation of LOF and find out the missing words.

1. When a ship runs into difficulty, a quick and efficient salvage operation is a priority for both the _____ and the owner.

2. The LOF enables salvage services to be provided without _____.

3. The Salvage Arbitration Branch collects _____ from shipowners, cargo owners and their insurers to protect the interests of the _____.

4. The salvage reward is left open and is determined later by a(n) _____. The level of "reward" is fair to all parties and encourages salvage operations, in other words it encourages others to aid vessels in distress.

5. The factors considered before the award (= arbitration decision) is determined and published are: the _____ consumed for the salvage operation, the risks presented, and the _____ of property salvaged.

General Average

Under the law of general average, if cargo is jettisoned in a successful effort to refloat a grounded vessel, the owners of the vessel and the cargo saved are required to absorb a proportional share of the loss to compensate the owner of the cargo that has been sacrificed. All participants in the maritime venture contribute to offset the losses incurred. The law of general average became an early form of marine insurance and was practised by ancient Greeks. It still remains part of the admiralty law of most countries. In order for General Average to be properly declared:

1) there must be an event which is beyond the shipowners' control, which imperils the entire adventure,
2) there must be a voluntary sacrifice,
3) there must be something saved.

The voluntary sacrifice might be: the jettison of certain cargo; the use of tugs or salvors; damage to the ship, be it, voluntary grounding, or knowingly working the engines that will result in damage.

f) Match the words to their definitions.

1. lien	☐ apply to a higher court for a reversal of the decision of a lower court
2. irrespective of	☐ counterbalance, use one cost to reduce the effect of another
3. grounds	☐ factors forming a basis for the justification of a belief
4. appeal	☐ the jurisdiction of law courts over cases concerning ships/the sea
5. impending	☐ regardless of, not taking something into account

6. ensuing	☐ following, that happens after or as a result of
7. mitigate	☐ imminent, approaching, that is going to happen very soon
8. offset	☐ lessen the gravity of a mistake or an offence
9. admiralty	☐ the right to keep somebody's property until a debt is paid

2. Chartering

I. Types of charter, terms and definitions

a) Read a text about chartering. Match each title sentence below with a paragraph.

What are freight rates?	Types of charter
The origin of the word "charter party"	Chartering as an activity within the shipping industry

1.

Chartering may seem like a new subject to you, until you realize that it is a term that has come into everyday use in other forms of transportation. But long before you could charter a bus, or take a charter flight to Europe, the principle was well established in shipping. The concept is similar: someone contracts with a shipowner for the use of all or part of his vessel; the owner gets a relatively assured income, and the charterer gets to use the carrying capacity of the vessel on the most favourable terms. The shipowner doesn't have to worry about each ton of cargo, so s/he doesn't have to charge a "retail" rate, as s/he would if s/he had fifty customers each time the vessel sailed.

2.

For hundreds of years, written contracts covering the leasing of a ship have been known as "charter parties". The term "charter party" derives from the Medieval Latin phrase "carta partita", meaning "divided document". To ensure the authenticity of a document, it was customary to execute the contract two times on the same piece of paper and then to tear it into two irregular portions. Each party would take one portion; subsequently, the authenticity of the document could be proven when the torn edges of the two copies fit together. Although this custom was not confined to contracts involving ships, widespread usage in sea commerce ultimately reserved the term "carta partita" to shipping contracts. The term "charter party" refers equally to the document and the specific agreement.

3.

A *voyage charter* is the hiring of a vessel and crew for a voyage between a loading port and a discharge port. The charterer pays the vessel owner on a per-ton or lump sum basis. The payment for the use of the vessel is known as *freight*. The owner pays the port costs (excluding stevedoring), fuel costs and crew costs. A voyage charter specifies a period, known as *laytime*, for loading and unloading the cargo. If laytime is exceeded, the charterer must pay *demurrage*. If laytime is saved, the charter party may require the shipowner to pay *despatch* to the charterer.

- With a *Contract of Affreightment* the shipowner undertakes to carry a number of cargoes within a specified period of time on a specified route.
- A *time charter* is the hiring of a vessel for a specific period of time; the owner still manages the ves-

sel but the charterer selects the ports and directs the vessel where to go. The charterer pays for all fuel the vessel consumes, port charges, commissions, and a *hire* to the owner of the vessel.

- A *trip time charter* is another "period charter". It is a comparatively short time charter agreed for a specified route only (as opposed to the standard time charter where the charterer is free to employ the vessel within agreed trading areas).
- A *bareboat charter or demise charter* is an arrangement for the hiring of a vessel whereby no administration or technical maintenance is included as part of the agreement. The charterer obtains possession and full control of the vessel along with the legal and financial responsibility for it. The charterer pays for all operating expenses, including fuel, crew, port expenses and P&I and hull insurance. In commercial demise chartering, the charter period may last for many years and may end with the charterer acquiring title (ownership) of the ship. Demise chartering is common for tankers and bulk-carriers.

4.

In some cases a charterer may own cargo and employ a shipbroker to find a ship to deliver the cargo for a certain price, called freight rate. Freight rates may be on a per-ton basis over a certain route (e.g. for iron ore between Brazil and China), in Worldscale points (in case of oil tankers) or alternatively may be expressed in terms of a total sum - normally in U.S. dollars - per day for the agreed duration of the charter.

b) See if you understand the types of charter; write them in the space provided.

time charter, bare boat charter, voyage charter, COA

1.	2.	3.	4.
In this contract it is the cargo and not the vessel that has a central position. A shipowner undertakes to carry quantities of a specific cargo on a particular route over a given period of time using ships of his choice with specific restrictions.	A ship earns freight per ton of cargo transported on terms set out in the charter party which specifies the precise nature and volume of the cargo, the port(s) of loading and discharge and the laytime and demurrage. All costs are paid by the shipowner.	The shipowner places the ship, with crew and equipment, at the disposal of the charterer. The charterer pays hire money and decides the type and quantity of cargo to be carried, the ports of loading and discharging. The charterer is responsible for supplying the ship with bunkers, for paying cargo handling operations, pilotage, towage and ship's agency. The technical operation and navigation of the ship remain the responsibility of the shipowner.	The ship is hired or leased for a period of time during which the shipowner provides only the ship while the charterer provides the crew together with all stores and bunkers and pays all operating costs. The shipowner gets a fee, usually long-term, and the ship is operated by the charterer as if s/he owned it.

c) Most Charter-Parties are standard forms with printed clauses and spaces or boxes in which details relating to the individual charter, such as freight, laytime, demurrage are inserted. The printed documents may vary and/or be added to by agreement of the two parties. Look at the circled words in the voyage C/P below. Explain what they mean, in English, and also explain their significance within the context of a voyage charter.

1. Shipbroker	RECOMMENDED THE BALTIC AND INTERNATIONAL MARITIME COUNCIL UNIFORM GENERAL CHARTER (AS REVISED 1922, 1976 and 1994) (To be used for trades for which no specially approved form is in force) CODE NAME: "GENCON" Part I
	2. Place and date
3. Owners/Place of business (Cl. 1)	4. Charterers/Place of business (Cl. 1)
5. Vessel's name (Cl. 1)	6. GT/NT (Cl. 1)
7. DWT all told on summer load line in metric tons (abt.) (Cl. 1)	8. Present position (Cl. 1)
9. Expected ready to load (abt.) (Cl. 1)	
10. Loading port or place (Cl. 1)	11. Discharging port or place (Cl. 1)
12. Cargo (also state quantity and margin in Owners' option, if agreed; if full and complete cargo not agreed state "part cargo") (Cl. 1)	
13. Freight rate (also state whether freight prepaid or payable on delivery) (Cl. 4)	14. Freight payment (state currency and method of payment; also beneficiary and bank account) (Cl. 4)
15. State if vessel's cargo handling gear shall not be used (Cl. 5)	16. Laytime (if separate laytime for load. and disch. is agreed, fill in a) and b). If total laytime for load. and disch., fill in c) only) (Cl. 6)
17. Shippers' Place of business (Cl. 6)	(a) Laytime for loading
18. Agents (loading) (Cl. 6)	(b) Laytime for discharging
19. Agents (discharging) (Cl. 6)	(c) Total laytime for loading and discharging
20. Demurrage rate and manner payable (loading and discharging) (Cl. 7)	21. Cancelling date (Cl. 9)
	22. General Average to be adjusted at (Cl. 12)
23. Freight Tax (state if for the Owners' account (Cl .13 (c))	24. Brokerage commission and to whom payable (Cl. 15)
25. Law and Arbitration (state 19 (a), 19 (b) or 19 (c) of Cl. 19; if 19 (c) agreed also state Place of Arbitration) (if not filled in 19 (a) shall apply) (Cl. 19)	
(a) State maximum amount for small claims/shortened arbitration (Cl. 19)	26. Additional clauses covering special provisions, if agreed

Council (BIMCO), Copenhagen

It is mutually agreed that this Contract shall be performed subject to the conditions contained in this Charter Party which shall include Part I as well as Part II. In the event of a conflict of conditions, the provisions of Part I shall prevail over those of Part II to the extent of such conflict.

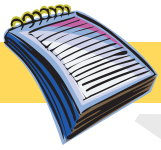
Signature (Owners)	Signature (Charterers)

What do shipbrokers do?

A shipbroker is an intermediary between shipowners and cargo owners. They bring the two together, negotiate a contract and see it through until the shipping contract is finished.

- There are approximately 8,000 bulk carriers around the world, the majority of which are floating freight taxis looking for the best paying business. No cargo owner can possibly keep tabs on where all these ships are. This is the role of the broker.
- There are literally thousands of firms that have cargo. Mining companies, trading companies, agribusinesses, governments, aid agencies etc. No shipowner can possibly know who has what and where! This is the role of the broker.

Brokers bring the two together and get paid a commission for their services. These commissions are very lucrative.



Glossary

confine	restrict, keep something inside the limits of a particular activity, area, subject
lump sum	a single payment made at a particular time, as opposed to a number of smaller payments or instalments
lucrative	producing a great deal of profit

d) Look at the following terms used in relation to chartering. What does each term mean? Match.

BROKERAGE / CONSIGNOR / TIME SHEET / ORDERS / MANIFEST
INCOTERMS (International Commercial Terms) **/ SHIP'S AGENT / OFF HIRE**

1		Set of instructions given by the shipowner or ship operator to the master of a ship concerning the next voyage. These instructions include the names of the intended ports of loading, bunkering and discharging together with the names, addresses, telephone numbers of the ship's agents at each port, and details of the cargo.
2		Fee or commission payable by the shipowner to a shipbroker for successful negotiation of a charter. It is normally expressed as a percentage of the freight, or hire, and is specified in the relevant Charter Party clause.
3		Person who places goods in the care of a carrier for delivery to a person known as a consignee.
4		Said of a ship on time charter for which hire money has temporarily ceased to be paid by the charterer, for example because of breakdown of the ship or its equipment.

5		Rules, governing the interpretation of terms and defining the duties of buyer and seller, used in international trade, published by the International Chamber of Commerce (e.g. FOB, Free on Board)
6		Statement, drawn up by the ship's agent at the loading and discharging ports, which details the time worked in loading and discharging the cargo together with the amount of laytime used. This latter figure, when compared with the time allowed in the voyage Charter Party, is used by the shipowner and charterer to calculate demurrage or despatch, as the case may be.
7		Document containing a full list of ship's cargo, extracted from the bills of lading. A copy is lodged with the Customs authorities at the port of loading, a further copy is similarly lodged at the discharge port, with one copy going to the ship's agent so that discharging operations may be planned in advance.
8		Person who looks after the interests of a ship while in port. Their duties include arranging for pilotage, towage and a berth for the ship, signing of bills of lading and collecting freight. S/he is paid a fee, agreed in advance with the shipowner.

II. The calculation of laytime

In commercial shipping, **laytime** is the amount of time allowed (in hours or days) in a voyage charter for the loading and unloading of cargo. If the laytime is exceeded, **demurrage** is paid. If the whole period of laytime is not needed, **despatch** (also spelled dispatch) may be payable by the shipowner to the charterer, depending on the terms of the charter party (despatch does not apply to tanker charters). So, the term demurrage refers to the period when the charterer remains in possession of the vessel after the period normally allowed to load and discharge cargo. The reverse of demurrage is despatch. If the charterer requires the use of the vessel for less time than the laytime allowed, the C/P may require the shipowner to pay despatch for the time saved.

Laytime and laydays are often confused as referring to the same idea. **Laydays** refers to the time when a ship must present itself to the charterer. If the ship arrives before the laydays specified, the charterer does not have to take control or start loading (depending on the type of charter). If the ship arrives after the laydays, then the contract can be cancelled – hence laydays are often presented as the term **Laydays and Cancelling** and can be shortened to **Laycan**. This is a spread of days, e.g. "Laydays 1st September/Cancelling 15th September", between which a vessel is to present for loading. Too early and it will probably have to wait. Too late and it risks being cancelled by the charterers.

The point when laytime commences is determined by a *Notice of Readiness* (NOR), which the master or agent of the ship must give the charterer when the ship has arrived at the port of loading or discharge. The NOR informs the charterer that the ship has arrived at the port and is ready in all respects to load or discharge.

a) Write the term for the following definitions, based on what you have learnt from the text above.

1		Amount of money, the rate of which is agreed in advance, payable by the shipowner to the charterer, shipper or receiver, as the case may be, for loading and/or discharging in less than the time allowed.
2		Amount of money paid to the shipowner by the charterer, shipper or receiver, as the case may be, for failing to complete loading and/or discharging within the time allowed in the Charter Party.
3		Days allowed by the shipowner to the voyage charter or Bill of Lading holder in which to load and/or discharge the cargo
4		Period during which the shipowner must tender notice of readiness to the charterer that the ship has arrived at the port of loading and is ready to load. This period is expressed as two dates. The charterer is not obliged to commence loading until the first of these dates if the ship arrives earlier and may have the option of cancelling the charter if the ship arrives after the second of the dates.
5		Time allowed by the shipowner to the voyage charterer or Bill of Lading holder in which to load and/or discharge the cargo. It is expressed as a number of days or hours or tons per day. There is a provision in the Charter Party for the commencement of this period of time, which is at a certain hour after notice of readiness has been tendered by the master, a provision for when this period does not count, for instance during bad weather, weekends or holidays, a provision for the period being exceeded, or not being fully used.

b) There is a number of terms and abbreviations used in charter parties which are of particular relevance to the calculation of laytime. Some common terms are presented below in alphabetical order. Listen to a presentation and fill in the missing terms and abbreviations.

	Abbreviation	*Full term*	*Meaning*
1	**EIU (e.i.u.)**		If cargo is loaded or discharged during these days, laytime not to count.
2			Cargo to be loaded and discharged at no cost to owner-charterer pays for loading/discharging.
3	**FOB (f.o.b.)**		Cargo to be loaded at no cost to owner; seller is responsible for delivering cargo to the port, paying also the loading.

	Abbreviation	*Full term*	*Meaning*
4			Dispatch must be paid by owners to charterers for any time saved.
5			Sundays and holidays do not count in laytime.
6			Sundays and holidays do not count in laytime unless used.
7		**Sundays and Holidays Excluded even if used**	Sundays and holidays do not count in laytime even if loading/discharging operation takes place.
8	**SHINC (s.h.inc.)**	**Sundays and holidays included**	Sundays and holidays count in laytime as normal days.
9		**Unless used**	If cargo is loaded or discharged during these days, laytime to count as normal days.
10			Laytime to commence counting whether the vessel is in berth or not.
11	**WD (w.d.)**	**Working days**	Normal working days.
12			Days that work can be performed subject to weather conditions.

c) Look at the following website of a charterer's company and do exercises (i) and (ii) below.

i. What do the highlighted terms mean? Read them in the context of the site, then match them to their definitions:

1		Document issued by a shipowner to a shipper of goods. It serves as a receipt for the goods, evidence of the contract of carriage and document of title.
2		Person to whom goods are to be delivered by the carrier at the place of destination.
3		An individual or company with cargo to transport, who enters into a contract with a shipping line or shipowner for the carriage of goods.

WELCOME TO SB SHIPPING

Chartering

Dry cargo chartering department
Reefer cargo chartering department
Tanker chartering department
Livestock carriage

Reefer cargo chartering department

The department has been supporting the fresh fruit liner service from Europe to St. Petersburg since 1999. Nowadays the company charters vessels for the following services: South America frozen food liner service, West Africa frozen food regular service, European frozen meat line and European fresh fruit line.

To support our trades, we operate not only with voyage chartered vessels but also with ships engaged on the basis of single-trip or period time-charters, contracts of affreightment and commercial management.

European fresh fruit line

A wide range of different types and sizes of electrically ventilated and refrigerated vessels (including ice-strengthened ones), taking in 1300 to 3500 standard ISO pallets, enables us to offer weekly sailings and thus guarantee to our Customers a smooth flow of cargoes to the tables of consumers.

Containerized shipments

In addition to break bulk shipments of refrigerated goods we are pleased to offer you shipments of cargo in refrigerated containers from different countries of the world to the port of Saint-Petersburg with the further delivery to different parts of Russia. We can transport fresh vegetables and fruits, frozen meat products and fish and other perishable products.

Main conditions for shipments with our company:
LILO (liner in – liner out, includes loading of container to the vessel, sea freight and discharging in port of destination).
DOOR – DOOR (delivery from ***Shipper's*** store to ***Consignee's*** place, includes pre-carriage from Shipper's place to port of loading, loading of container aboard the vessel, sea freight, discharging in port of destination, delivery to Consignee's place).
Custom clearance (export and import) and Port forwarding can be offered in addition to the mentioned conditions of carriage as well.

Seller Protection system
We process hundreds of sets of documents per annum and so are only too well aware that any damage to, loss of, or delay in receipt of original documents can lead to heavy expenses on Shippers' side. Also, we realize that not a single ton of cargo should be received by a Consignee without entire due payment. On top of conventional methods of protecting Shippers' interests, such as holding of original ***bills of lading***, we resort to the following instrument: the protected holding of the original documents. Many Shippers consider sending original documents to Receiver only against cash received. With our system, when the original documents are ready and cargo is on the water on board conventional or container vessels, Shipper can send the original documents to our office in St. Petersburg and we will be holding them until clear instructions from an authorized person are issued and received for the release of those documents to Consignee. This method involves an opportunity to reduce the risks of demurrage through Receiver's fault due to late payment, and the risks of demurrage due to air-courier's mistake, because the documents are not sent in the very last moment but well in advance.

ii. Imagine you work at the reefer cargo chartering department and you receive the following message on the company contact form from a potential customer requesting information.

Contact Form
Message:

I need to transport a consignment of fresh fruit from Greece to Russia.
Could you please inform me as to the following:
1. What types of charter do you offer?
2. What types of ships and transportation modes / packaging are available?
3. How is the shipment delivered to port and then to the customers?
4. In the past we had some problems with original documents being delayed. As a result we had to pay demurrage. How do you handle this potential problem?

Based on the information on the company site, write an email to the potential customer. Start like this:

I am writing in reference to your request for information on our services.

First of all you should know that we have a long tradition chartering vessels to transport fresh fruit from Europe to Russia. On top of that, we offer a variety of charters you can choose from.

1. We offer.....
2. You can use.....
   The cargo is packaged/carried in.....
3. We can take the shipment from your store.....
4. To tackle this common problem we have established a protection system.....

I am at your disposal if you have any further questions.

Round-up

A. Can you describe basic principles of marine insurance and chartering? Tick ☑ the concepts that you can explain in English.

☐ general average	☐ shipbroking	☐ P&I Club
☐ underwriting	☐ liability	☐ salvage
☐ time charter	☐ bareboat charter	☐ laytime/demurrage/dispatch

B. Class Project.

- Research the concepts of ***Actual Total Loss/Constructive Total Loss*** and present them in class. Use the following case study as an example: Even though only partially sunk in shallow water, in 2012, the relatively new cruise liner *Costa Concordia* was declared a "constructive total loss" due to escalating environmental and salvage clean-up costs.

- Explain the following ***INCOTERMS*** in class: CIF, DAT, FAS, CFR.
- What is the ***"Both to Blame Collision Clause"*** in a Bill of Lading or Charter Party? Locate it in a C/P, read it in class and explain.
- ***"Once on demurrage, always on demurrage"***. What does this maxim mean?

C. Fill in the gaps.

orders	liability	indemnify	claim
policies	average	avert	completion

1. He set fire to the boat to _____ the insurance money.
2. The company cannot accept _____ for any damage caused by natural disasters.
3. The object of marine insurance is to _____ the insured against marine adventure.
4. The York-Antwerp Rules of General _____ establish the rights and obligations of the parties when cargo must be jettisoned from a ship. The rules are incorporated by reference into most marine insurance _____ and provide for the shipowner to recover the costs of repairs, loading and unloading cargo, and maintaining the crew, if these expenses are necessary for the safe _____ of the voyage. Traditionally, the merchants whose cargo landed safely would be called on to contribute a portion, based upon a share or percentage, to the merchants whose goods had been jettisoned to _____ imminent peril.
5. When a ship is "awaiting _____", the master may be instructed to anchor at the ship's current location or to steam in the direction of the area where the shipowner expects to find a cargo.

D. Match to make collocations.

1. third .....
2. sea .....
3. ensuing .....
4. to tender .....
5. voluntary .....
6. customs .....
7. hull and machinery .....

venture
party
sacrifice
investigation
cover
notice of readiness
clearance

E. Match each abbreviation to its meaning. Then write exactly what the abbreviation stands for. One is given as an example.

LOF	WP	C/P	SHEX
LAYCAN	NOR		B/L

	Abbreviation	***Term***	***Meaning***
1			Charter Party term which provides that particular days do not count in the calculation of laytime.

	Abbreviation	Term	Meaning
2			Standardized salvage contract.
3			Spread of days between which a vessel is to present for loading; arriving too late, the vessel can be cancelled by the charterers.
4			Document serving as evidence of the contract of carriage, as a receipt for the goods carried and also giving the holder title of the goods.
5			Document containing all the terms and conditions of the contract between a shipowner and a charterer, signed by both parties or their agents, for the hire of a ship or the space in a ship.
6	WP	Weather Permitting	This means that any time, when weather prevents the loading or discharging of the vessel, shall not count as laytime.
7			This means the notification to charterer, shipper or receiver (as required by the charter party) that the vessel has arrived at the port or berth and is ready to load or discharge.

F. Word puzzle.

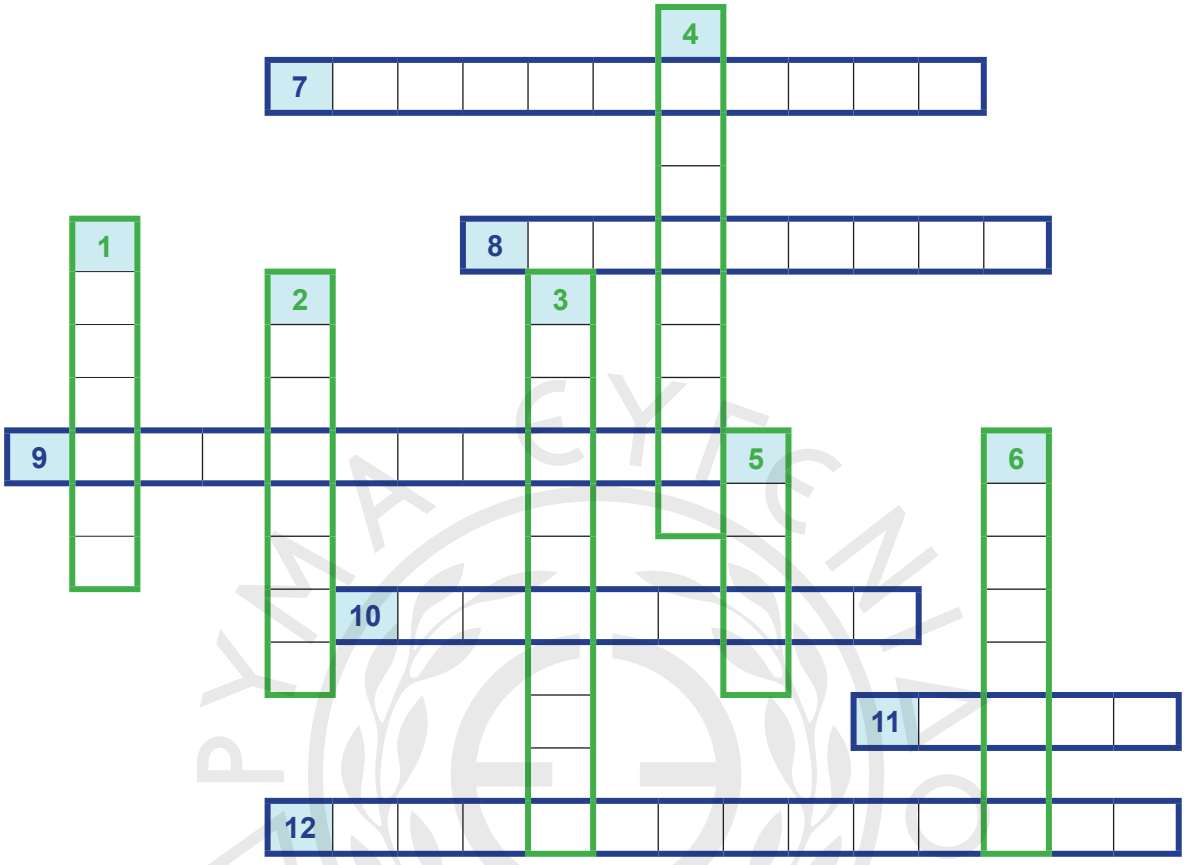
Down

1. An article in a legal document which says that a particular thing must or must not be done.
2. Amount of money paid for an insurance policy.
3. Specialist intermediary/negotiator between shipowners and charterers who use ships to transport cargo, or between buyers and sellers of vessels.
4. Person responsible for the receipt of a shipment, designated as the receiver of goods.
5. A shared supply of resources to be drawn on when needed.
6. The period of time during which the owner will make and keep the vessel available for loading or discharging without payment additional to the freight.

Across

7. The Lloyd's market is a collection of _____.
8. An agreed amount payable by the owner if the vessel completes loading or discharging before the laytime has expired.
9. To accept responsibility for an insurance policy so that you will pay money in case damage or loss happens.
10. A ship hired without a crew is on _____ charter.
11. A right to keep possession of property belonging to another person until a debt owed by that person is discharged.

12. Contract of _____: contract for the hire of ship; the shipowner undertakes the transport of certain amounts of goods for one or several voyages.



UNIT 8

Marine Correspondence

1. *Documents / Certificates*
2. *Letter of Protest*
3. *The language of written communication*
4. *Request letter, memo, meeting agenda*
5. *Weekly observations and management meetings*

Round-up

1. Documents / Certificates

Imagine you are going to have an ISM audit on board, and you receive the following instruction:

The documents that are required by the auditor in an ISM audit for the SMC (Safe Management Certificate) include:

- *Ships Statutory Certificates*
- *Class Certificates & Survey Status Reports & Conditions of Class*
- *Stability Book*
- *Oil Record Book Part 1*
- *Garbage Record Book*
- *Officer Certificates of competency and Certificates of equivalent competency*
- *Crew Agreement*
- *Safety Management Manuals*
- *Training & Familiarisation records*
- *Record of Drills*
- *Details of Accidents, non-conformities and hazardous occurrences*
- *Minutes of Safety Meetings*
- *Planned Maintenance Records*
- *Cargo Loading / Discharge Plans*
- *Permit-to-work records*
- *Records of Previous internal audits*
- *Hours of Work records*
- *Port State Control Inspection Records*

Please ensure that the following documents (relevant to your vessel) are made available for the audit.

A. *Below are definitions/explanations of some of these documents. Which ones?*

1. _____: a summarized record of the proceedings of a meeting.
2. _____: a certificate issued and endorsed by the administration, for masters, officers and GMDSS radio operators in accordance with the provisions of STCW, which entitles the lawful holder to serve in the capacity and perform the functions involved at the level of responsibility specified.
3. _____: employment contract between a ship's owner and its crew.
4. _____: official document giving someone authorization to do some work, for a limited period of time, such as cold/hot work, entry to confined spaces, etc.
5. _____: certificates required to be kept on board the ship in compliance with currently valid International Conventions and Codes, (for example, the International Load Line Certificate, the Cargo Ship Safety Construction Certificate, the International Oil Pollution Prevention Certificate).

B. *This is an example of the SMC certificate that will be issued. It is a statutory certificate, compulsory under the ISM Code. Fill in the missing words.*

applicable	amended	subject	provisions	tonnage
certify	valid	audited	compliance	registry

DET NORSKE VERITAS

SAFETY MANAGEMENT CERTIFICATE

DNV Ship Id. No.: 00000
DNV Company No.: 000000
Certificate number: D00000/021202F

Issued under the 1. of the INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, as 2.

Issued under the authority of the Government of:

Norway

by Det Norske Veritas

Name of ship:	"FELICIA"
Distinctive number or letters:	XXXX1
Port of 3.	KRAGERØ
Type of Ship*:	Other Cargo Ship
Gross 4.	11658
IMO Number:	00000000
Name and address of the Company: (as per ISM Code sec. 1.1.2)	Benkestok Shipping Rørvikveien 32 3770 Kragerø Norway

THIS IS TO 5. THAT the safety management system of the ship has been 6. and that it complies with the requirements of the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code), following verification that the Document of 7. for the Company is 8. to this type of ship.

The Safety Management Certificate is 9. until 2007-10-14, 10. to periodical verification and the validity of the Document of Compliance remaining valid.

Issued at: Det Norske Veritas, Høvik, Norway
Date of Issue: 2002-12-02

Sign.

Name
Head of Section

* Insert the standard IMO ship type.

C. ***Common collocations/phrases that appear in ship certificates. Match to recreate them.***

1. subject .....
2. expiry .....
3. in accordance .....
4. under .....
5. is in all .....
6. date .....
7. the undersigned .....
8. date on .....

respects satisfactory
which keel was laid
to verification
date
with
the provisions of
of issue
is duly authorized

2. Letter of Protest

A. ***Read the following Letter of Protest and underline the phrases that are related to a possible liability claim. What are the damages the master wants to cover against? What claim might the cargo interests/third parties make? Who is asked to accept liability?***

Port: Guaiba Island Terminal — Voyage: 131
To: GUAIBA Harbour Master, BHP BILLITON — Date: 03 February 2016
From: Master, M/V Dream

Re: Vessel aground alongside berth

Dear Sirs,
You are hereby advised that in accordance with the terms of the governing charter party, my vessel must be berthed alongside a quay where sufficient depth of water exists at any state of the tide to remain safely afloat at all times. Under no circumstances is my vessel permitted to lie aground.

In accordance with the tidal predictions, time of LW on 03/02/2016 is 1030 hours LT. Vessel draught at 03/02/2016 1030: FWD 18,10 meters, MID (PORT) 16,90 MTRS, MID (STBD) 19.20 MTRS, AFT: 18,15 MTRS.

Accurate soundings of the depth of water around my vessel were taken when above draught was read (see attached diagram) that clearly indicates my vessel has heavily grounded. I therefore place you on notice and I strongly protest against you and hold you responsible and liable for any damage(s) that may have been caused to my vessel's underwater hull area, including but not limited to any time and cost performing an internal/underwater survey or shifting the vessel to a safe berth or deviating the vessel to a port or place for repairs. I also hold you fully responsible and liable for any claim whatsoever from cargo interests or third parties for delaying cargo operations or delivering cargo at an unscheduled place. Details of any damage will be advised as soon as possible, but to avoid further possible damage, you are requested to accept liability and immediately arrange for my vessel to be shifted to an alternative berth where deeper water exists to lie safely afloat at all times.

Please urgently advise what arrangements you are making.

Yours faithfully,
Master, ...

Received and acknowledged by .....
for and on behalf of BHP BILLITON.

B. *The following are some subjects of Letters of Protest. Fill in the missing words.*

figures	contaminated	supplying	commencing	facilities	fouled	sample

- Delay between arrival (NOR) and (1) _____ loading.
- Delay during cargo operations.
- Slow Loading.
- Slow Discharge.
- Inadequate Loading (2) _____.
- Loading of suspected (3) _____ cargo.
- (Bunkers) Delay in (4)_____ Bunkers.
- (Bunkers) Difference between Ships / Barge (5) _____ for quantity supplied.
- (Bunkers) Water in barge / shore tanks, before commencing.
- Berth unsuitable for this ship (poor moorings etc.).
- Delay awaiting documents.
- Inadequate Fenders at Berth.
- Delay awaiting results of (6) _____ analysis.
- (7)_____ mooring rope.

C. *What is the role of LOPs? Listen to a short lecture and fill in the missing words in the summary below.*

A letter of protest describes something that went wrong beyond the Master's (1) _____, and brings it to the attention of all parties concerned, either for some immediate action or for (2) _____ reference. Sea Protests were signed in front of a (3) _____ public but nowadays this practice is generally abandoned. Although the letter of protest is not a (4) _____ document, it has a certain legal value because it is treated as admissible (5) _____ in the courts of justice. Nevertheless, it can be contended as untrue or of no weight because it is usually singed 'for (6) _____ only.'

An important role of Letters of Protest is that they usually form part of the documentation submitted by the shipowner in support of a (7) _____ claim against the charterers, under the (8)_____ of the charter party. For example, letters of protest entitled "Slow Pumping" or "Delays" are issued to show the reason of any delay from the terminal side during (9)_____. Also, in the transportation of liquid cargoes with high hydro sulphide content, a letter of protest is required to be issued if the H_2S (10) _____ are not provided by the terminal.

D. *Look at the following two samples of LOPs. Identify the parts they are made of and put them in order. Write the correct number (1-10) in the boxes.*

☐ subject
☐ recipient
☐ main body (paragraph with details of the circumstances)
☐ main body (paragraph with "I protest against" phrase)
☐ main body (paragraph with "I reserve rights of my owners to make claims" phrase)

- ☐ place & date
- ☐ sender (Master)
- ☐ complimentary closing (“yours faithfully”) & Master signature
- ☐ salutation (“Dear sir(s)”)
- ☐ “for receipt” & recipient signature

LETTER OF PROTEST

Port: Al Jubail
Berth: SASREF # 61
To: Drum Oil Co.
From: Master

Voyage No.: 1232
Date: 16/02/2015

Re: **Slow discharge**

Dear Sirs,

On behalf of my Owners and Charterers I hereby present this protest due to the slow discharge of the cargo of Jet A1, owing to the restricted cargo handling facilities available.

This vessel is equipped to discharge through 4 x 16” lines but at your terminal only two 8” hoses were available for this grade. In addition, the vessel was restricted to discharge at a maximum backpressure of 8.5 kg as per shore requirements.

I therefore reserve the rights of my Owners and Charterers to refer to this matter at some later date and take such actions, or make any claims, as they may deem necessary.

Yours faithfully,
Paul Hebden,
Master, M/V GREG

For Receipt only.....
On behalf of Drum Oil Co.

Port: Bahrain
Terminal: BAPCO
To: BAPCO
From: Master

Voyage No.: 10
Date: 25/09/15

Re: **Loading of suspected contaminated cargo**

Dear Sir,

On behalf of my Owners and Charterers I hereby lodge this protest due to the apparent loading of contaminated cargo into ship’s tanks.

Once loading operations were resumed at 0945 LT 24/09/15, further samples were taken from ship’s tank No: 4 centre. These were visibly cloudy, with apparent solid particles present. At 1020 LT 24/09/15, the master required that loading be suspended, until this matter can be resolved. Charterers and Owners were informed of the situation via phone, and Ship’s agency, "Mina Tank" and Owners’ P and I Club, "Gulf Agency Corp., (Kuwait)", were telexed, and P & I representative requested to attend the vessel.

I therefore reserve the rights of my Owners and Charterers to refer to this matter, at some later date, and take any actions, or make any claims as they may deem necessary, as a direct result of this incident.

Yours faithfully,
Paul Hebden,
Master, M/V GREG

For Receipt only.....
On behalf of Kuwait Petroleum Corp.

E. *What is the subject? Fill it in (choose from the list in exercise B).*

Re:

Dear Sir,

On behalf of my Owners, I hereby present this protest due to the poor fendering arrangements, being provided for the intended S.T.S. operations.

At 1420 L.T. 01/09/15, I brought this to the attention of your representative, via the ship's agent, and requested that floating («Yokohama» type) fenders be provided, as is normally customary for such transhipment operations. In lieu of these, I requested that the fendering arrangements be much improved on all barges, to be used for this operation. I was later advised that there were no floating fenders available. The receivers were advised that I would suspend operations as necessary, should subsequent fendering arrangements or weather deem it necessary.

Regardless of the above, I hereby hold you responsible for any damage that may be sustained, as a direct result of the poor fendering arrangements. I also reserve the rights of my Owners and Charterers to refer to this matter at some later date and take any actions, or make any claims, as they may deem necessary.

Re:

Dear Sir,

On behalf of my Owners and charterers I hereby lodge this protest due to the delay between the vessel arriving / tendering Notice of Readiness and the commencement of loading.

The vessel arrived / tendered Notice of Readiness at 1648/14th Feb but cargo loading did not commence until 0105 / 16th Feb.

I therefore reserve the rights of my Owners and Charterers to refer to this matter at some later date and take any action, or make any claims, as they may deem necessary.

F. *Look at the following useful phrases and choose the words which complete the LOP below. Also, what part is missing from the main body of the LOP?*

- please note the following
- under the circumstances
- yours faithfully
- I hold you responsible
- for reasons beyond (my) control
- the commencement of loading/discharging was delayed

Re: Delay in commencing discharge

This is to protest against the fact that for reasons beyond the vessel's 1._____, the commencement of discharging operations was 2._____ for a period of 02 hours.

Under the 3. _____, I hold you fully 4._____ for the delays, any direct or indirect damage and other consequences.

Yours 5._____

G. *Fill in the correct prepositions in the protest. What type of vessel is it?*

Re: Damage (1)_____ the vessel during discharge operation and delay of cargo operations completion

Dear Sirs,

I, the Master of M/V Morundo, of gross tonnage 81877 MT, (2)_____ Greek flag and registered at the port of Piraeus, protest (3)_____ the damages caused to the vessel due (4) _____ incompetent handling of the crane operator during discharge operations as well as against any delays that may occur due to the above incident.

More specifically, the negligence of the crane operator caused the spreader to hit forcefully the cell guide and to bend it (5) _____ such a way that it is impossible to continue discharging. This will result (6)_____ delay concerning the discharge of Bay 30.

After agreement with the charterers and the owners, the repairs will take place (7) ____ your good port. (8) _____ the circumstances, please make all the necessary arrangements for the immediate commencement of repairs in order to minimize the forthcoming delay of the vessel's departure.

Please accept full responsibility concerning the above unpleasant incident.

Yours faithfully,
Capt. Pantelis Ioannou
Signature and Stamp

Received by …..
Name and Signature

H. *Write a LOP. Choose your own subject. Use the following words in your text.*

accept, in accordance with, circumstances, protest against

I. *Read the text and answer the following questions.*

1. What makes the language of LOPs unclear?
2. Why must the Master understand what the LOP hopes to achieve?
3. In the court case, the Master used the standard form of LOP and referred to documents which he actually hadn't used. Which ones? Which document had he actually used to record delays and times?
4. Was demurrage paid by the charterers?

Lack of clarity in Letters of Protest[1]

Letters of protest may actually be related to almost any activity on board, i.e. cargo, stores and bunker handling, equipment or machinery failure, navigation, safety, local regulations, etc. In practice, such letters are being abundantly issued and counter-issued by various parties participating in the common maritime adventure. This industrious productivity in combination with little understanding of anticipated effect and value of LOP, contribute to situations when the content of such documents is usually blurred with general phrases vaguely alleging that someone is to be responsible for something. Such unintelligible documents produce no positive effect at all.

1. Abridged from www.lawandsea.net.

Common sense.

As a rule of the thumb, to hold someone responsible for something, it is necessary first of all to establish that this person had an obligation with regard to this 'something'. For example, it is usually senseless to hold the charterers responsible for the damage caused by third party independent contractors, such as tug boats, pilots or bunker barge, because, generally, charterers do not take such responsibility under voyage charter and therefore they are under no obligation to compensate shipowners.

Unintelligible documents produce no or negative effect.

A decision of the High Court on 19 February 2015 is a vivid illustration of the destructive effect caused to a demurrage claim by incomprehensible wording of Letter of Protest.

In that case, the owners claimed demurrage in the amount of US$ 364,847.78 as a result of delays at both the load port, Sitra, and the discharge port, Port Sudan totalling 21 days 13 hours and 48 minutes. To support their demurrage claim, the owners submitted copies of Notice of Readiness, Statement of Facts, pumping log for discharge port and Letters of Protest. The Arbitration Tribunal found that a number of the Letters of Protest at Sitra referred to delays or stoppages "recorded in port log/time sheets". Since there were no such documents within those supporting the demurrage claim, the charterers argued that they are not liable for demurrage. They based their argument on assumption that as per charter party the port logs and time sheets were required to be presented as important evidence supporting the demurrage claim.

Vessel was chartered under amended BPVOY4 form, where clause 20 provided that:
20.1 Charterers shall be released from all liability in respect of any claim for demurrage, deviation or detention which Owners may have under this Charter unless a claim in writing has been presented to Charterers, together with all supporting documentation substantiating each and every constituent part of the claim, within ninety (90) days of the completion of discharge of the cargo carried hereunder.

The owners contended that port log/time sheets were not required in this case as all the information required for the purpose of the demurrage claim was set out in the signed Statement of Facts. Assumingly the standard form of Letter of Protest used by the master mentioned port log and time sheet forms as generic titles of the document where all times and delays are recorded by the master. But in fact the master used a document titled as Statement of Facts, not port log/time sheet, albeit containing similar information.

Nevertheless, both the Arbitration Tribunal and, on appeal by the owners, the High Court held that the port logs and time sheets were required to be presented. Thus, it was decided that all supporting documentation was not provided as required by the clause 20, with the consequence that the claim for demurrage was rejected.

3. The language of written communication

General guidelines for marine correspondence.
The basic principles are:

- ***Keep it clear.***
- ***Keep it short.***
- ***Keep the register formal.***

Make your intention clear; all writing should be understandable, clearly worded and should not be ambiguous or misleading. Also, remember that written communications like business letters, memos, reports etc. have a formal style.

Also,

- *Be courteous*; compare "send us the correct stowage factor" with "please advise us the correct stowage factor." When you use phrases like "please advise" or "your good vessel" you come across as polite and considerate.
- *Keep it complete*; incident reports answer the basic questions: *when, where, what, who, how.*
- *Keep it correct*; Proofread your text and check for syntax/grammar mistakes. Here are some common mistakes:

example	***type of mistake***	***corrected***
• Came on board an inspector in Fos to do a PSC inspection.	Word order (SVO) Formal vocabulary	• An inspector came on board in Fos to carry out a PSC inspection.
• First, he check the Ship Certificates.	Grammar:Tenses	• First, he checked the Ship Certificates.
• After, he checked...	Connecting words	• Then, he checked...
• There was two non-conformities.	Grammar: plural	• There were two non-conformities.

A. ***Fill in the gaps. Put the jumbled letters in order to form the missing words. Does the report have an appropriate formal style?***

I am writing _____ *[g-a-g-e-r-i-r-n-d]* the recent thefts that have _____ *[c-e-o-d-u-r-c-r]* onboard. I can _____ *[r-u-s-e-s-a]* you that I have the matter in _____ *[n-h-d-a]*. The cabin locks have been changed and a new master key is now in use. I am _____ *[t-e-n-o-c-i-n-d-f]* we will not have similar problems in the future.

B. ***The master sends an email to report a problem on board. On the right, the report has the appropriate formal style of written communication. On the left, there is a more informal version of the same report; the style is more like that of spoken language. Rewrite the two missing parts of the report, making them more formal. Use corresponding formal words/phrases where you can and keep the same meaning. For help, use the dictionary entries below. Also, write the subject.***

Date: 23 July
From: MV Bricklayer
To: HSEQ dep
SUBJECT: _____

Dear sirs,

I am sorry to tell you this: *What happened is that I suspect cold stores on board have gone off.* *The chief cook told me that the temperature in the freezer unit has not been the correct one.*	I regret to inform you of the following: We had an incident of suspected contamination of the cold stores on board. I was informed by the chief cook that the temperature in the freezer unit has not been the appropriate one.

When they opened the freezer today the smell was bad and some products had began to melt and rot. I think some of the food has become bad.	When the freezer was opened today, ...
Plus, when I looked myself, I saw that not all the food was wrapped separately. So, now the smell has spread and the bad smell is absorbed by all the cold stores in the freezer unit. *Why did it happen? Perhaps the door joint was broken and nobody saw this when we had the planned maintenance inspection.* *The cook had checked the temperature but the thermometer readings were recorded with mistakes and we didn't see the problem.*	Additionally, upon inspection, I noticed that not all the food was wrapped separately. As a result, the odour has spread and it is absorbed by all cold stores in the freezer unit. As to the cause of the problem, it is most likely a malfunction in the door joint that went unnoticed during planned maintenance inspection. The cook had checked the temperature but ....
I haven't heard of any cases of food poisoning on board so far. But I am worried about this situation, as I am responsible to keep my crew healthy, and make sure that there is no risk of illness because of eating contaminated food. *Don't worry, the situation is now under control. After speaking to the Chief Cook, I decided to seal the freezer and not use the stores at all. I hope this is okay.*	As far as I am aware, there have been no cases of food poisoning on board. Yet, this situation concerns me as I have full responsibility to safeguard the well-being of my crew, and ensure that my crew is not at risk from illness caused by the consumption of contaminated food. I can assure you that I have the matter in hand, however. After speaking to the Chief Cook, I have decided to seal the freezer and the stores will not be used at all. I trust that this is acceptable to you.
I am very sorry about this terrible thing that happened. Please give me instructions.	I deeply regret this unfortunate incident. Awaiting your instructions.

Dictionary entries *[from Oxford Advanced Learner's Dictionary, www.oxforddictionaries.com]*

foodstuff	**decay**
noun /ˈfuːdstʌf/ [usually plural]	*verb* /dɪˈkeɪ/
any substance that is used as food *'Basic foodstuffs such as sugar, flour and cooking oil have disappeared from supermarket shelves.'*	(of organic matter) rot or decompose through the action of bacteria or fungi (as adjective **decaying**) *'the odour of decaying fish'* [mass noun] the state or process of rotting
odour	**inaccurately**
noun /ˈəʊdə(r)/ (formal)	*adverb* /ɪnˈækjərətli/
a smell, especially one that is unpleasant *'The officer smelled the odour of alcohol on the accused's breath.'*	in a way that is not exact, or accurate, or has mistakes *'She was inaccurately referred to as the first woman captain of a mega-cruise ship.'*

C. *Read the answer that was sent by the ship manager. Do exercises (i) and (ii).*

i. Which of these messages are contained in the text? Where in the text can you find them? Circle the messages the text contains and highlight the relevant part of the text.

reminder invitation instruction request warning explanation

ii. Find the words/phrases which are explained in the glossary and fill them in.

From: Ship manager, HSEQ department
To: Master, M/V Bricklayer

Dear Master,

We find the incident you described alarming and are seriously concerned about the sanitary conditions on your vessel. New food provisions will be delivered in the next port of call and, furthermore, an HACCP food inspector, accompanied by the local agent, will come on board for an inspection. Keep in mind that our company deals with food and fresh water safety and hygiene issues based on a HACCP system (Hazard Analysis and Critical Control Point). You are requested to give this person full access to all accommodation spaces.

Please take note of the following guidance that you must adhere to, for your information and reference:

MLC 2006, Minimum Requirements Regulations, Part 8, Provisions covering food and catering for seafarers working on merchant ships[2].

1. The shipowner and Master must ensure food is provided on the ship which does not contain anything which is likely to cause sickness and is unfit for consumption.
2. The Master, or an authorized person, must make weekly inspections of the supplies of food and water to check compliance with regulations 34 and 35 (*Regulation 34: Provision of food and drinking water, Regulation 35: Organization and Equipment of the Catering department*).
3. Safe temperatures for cold stores are generally considered to be minus 18°C or colder for freezer cabinets. In freezer units, the combination of high humidity and fluctuating temperatures (warmer than minus 10°C) accelerate mould and other spoilage bacterial growth. Fluctuating temperatures may also cause an accumulation of ice deposits.
4. Although fridges and freezer cabinets should be maintained according to the ship's planned maintenance system, cooks and others working in the galley should regularly check the conditions of door seals and closing devices as well as routinely monitor temperatures.
5. Food should always be covered or wrapped to prevent cross contamination and absorption of odour.

We expect the crew's full cooperation in making sure no similar occurrence takes place.

Glossary

_____ (idiom) to pay attention to something and be sure to remember it
_____ worrying or disturbing
_____ to make something happen faster or earlier than expected

2. From MLC 2006: Food and Catering, Provision of Food and Fresh Water, Maritime and Coastguard Agency, Merchant Shipping Notice (MSN 1845), July 2014.

_____ (formal) escorted by
_____ rising and falling irregularly in number or amount; changing frequently in size, amount, etc., especially from one extreme to another

4. Request letter, memo, meeting agenda

A. ***Listen to some advice on how to create a meeting agenda/letter of request/ memo (memorandum) and match the tips to each type of text.***

A.	*B.*	*C.*
• don't use a complimentary close • don't sign at the bottom • use headings, bullets or numbered lists so key points stand out and the document is easy to read	• tell the recipient why you are writing • explain what it is you want the reader to do • list your contact information • don't forget to identify any attachments • thank the person for their assistance	• include start/end time • include location • list topic headings • give the time each topic is expected to last • list which participants are expected to introduce each topic

B. ***Read the following three texts and check if they meet the standards mentioned above. Do they follow the tips? Use the list of tips and check ☑ each one that is followed.***

25/07/2015
Dear Mr. Smith

Re: Request for an Interview

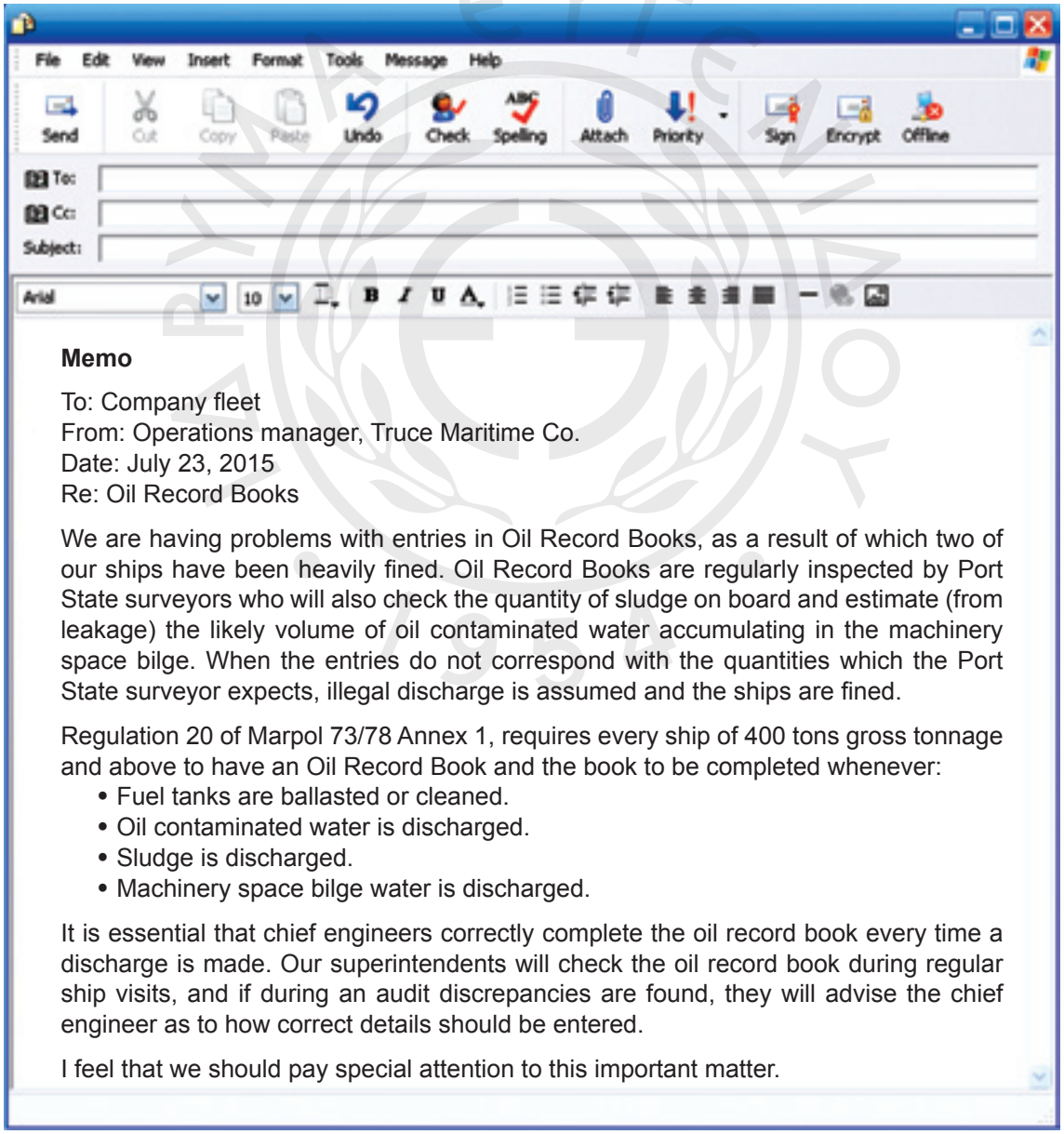
My name is ALKIS GEORGIOU and I am writing to request for an interview to discuss available positions in your company.

I am a graduate of the Merchant Marine Academy of Syros and I have 24 months of experience as a Second Officer. I am currently looking for new employment opportunities and I would like to have the chance to explore the possibility of serving in your company.

I will contact you by phone next week to set up a convenient time when we can discuss my request. If you have any questions or would like more information please feel free to contact me. I can be reached by e-mail at ageorgiou@xxx.com or by phone at 7000777700.

Attached you will find my c.v.
Thank you for taking the time to consider my request, and I will be in touch with you soon.

MV Lucia **Safety meeting agenda** **28 Aug 2015** **Start at 17:10 in Ship's Office**		
Item	**Responsible**	**Time**
Debriefing: ABANDON SHIP DRILL Discussion: PERSONAL SURVIVAL TECHNIQUES Show Videotapes: LIFERAFTS	C/O	30 min
Discussion: ISPS regulations Show video: SECURITY TRAINING	2nd /O	20 min
End at 18:00		



Memo

To: Company fleet
From: Operations manager, Truce Maritime Co.
Date: July 23, 2015
Re: Oil Record Books

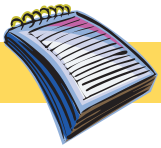
We are having problems with entries in Oil Record Books, as a result of which two of our ships have been heavily fined. Oil Record Books are regularly inspected by Port State surveyors who will also check the quantity of sludge on board and estimate (from leakage) the likely volume of oil contaminated water accumulating in the machinery space bilge. When the entries do not correspond with the quantities which the Port State surveyor expects, illegal discharge is assumed and the ships are fined.

Regulation 20 of Marpol 73/78 Annex 1, requires every ship of 400 tons gross tonnage and above to have an Oil Record Book and the book to be completed whenever:

- Fuel tanks are ballasted or cleaned.
- Oil contaminated water is discharged.
- Sludge is discharged.
- Machinery space bilge water is discharged.

It is essential that chief engineers correctly complete the oil record book every time a discharge is made. Our superintendents will check the oil record book during regular ship visits, and if during an audit discrepancies are found, they will advise the chief engineer as to how correct details should be entered.

I feel that we should pay special attention to this important matter.



Glossary

to fine	to make somebody pay money as an official punishment
likely	probable or expected
to accumulate	to gradually increase in number or quantity over a period of time – build up
to correspond with	to be the same, or match something
audit	an official examination of the quality or standard of something
discrepancy	a difference between two (or more) things that should be the same

C. *Fill in the gaps with the words in the glossary.*

1. There is a(n) …….. between my figures and yours. We should check again.
2. What do you think the …….. outcome of the managers' meeting will be?
3. Debts began to …….. after I lost my job.
4. The company was …….. $20,000 for breaching safety regulations.

Audit – Survey – Inspection

Note the following ways in which we use these words in the maritime industry:

Port State Control Inspection
Marine/Ship Surveyor
ISM Audit
Classification Society Survey

Port State Control carries out regular *inspections*, during official visits to vessels to check that standards are acceptable.

An ISM *audit* examines how shipping companies manage their safety through implementation procedures.

A classification society *survey* is carried out to make sure that ships are built and maintained according to the standards required for their class. A survey generally examines the condition of something, for instance, a *Pre-Charter Survey* is carried out by a private company to document the exact condition of a vessel, its machinery and equipment at the time it is taken on charter.

What is an audit?[3]

Auditors look at management processes and their effectiveness, both onboard vessels and in offices. An audit therefore differs from a classification survey, which looks at the technical aspects of a ship's hull and associated equipment.

Some audit processes widely used in the maritime industry: all ships need an ISM audit (safety); all ships need an ISPS audit (security), shipping companies opt to achieve ISO 9000 (quality) and ISO 14000 (environmental) certification.

An important point to note is that an audit is not an inspection; it does not look at specific items of equipment, but asks how ships and shipping companies manage their quality, safety, environmental and security business through implementation procedures.

3. From www.tankoperators.com

5. Weekly observations and meetings

A. ***You are the Master. Your ship has received the following e-mail. What must you do after reading the e-mail?***

1. Check which of the observations are applicable and arrange for them to be included in the meeting agenda this week.
2. Write to the office which of the observations are applicable to your vessel and also give the office a detailed schedule of when they are to be fixed.
3. Nothing, this is just for your information.

> > TO : ALL ALM MANAGED TANKERS
> > FM : ALTAMARE HELLAS
> > DATE: 18.09.15
> >
> > RE: WEEKLY OBSERVATIONS UPDATE NBR.40 WEEK 40/2015.
> > ==
> > DEAR CAPTAIN, CHIEF ENGINEER,
> >
> > PLEASE FIND HEREBELOW OBSERVATIONS RECORDED DURING INSPECTIONS
> > LAST WEEK.
> >
> > WE INVITE YOU TO DISCUSS THESE OBSERVATIONS WITH YOUR CREW DURING THE
> > WEEKLY MANAGEMENT MEETING AND ENSURE SAME (AS FAR AS THEY ARE
> > RELEVANT/APPLICABLE) DO NOT EXIST OR OCCUR ON YOUR VESSEL.
> >
> > 1. THE LAST NEAR MISS REPORT WAS DATED ON 03-06-2015.
> > comments:
> > We do not receive enough casualty/near miss reports for the size of the fleet. The reports are
> > used for a good purpose in an effort to prevent incidents from occurring. Anyone of the ship's
> > staff can fill them in if a near miss situation is experienced or seen and certainly for any
> > accident-born injury.
> >
> > 2. THE F.O. FILTER FOR MAIN ENGINE PUMP WAS FOUND LEAKING. EVIDENCE
> > OF LEAKAGE NOTED ON THE LOWER PLATFORM OF THE EQUIPMENT.
> > comments:
> > Every effort should be made to ensure that no leaks exist especially so when it is known there
> > is going to be any kind of inspection.
> >
> > 3. ENTRIES IN DECK LOG RECORDED THAT THE NAVIGATING OFFICERS CARRIED
> > OUT RADAR PERFORMANCE TEST EVERY WATCH, BUT THEY WERE RECORDED
> > ONLY 'OK' AND THERE WERE NO RECORDS OF ANY NUMERIC PERCENTAGE, OR
> > OTHER MEASUREMENT VALUE.
> > comments:
> > This is another repeated observation this office has received. Please enter the indicated
> > numerical value in the log.
> >
> > 4. AT LEAST 4 OF THE LIGHTS LOCATED WITHIN THE CARGO PUMP ROOM WERE
> > SHOWING SIGNS OF FATIGUE AND CRACKING, AT PRESENT THE GLASS COVERS
> > WERE STILL INTACT.
> > comments:
> > There is a particular South Korean manufacturer whose lights that are installed in South
> > Korean built vessels are beginning to fail and the covers are cracking. Please ensure your
> > pump room lights are checked thoroughly and the results of your inspection are sent to this

> > office irrespective of whether any lights are cracked or not. This is understandably a high
> > risk observation that seriously affects the vessel's safety.
> >
> > 5. THERE WAS NO FILE FOR THE CLASS SURVEY REPORTS AVAILABLE ONBOARD.
> > comments:
> > Self explanatory.
> >
> > 6. A COPY OF 'EFFECTIVE MOORING' WAS NOT AVAILABLE ONBOARD.
> > comments:
> > Please check the index of your onboard library and order any publications that are missing.
> >
> > 7. SINCE DELIVERED NO CARGO TANK INSPECTION WAS CARRIED OUT.
> > comments:
> > When a safe opportunity to inspect cargo tank/s is available check with your vessel's operator
> > to ensure time is available for inspections after all safety precautions have been taken.
> >
> > 8. O.W.S. WAS NOT RECORDED IN THE O.R.B. PART I. IT WAS RECORDED IN
> > THE P.M.S.[4]
> > comments:
> > Any maintenance and testing of the OWS must be recorded in the ORB part 1 under section F.
> >
> > FURTHERMORE, PLEASE ENSURE THAT THOSE RESPONSIBLE FOR CHECKING
> > OR PERFORMING CORRECTIVE ACTION WILL NOT ALLOW SAME OBSERVATIONS
> > TO RE-OCCUR OR BE DISCOVERED DURING ANY INSPECTION.
> >
> > HAVE A NICE WEEKEND.
> >
> > BEST REGARDS,
> > CAPT. E. LYRAKIS / OPERATIONS MANAGER

B. ***Six observations are applicable for your vessel, numbers 1, 2, 3, 4, 7, 8. Also, there is a vetting inspection coming up that you need to discuss. Below you can see the meeting agenda. Designate the appropriate person to present each item and fill in the time needed.***

M/T ALTA **Safety management meeting agenda** **20 Sep 2015 / Start at 17:30 in Ship's Office**		
Item	**Responsible**	**Time**
Upcoming vetting inspection Discussion of fleet weekly observations applicable: 1. discuss near-misses and send them 2. cargo tank inspection 3. cargo pump room lights Deck-related: 1. Entries in deck log book		min
Engine-related: 1. Fuel Oil filter leakages 2. ORB: briefing on who to fill it in		min
End at		

4. Oil Water Separator, Oil Record Book, Planned Maintenance System.

C. *Tick the statements you agree with.*

Participating in meetings conducted in a foreign language can be stressful because

- ☐ people might speak very quickly or have strong accents.
- ☐ people might use words you don't understand or talk about topics outside your area of expertise.
- ☐ you might find it difficult to interrupt or disagree, to take turns, or to take the floor in a natural-sounding way.

Participating in meetings conducted in English.

MEETINGS – TIP: Be polite

Five ways to sound natural, more polite and less confrontational[5]: these phrases help you "soften" what you want to say, so that you don't sound abrupt, or rude or disrespectful.

1. Use **"can"/ "could"**
   e.g. **to interrupt**: Can I just ask you…
   (NOT I want to know…)

2. Use **"I think"/ "I feel"**
   e.g. **to agree**: Actually, I think the Chief is right.
   (NOT We must do as the Chief says.)

3. Use **"sorry"**
   e.g. **to disagree**: Sorry, but I really disagree.
   (NOT I disagree.)

4. Use **"just"**
   e.g. **to ask for some clarification**: I just wanted to see the exact figures.
   (NOT Tell me the exact figures.)

5. Use **"would like"**
   e.g. **to raise an issue**: I would like to say something, if that's all right.
   (NOT I want to add something now.)

Meeting style can change from country to country, company to company, and even from meeting to meeting, but generally speaking, it is important to be polite in meetings, even if the meeting is quite informal in tone.

D. *This is how the person in charge of running the meeting (chairperson or co-ordinator) sets the agenda. Fill in the missing prepositions. [in/of/to/on]*

1. Right then, let's get down _____ business. _____ the agenda today for our safety management meeting are the weekly observations we received.
2. Let's take them _____ order. First _____ all, as you can see…

5. Adapted from BBC Learning English: Talking Business (2008), www.bbc.co.uk/worldservice/learningenglish/.

E. *Imagine you are attending the meeting. Choose the alternative you feel is more appropriate and explain why.*

1. *To open the meeting and to set the agenda, the Master says:*
   a) Right then, everybody, let's get down to business. Now, there are just a couple of things on the agenda today; first of all, the weekly observations, and second the upcoming vetting inspection.
   b) Shut up please, I want to get started. Now, you all know why we are here.
2. *To start the main part of the meeting, the Master says:*
   a) The proposal from the office is that we check and respond to all these matters simultaneously.
   b) Come on then, let's get on with it. We're supposed to deal with all these things at the same time.
3. *You don't agree with the office proposal. What do you say?*
   a) That's the most ridiculous proposal I have ever heard.
   b) I'm sorry but I'm not sure that's a good idea. I feel we'd better set a priority and take care of the most important ones first.
4. *Your colleague, Jim, suggests keeping the tank inspections for later, and dealing with the safety-related observations first. You agree. What do you say?*
   a) I'd be much happier if we adopted Jim's idea. We can't deal with everything at the same time.
   b) At last, somebody's talking sense! Clearly, Jim's idea is much better that anyone else's.
5. *All the items on the agenda have been discussed. What does the Master say next?*
   a) Any other business? Does anybody have anything they want to raise before we wrap up?
   b) OK, everybody, time to go.
6. *The meeting is nearly over, but there is something else you want to discuss. What do you say?*
   a) We haven't finished yet, actually!
   b) Could I just say something here? Sorry to hold the meeting up…
7. *To close the meeting, the Master says:*
   a) Well, I've got to go now, see you next time!
   b) Okay, well, everybody has a lot to do, so we'd better leave it there – but thanks for your co-operation.

F. *Act out the meeting; use the meeting agenda, decide how you are going to fix the problems and in what order. Take one of the following roles, apart from the designated officer you are supposed to be.*

Role 1; you chair the meeting; you set the agenda, you open and close the meeting.

Role 2; try to interrupt all the time.

Role 3; try to agree with everyone; each time someone speaks, say you agree with them.

Role 4; try to disagree with everybody; each time someone speaks, say you disagree with them.

Role 5; you take notes to write up the minutes.

G. ***Write an email to the company, informing them of what you propose to do, the solutions you propose, after the meeting. Give them a time scale of when all the problems will be fixed.***

Start like this:

This is to inform you of the solutions I propose.
In particular...

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

- ☐ recognize the appropriate use of a range of documents on board
- ☐ discuss problems outlined in authentic emails to a vessel
- ☐ draft memos, reports, letters required for ship business, using correspondence guidelines
- ☐ understand and produce written documents/formal correspondence

B. Class Project. Find information on the following and present to class.

- What is the International Oil Pollution Prevention Certificate? (type of ship it is for, period of validity, issuing authority and the code/convention it is issued in accordance with)
- What is the Notice of Readiness? What is the role of this document in voyage charters?
- What is the history of Articles of Agreement (or Ship's Articles)?

C. Put the words in the correct order to make full sentences that usually appear in ship's certificates.

1. surveyed / has / with / the requirements / in accordance / the ship / of the SOLAS Convention / been.

   .....

   .....

2. and appliances / the ship / all the requirements / complied with / as regards / fire safety systems.

   .....

   .....

3. is valid / subject to / until 8 October 2020 / periodical surveys / this certificate.

   .....

   .....

4. the undersigned / to issue / that / he is duly authorized / declares / by the said Government / this Certificate.

   .....

   .....

D. Fill in the missing words in the following letter of protest.

initial	above	rights	behalf	circumstances	deem	responsible	against

Re: Poor service by cargo surveyor

On (1) _____ of my owners and charterers, I hereby present this protest (2)_____ the poor service provided by your cargo surveyor, Mr. Stefan.

On arrival, Mr. Stefan attended the vessel and witnessed the (3) _____ cargo survey, but did not calculate the ship's arrival figures, rather, he accepted those as noted out by the ship's Chief Officer.

When the vessel completed discharge today, the (4)_____ mentioned surveyor was requested to inspect ship's tanks, by witnessing manual soundings of all tanks, taken by ship's staff, to independently verify that there was no cargo remaining onboard. This he refused to do.

Due to the above actions and under these annoying (5) _____, there can be no independent verification of the ship's cargo figures, as is normally the case, when independent surveyors are employed. As a result of this, the vessel cannot be held (6) _____ for any cargo claims that may result. I therefore reserve the (7) _____ of my owners and charterers to refer to this matter on some later date and take such actions or make any claims as they may (8) _____ necessary.

E. Draw arrows to match the words to their definitions. Then use the words to fill in the gaps in the sentences below.

jointly	impossible to understand
vaguely	in a way that is not detailed or exact
unintelligible	say that something is true, especially in an argument
contend	although
albeit	with another person or people; together

1. He finally agreed, _____ reluctantly, to help us.
2. He will _____ that the arguments are false.
3. This is a _____ worded statement, it can easily be misinterpreted.
4. A lot of jargon in the shipping industry is _____ to outsiders.
5. This report was prepared _____ by MCA and USCG.

F. Write an appropriate SUBJECT (Re:) and fill in the gaps in the following part of a LOP.

accordance	inform	inspected	completion	correspond	figure

Re:……

We regret to (1) _____ you that we cannot accept your Cargo Receipt for a total amount of 46,000 MT of Light Gas Oil, discharged from our tanker, as this (2) _____ is based on wrong shore measurements and shows a shortage of about 200 MT against actual quantity delivered ashore.

In (3) _____ with the agreement made with your representative, Mr Foxtrot, before discharging the cargo, all the ullages were jointly checked and found to

(4) _____ to the ullage reports issued at the port of loading, as well as to the Bill of Lading quantities. Besides, on (5) _____ of discharging the cargo, all the tanks were duly and jointly (6) _____ and found to be dry and empty.

G. Match the synonyms.

1. clarity	☐ smell
2. odour	☐ probable
3. decay	☐ difference
4. adhere	☐ disturbing
5. fluctuating	☐ rotting
6. alarming	☐ the quality of being expressed clearly
7. discrepancy	☐ conditions in a legal document
8. likely	☐ summarized proceedings
9. minutes	☐ changing frequently
10. provisions	☐ behave according to and follow a particular set of rules

UNIT 9

Standards Of Work and Behaviour

1. Seafarers' fitness

Lead-in: Seafarer fitness signifies both seafarers being *physically* fit, as well as *psychologically* fit, and being fit (suitable) for the job, i.e. having the right *skills and qualities*. Here are some of the required skills and qualities:

- ☐ stress tolerance
- ☐ practical skills
- ☐ co-operation & team spirit
- ☐ communication and presentation skills
- ☐ leadership
- ☐ theoretical knowledge
- ☐ intercultural skills

i. Which ones are important for a Chief Officer? for a Third Engineer? (choose three that you believe are the most important for each rank)

ii. In your opinion, which ones are more/less important for a Master or a Chief Engineer? Put them in order of importance (from 1-7) for the rank of Master or Chief Engineer.

A. *Look at this piece of Guidance to Masters[1]. Fill in the gaps with the words in the box.*

mandatory	psychological	consumption	substitution	contributed

Crew fitness

The Master is advised to continually monitor the fitness and health of the crew during the voyage. This includes observing:

- alcohol (1) _____
- drug abuse
- abuse of medications
- fatigue

Accidents are often caused, or (2) _____ to, by inattentive, intoxicated or fatigued crew. Should the Master, therefore, observe any of the above, he/she should take whatever necessary and appropriate corrective action without delay. Particular attention should be paid to (3) _____ resting times prior to watches, if applicable.

The master should closely monitor indications of physical or (4) _____ unfitness and should, if necessary:

- review working hours/workloads of the relevant individuals
- initiate a medical examination
- inform the Company and request a (5) _____

B. *Read the following text on the ABCs of seafarer well-being[2] and do exercises (i) and (ii).*

i. Fill in the missing words:

housekeeping / communication / vibration / investigation / identifying hazards / alcohol / living / internet

1. From Gard (Norwegian P&I Club, www.gard.no), *Guidance to Masters*, 2nd ed. Sept. 2006.
2. From www.he-alert.org , "The Good Guide to Seafarer Health, Safety and Wellbeing."

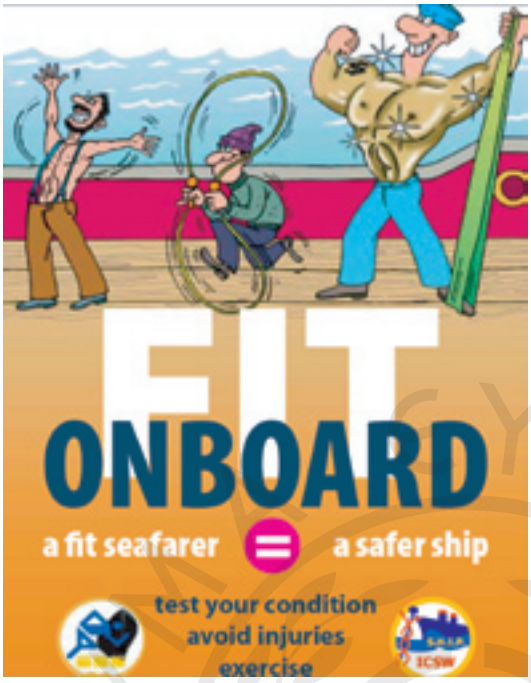
ii. Find the following words in the text. What do they mean? Circle the correct meaning in italics (the appropriate paragraph is provided in brackets).

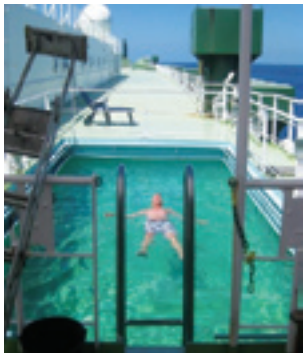
(A) **implementing**: *putting into practice / offering*
(B) **benefits**: *good things / payment made by the state to people entitled to receive it*
(D) **good conduct**: *good organisation / good behaviour*
(F) **detention**: *being kept in a place and prevented from leaving / punishment*
(J) **instil**: *ask for / gradually but firmly establish an idea or attitude in a person's mind*
(L) **stamina**: *the energy needed to do a tiring activity for a long time / patience*

C. *Imagine you are the crew training manager and your company is holding a day conference on Seafarer Wellbeing. You have been asked to give a talk on the topic circled in the "The Good Guide to Seafarer Health, Safety and Wellbeing" above. Your audience is a group of seafarers of different age groups. In your talk answer the following questions and use the poster.*

LIFESTYLE How can seafarers keep fit on board merchant ships? Why is it important?
What medical examinations must be taken? How do we monitor alcohol / drug abuse?

What does the equation "a fit seafarer = a safer ship"[3] mean?
Are there any initiatives/programs oriented at improving seafarer fitness?





Making a presentation in English. Look at the main parts of a presentation. Can you think of some phrases you might use in each part?

GIVING A TALK – TIP:
Be short, precise and to the point

Opening	1. greet your guest / thank them for coming / introduce yourself 2. introduce your topic / outline your presentation clearly and concisely
Body	3. analyze your topic (give reasons, solutions, examples) 4. use visual aids (slides/graphs/pictures) to help you explain 5. sum up and conclude
Questions	6. say you have reached the end of your talk / politely ask if there are any questions

D. ***Imagine you are making a presentation on piracy to a large group of people working in the same shipping company as you. Choose the alternative you feel is more appropriate and explain why.***

1. This is the way you start:
   a) Are we all here? Good, well if you look at the first slide you'll see how piracy has risen in the past 10 years.

3. The poster comes from the site: www.seafarershealth.org.

b) Hello everyone. Thanks very much for coming along today. My name is Yiannis Ioannou and today I'll be talking about how to combat piracy at sea.

2. Next you say:
   a) I'll begin by giving you some background into the rise of piracy in recent years, then we'll look at the high risk areas and finally I'll present the measures that have been introduced by our company.
   b) Okay, this presentation is all about piracy and when the shipping industry realized it was such a real threat it wasn't sure what to do about the problem but I'll talk about that in more detail later. Then I'll tell you about some of the high risk areas – actually I remember one particular incident very clearly involving one of our ships, which I'll quickly tell you about.
3. Later you go through your slides:
   a) Well, as you can see in this slide, piracy has increased significantly, despite the implementation of the ISPS code.
   b) Here's the next slide. In Jan 2005 there were 10 incidents, in February there were 15 incidents, in March 17 incidents, in May 21 incidents…
4. You've reached the end of your presentation. You say:
   a) Any other business?
   b) If you have any questions, I would be happy to answer them now.

The following language is useful for signposting (indicating to your audience how your talk is developing, the stages in the talk)[4]:

Stage in presentation	**Useful phrases**
Introducing the topic	The subject/topic of my talk is... I'm going to talk about... My talk is concerned with...
Outline of presentation	There are a number of points I'd like to make. Basically, I have three things to say. I'd like to begin/start by... First of all, I'll... /…and then I'll go on to… Then / Next... Finally / Lastly...
Finishing a section	That's all I have to say about... We've looked at...
Starting a new section	Moving on now to… Let's turn now to… / Let's look now at… The next issue/topic/area I'd like to focus on… I'd like to expand/elaborate on… Now we'll move on to... I'd like now to discuss...
Analysing and giving recommendations	Let's consider this in more detail... / This is due to… What does this mean for...? Why is this important? The significance of this is... So, how do we solve this problem?

4. Adapted from BBC Learning English: Talking Business (2008), www.bbc.co.uk/worldservice/learningenglish/

Giving examples	For example,... / To give you an example,… As an illustration,... / To illustrate this point…
Summarising and concluding	To sum up... / To summarise... If I can just sum up the main points... / In short… Finally, let me remind you of some of the issues we've covered... To conclude... / In conclusion... So, to remind you of what I've covered in this talk,… I'd like now to recap...
Paraphrasing and clarifying	In other words... So what I'm saying is... To put it more simply... To put it another way...
Invitation to discuss / ask questions	Does anyone have any questions or comments? Please feel free to ask questions. If you would like me to elaborate on any point, please ask. Would you like to ask any questions? / Any questions?

2. Fatigue at sea

Lead in:

Do you think fatigue is a factor contributing to maritime accidents? How can you manage fatigue?

Note: For more information on this important issue, you can watch a research video about fatigue in *www.seafarersfatigue.com*

A. *Fill in the gaps with the words in the box.*

approaching	fell asleep	keeping	making assumptions	did nothing

Collision caused by fatigue (very serious casualty)

What happened?

The two vessels collided almost head-on after neither watchkeeper took action to avoid the collision. Vessel 1 sank as a result of the collision and her chief engineer was lost.

Why did it happen?

- The watchkeeper on board vessel 1 …… (1) in the bridge reclining chair.
- Consequently, he did not maintain a look-out and did not see the …….. (2) ship until it was too late.
- The watchkeeper on board vessel 2 assumed that the other ship would take avoiding action so …….. (3) despite the fact that the two ships were approaching each other on an almost reciprocal heading so as to involve a risk of collision.

What can we learn?

- The importance of fatigue both in port and at sea following time in port.
- The importance of …….. (4) a proper and effective look-out.

- The importance of not ……..…… (5) that the other ship in a risk of collision situation will take action to avoid the collision.

B. *Read the following extract on fatigue[5]. Five parts have been removed from the text. Choose from the parts A-E the one which fits each gap (1-5).*

[A]
Sleep needs to last sufficiently long to include several periods of deep sleep and REM (dream) sleep.

[B]
Hundreds of thousands of sea creatures died. Within two years, the local marine population and fishing industry had all but collapsed.

[C]
However, the same organisational mistakes continue to be made to the present day throughout the industry.

[D]
Automation solves some problems at the expense of creating others. In the case of the unfortunate crew on *Exxon Valdez*, the demands placed on them increased fatigue to the point where it became a serious threat to safety.

[E]
Neither had been given their mandatory six hours off duty before their 12-hour duty began.

How much of a problem is fatigue?

Before 1989, it had been common knowledge for thousands of years that seafaring and fatigue went hand in hand. Then, on a cold midnight in March, the single-hulled *Exxon Valdez* struck Bligh Reef off Alaska. The tanker spilt 11 million US gallons of crude oil into the sea. The slick eventually covered 11 million square miles of ocean (a gallon of crude goes a long way), creating the most devastating man-made environmental sea disaster in history. **[1]** ..... Several residents, including a former mayor, committed suicide and the Alaska Native Corporation went bankrupt. Billions of dollars were paid in damages and fines. The shoreline will not recover until 2020.

At the time of the accident, there were two crew members on the bridge. The Third Mate, then aged 25, was in charge of the wheel house and an Able Seaman was at the helm. **[2]** ..... Amongst its main findings, the US National Transportation Safety Bureau's (NTSB) accident investigators concluded that the Exxon Shipping Company's manning policies *"did not adequately consider the increase in workload caused by reduced manning"*.

The widely-shared belief that fatigue played a significant part in marine incidents had been made official. Yet, despite that unambiguous finding 20 years ago, the issues of reduced manning, increased workload and resulting fatigue have continued to play a major role in many maritime accidents to the present day.

Reduced manning is an organisational policy aimed at increasing efficiency. It is often made possible by the introduction of automation. Increased efficiency usually means a corresponding decrease in thoroughness. **[3]** .....

Fatigue is an inevitable and normal human response to wakeful activity. The onset of fatigue is affected by workload, perceived risk, diet, fitness, the time of day and environmental factors such as light, noise, vibration, temperature and motion.

The only treatment for fatigue is sleep. **[4]** ..... If not, we build up a 'sleep debt' which causes us to misread situations, overlook key information and fall asleep even when we know it will put us and our colleagues in extreme danger.

Many lessons were learned about the role of fatigue and sleep debt in ship and environmental safety from the 1989 *Exxon Valdez* disaster. **[5]** .....

5. From The Human Element: A Guide to Human Behaviour in the Shipping Industry, Maritime and Coastal Agency, 2010.

C. *Listen to some statistics on seafarers' fatigue[6] and choose the correct alternative of the percentages.*

Research shows that

- **25%, 40%, 50%** of seafarers say that they have fallen asleep while on watch.
- **20%, 40%, 50%** of seafarers report working 85 hours per week.
- **20%, 30%, 50%** of seafarers believe their working hours may pose a danger to the safe operation of the ship.

D. *Read about the following court case. Put the missing phrases in the correct place.*

Seafarer claim against shipping company regarding fatigue[7]

A recent court ruling in Florida Miami, where a Chief Mate brought a claim against Maersk for excessive dangerous working conditions, sets a legal precedent, leaving shipowners to face legal actions from seafarers who believe that working conditions onboard have affected their overall health.

Plaintiff William Skye, 57, was working as Chief Mate onboard a Maersk vessel for a period of four years. During these years the Chief Mate (1) …… . According to Mr. Skye his daily program involved 15.75 hours of work per day, which is also a violation of relevant US regulations.

As a result of the above the Chief Mate was lacking (2) ……., which is an important factor contributing to a seafarer's fatigue, and consequently led to Mr. Skye developing a heart condition leading him to an early retirement.

Furthermore, two former Maersk employees testified that the intensity of the duties related to the position of the Chief Mate made it very difficult if not impossible to (3) ……. .

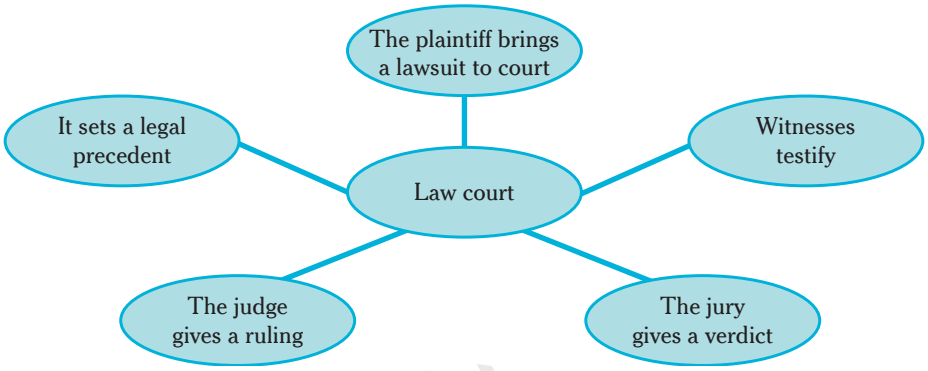
The jury concluded on a **$2.36 million verdict but assessed 75 percent comparative negligence to the Chief Mate which reduced the award to $590,000**. The jury also found that Skye would be able to work for another 10 years if his condition was not worsened (4) ……. . Finally the jury did not find that Maersk had violated any work/rest regulations.

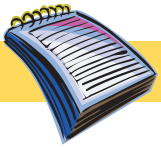
This case draws once more the attention to the working conditions onboard merchant vessels and on whether the actual hours of work/rest required by STCW and other national regulations are actually implemented. Fatigue is continuing to be either the main cause (5) ……. in the worsening of a seafarer's health, not to mention the considerable number of casualties at sea which were the result of fatigue due to overwork.

A. fulfil all tasks without taking overtime	B. was assigned to duties which violated the STCW hours of work/rest	C. or a contributory factor	D. due to excessive workload	E. consistent and uninterrupted sleep

6. Seafarer fatigue & the implications on seaworthiness, by Stephen Angove, Sept. 2014, www.lexology.com.
7. By Stavros Kairis, July 2012, www.officerofthewatch.com.

E. ***Look at the following word grid, with words from the text above, related to court trials. Use the grid to fill in the glossary.***





Glossary

..... a group of members of the public who listen to the facts of a case in court and decide if somebody is guilty or not
..... give evidence as a witness in a law court
..... a previous case or legal decision that may be followed in subsequent similar cases
..... person in court who has the authority to decide how criminals should be punished
..... someone who makes a formal complaint against somebody in court
..... an official decision made by a judge

F. ***What is the significance of the court ruling for seafarers? Say your opinion.***

G. ***Listen to some results of a 6-year research program into seafarer fatigue from Cardiff University[8]. Five different speakers, who were interviewed, make points on fatigue. Match the halves to make full sentences that summarize what the speakers say.***

1. People with long working hours
2. People on shore
3. People on shore
4. People who work in other modes of transport (trains, buses, airplanes)

☐ are not allowed to work more than 40 or 48 hours per week.
☐ is suffering from the effects of fatigue, such as pollution or loss of life.
☐ see fatigue as important, that's one reason why it hasn't been dealt with properly.
☐ have similar performance to people who have consumed alcohol.

8. You can find the full research video created by Cardiff University in www.seafarersfatigue.com.

5. Not enough people	☐ often complain when they get about 35 hours per week.
6. A solution to fatigue	☐ requires the industry to pay additional cost, that's why the problem hasn't been dealt with.
7. The shipping industry	☐ would be surprised at the long working hours of seafarers on board.

H. *Give a talk on the causes and effects of fatigue at sea. Answer the following questions.*

When does fatigue occur? What are the causes of fatigue at sea? How does it affect the mind? How does it affect the body? Did you yourself, or someone from the crew you worked with, display any of the symptoms of fatigue? What solutions are there?

You can find material that you can use to answer these questions in ***Appendix II: Fatigue at Sea*** (p. 376). Summarize the points in the texts you think are the most important and use them in your presentation. You can make this a collaborative presentation, work in pairs or groups of three and allocate which questions are going to be presented by each one.

I. ***Write a memo to circulate in the company fleet with the subject "How can we combat fatigue?"***

3. Team work and intercultural communication

A. ***Read the Guidance to Master on Teamwork. What is each paragraph about? Write the following title-words in the appropriate space.***

Meetings / Crew / Praise / Leadership / Officers / Cultural Difference

(from Gard P&I Culb, *Guidance to Master*)

Teamwork – Communication

..... The Master should create a working environment on board that emphasises teamwork with his/her deck and engine officers on whom he/she will depend heavily in ensuring safety and security on board the vessel. Key elements of teamwork are good communication and clear allocation of responsibilities. Well-informed officers are better motivated and able to carry out their duties effectively.

..... Due to the composition of a crew with different nationalities and religions, the Master should be aware that thoughtfulness is required where crews of different religions and cultures are required to work in a team. When the Master allocates certain responsibilities to an officer, the Master should not only be confident that the officer is able to carry out such tasks, but should also ensure that the officer has clearly understood his/her allocated duties.

..... Teamwork is not to be understood as a simple delegation of tasks and duties to exempt the Master from his/her own responsibilities. Teamwork involves leadership and its effect needs to be explained and relevant training be provided to ensure that every team member understands his/her individual role within the team.

..... To ensure that the team works efficiently, the Master must exercise leadership skills and encourage each crew member to take responsibility for their own safety as well as that of their shipmates and the vessel generally. The investigations of accidents have shown that in many cases crew members suspected that something was wrong but did not dare to tell the Master, pilot or duty officer. Comments or questions from crew members should therefore be listened to sympathetically and be taken seriously. The crew is, potentially, an important safety net for the officers if they, at any point, make the wrong decision or overlook important information.

.....

Regular shipboard management meetings will assist the Master in achieving the best use of the entire ship's team. Any remarks, observations and reported non-conformities should be taken seriously and duly recorded in the vessel's documents. Corrective action should be taken immediately to ensure that the validity of the vessel's Safety Management Certificate (SMC) is not jeopardised. Likewise, any remarks, observations, reasoned suspicions and reported non-conformities need to be rectified immediately under the vessel's Ship Security Plan to remain compliant with the requirements of the ISPS Code.

.....

People appreciate praise and rewards for good performance. Where possible and appropriate, the Master should praise individual crew members in the presence of other crew members. Such practice will help the Master maintain morale and motivate the crew!

B. ***Do you think cultural awareness can improve team work at sea? How?***

C. ***You are attending training in intercultural understanding. Listen to fill in your notes.***

How to behave in a mixed-nationality crew environment to build up team spirit:

- show respect for _____ and _____ beliefs
- communication in a foreign language takes more _____: be _____
- social interaction is important: be _____ and mix with other nationalities
- don't _____ other people by speaking your own mother-tongue within your ethnic group in their presence

D. ***Read the following extracts from a paper on cultural sensitivity at sea[9]. Choose the one you agree or disagree with and give your opinion, offering examples from your experience on board where applicable.***

- Intercultural communication has to be learnt; it is not something that humans are born with. Irrespective of a person's background, mutual respect and tolerance are behaviours that everybody can participate in and take responsibility for.

- People in groups, more than four persons, tend to take their culture with them to their new environment. If there is an individual problem, this is often solved within their community.

9. "Cultural and gender diversities affecting the ship/port interface", by Jan Horck, WMU, May 2008.

• If people cannot understand the *meaning* of what is said due to weak English and cultural differences prejudice, power distance and stereotyping, it can not only affect team work at sea, it can become fatal; miscommunication is costly and can destroy the reputation of the entire shipping industry.	• Courses are needed in cultural awareness and good communication in Maritime Education and Training Institutions.
• Normally, a person with different views and ideas is an asset. Different thinking comes with different cultures, beliefs, languages and gender. These are the diversities that should be recognized in shipping.	• To fully welcome diversity, first one has to develop a good understanding of self.

4. Marine appraisal

A. ***The captain has filled in the crew assessment form below and asks for the Chief Officer's opinion. Listen to the dialogue.***

- Does the captain change any of the numbers?
- Fill in the captain's recommendation in the "comments" part.

SEAFARER PERFORMANCE APPRAISAL

Name: Orestis Tsonos Rank: 2nd Officer
Vessel: M/T Nostos Period: Feb-July 2016

Personal Competencies & Characteristics

[3] Team work
[4] Flexibility
[5] Reliability

Technical & Job-related skills

[3] Language skills (English)
[5] Environmental awareness and conformity
[5] Safety awareness and conformity

Leader & management skills

[5] Planning & organisation of work, effective use of resources
[4] Decisiveness
[4] Ability to perform under pressure

Comments:
I was asked to comment on the 2nd Officer's aptitude for the position of Chief Officer. In my view.....

B. ***The following sentences have been taken from appraisal reports. Each one illustrates that the seafarer possesses a particular quality. Which quality/characteristic is assessed in each sentence?***

cultural awareness	stress tolerance	teachability
communicative skills	safety awareness	sense of order

1.	She can weigh up the consequences when she identifies an operation as risky.	⇨	
2.	He has a lot of cultural and gender prejudice and has difficulty in coexisting harmonically with mixed nationality and gender crews.	⇨	
3.	She is good at explaining procedures and allocated duties to the ratings.	⇨	
4.	She insists on the workshop tools always being returned to their exact place after being used, and won't tolerate others failing to do so.	⇨	
5.	He showed a natural aptitude for dealing with Inspectors / Auditors, and can talk to them and take care of business with them efficiently.	⇨	
6.	He has the ability to perform well under pressure in complex situations.	⇨	

C. ***Put the words in the correct order, make full sentences and recreate the appraisal.***

Crew member appraisal

I recommend 2nd Engineer Thomas B. for recruitment for the following reasons:

1. ~~a good~~ / ~~he has~~ / safety record / never / and / caused / has / in the ER / any accidents.
   He has a good .....
   .....
   .....
2. makes / to get on / ~~he possesses~~ / the rest of the crew / interpersonal / every / skills / and / effort / with.
   He possesses .....
   .....
   .....
3. a multicultural environment / ~~he is~~ / difference / ~~sensitive~~ / and he is comfortable / to cultural / working in.
   He is sensitive .....
   .....

4. he stands out / punctuality / not only / housekeeping practice / for his excellent / but also / for his.

.....

.....

5. additional / take on / willing / he is / to / responsibilities.

.....

.....

6. for detail / an aptitude / excellent / he has / and he also has / problem-solving skills.

.....

.....

7. specialized tools / the use / instruments / and / he is / and maintenance / of all / adept at.

.....

.....

8. the ability / and productive / pressure / he has / under / to remain / composed.

.....

.....

D. ***The following appraisal system is used by shipping companies to assess how much seafarers fulfil expected standards of work and behaviour. First you will read all the 25 attributes/criteria. Then, five headings are presented in more detail. Read what characterizes someone who has a high or low level of each attribute. Fill in the glossary below with the words highlighted in red.***

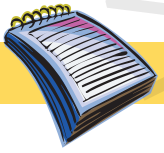
Appraisal system for seagoing personnel[10]

Example:	The headings are:	
The **sobriety** scale is used to establish an individual's drinking habits and has two alternatives: 1. Acceptable and compliant with company policy. 2. Not acceptable / incompatible with company policy. The other 24 headings illustrate personal traits, interpersonal style, professional capacities, attitudes and knowledge.	1. Sobriety 2. Practical Skills 3. Planning 4. Safety Awareness 5. Judgement 6. Loyalty 7. Cooperation 8. Intercultural Skills 9. Leadership Skills 10. Energy 11. Initiative 12. Teachability 13. Self-Knowledge	14. Theoretical Knowledge 15. Sense of Order 16. Seriousness 17. Vigilance 18. Reliability 19. Sociability 20. Communicative Skills 21. Stress Tolerance 22. Motivation 23. Maturity 24. Receptivity 25. Physical Appearance

10. From *Appraisal System for the Maritime Industry*, by Bengt Schager, www.marine-profile.com/Appraisal-System.html, adapted and abridged.

	HIGH LEVEL	LOW LEVEL
PLANNING Planning **denotes** an individual's **capacity** and willingness to plan his activities and to act and work efficiently, accurately and methodically. It **implies** capacity for preparation, economical efficiency, good timing and **anticipation** of alternative measures. Capacity for planning is an aid for controlling situations and avoiding surprising events.	• anticipates problems • good time-keeping • good administrative order	• problems with preparations, efficiency, time-keeping, administrative matters • problems with keeping of promises, keeping costs, and utilizing resources • needs to be supervised and checked by others
SENSE OF ORDER Sense of Order denotes an individual's capacity for **tidiness**, order and thoroughness in his work. It implies how well an individual accepts and carries out his duties. It involves maintenance, checking, finding and returning tools/equipment, cleanliness, the style of performing administrative tasks, making preparations, giving instructions, and reporting back.	• discovers and corrects others' mistakes and covers up for others' **shortcomings** • does not need supervision or corrections • **punctual** • has a low tolerance of messiness and dirt	• forgetfulness, incomplete performance of tasks • carelessness, negligence, sloppiness • often tries to cover up or blame others for his own negligence and mistakes • good at finding excuses
SAFETY AWARENESS Safety Awareness denotes an individual's level of respect for safety issues and knowledge about and **adherence to** safety regulations, instructions and good practice. Also, the day-to-day perception of risks, exposure to and handling of risks, the level of involvement in exercises/drills, avoidance of uncertainty, overall ***situational awareness,*** precautions.	• shows a keen interest and high involvement in exercises and drills • involves superiors at an early stage in **ambiguous** and uncertain situations • ready to ***spontaneously intervene*** and to instruct or correct others in preparations and precautions	• doesn't obey regulations • ***repetitive occurrence*** of accidental situations and loss of situational control • complacent behaviour, indifferent attitudes or poor assessment of consequences • has a tendency to ***verbally diminish*** risks, to overestimate his own experience and a need to impress others
VIGILANCE Vigilance has to do with perception, focus and concentration.	• concentrated, focused	• fails to detect new information / seek relevant information

The level of alertness and the capacity to read and understand a situation are important characteristics of Vigilance. A critical attitude is also often significant. Vigilance also appears in the ability for ***simultaneous perception***, monitoring and the capacity to detect new information.	• very alert • active in seeking and checking information from available sources • critical and **sharp-eyed** attitude	• is taken by surprise, acts late, lacks sufficient time and misses information. • **absent-minded**, easily **distraught**, easily fatigued or easily influenced
LOYALTY Loyalty shows in an individual's attitude towards the shipowner, the management, the ship, and also towards other individuals onboard. Loyalty often shows in how an individual handles resources, cares about equipment, executes his duties and is able to ***embrace social norms***, as well as how an individual identifies himself as being a company person or not.	• feels and behaves as a representative of the company • will make individual sacrifices for the benefit of the totality • shows readiness to carry out orders and to put things right, to care for equipment • respects and stands up for policies and the shipowner	• places himself and his individual interests first • **readily** accuses others or the company for various reasons • equipment is not cared for, is indifferent to costs and savings or others' comfort and well-being • easily breaks rules, policies and social norms



Glossary

1. ..... ability (to do or understand something)
2. ..... seeing that something might happen in the future and perhaps doing something about it now
3. ..... suggests, indicates indirectly
4. ..... means, represents
5. ..... faults in somebody's character
6. ..... not late; doing something at the correct or arranged time
7. ..... a tendency to keep things neat and in order
8. ..... observant, quick/good at noticing things around you
9. ..... extremely upset and anxious (so that you cannot think clearly)
10. ..... the fact of following and behaving according to a particular rule
11. ..... without hesitation or reluctance
12. ..... tending to forget things, perhaps because you are not thinking about what is around you, but about something else
13. ..... not clear, not having one obvious meaning

E. *What do the following phrases mean? Find them in the text highlighted in blue italics (p. 172-173) and match them to their definitions.*

1.	spontaneously intervene		The ability to become aware of many things at the same time
2.	verbally diminish		Accept with enthusiasm standards of behaviour (that are typical of a particular group or society)
3.	simultaneous perception		An incident happening frequently, repeated many times
4.	embrace social norms		Become naturally involved in a situation, in order to improve or help it, without being forced to do it
5.	repetitive occurrence		Knowing what is going on around you so that you can figure out what to do; keeping track of the significant events and conditions in your environment
6.	situational awareness		Make something seem less important than it really is, belittle it with words

F. *Put the following adjectives that describe character traits in the correct column, negative or positive traits. Then write the noun for each one, as in the example.*

vigilant	careless	~~willing~~	tolerant	accurate	efficient
aware	complacent	absent-minded	~~indifferent~~	negligent	uncertain
forgetful	alert	thorough	sloppy		

positive traits (+)		***negative traits (–)***	
adjective	**noun**	**adjective**	**noun**
willing	willingness	indifferent	indifference

G. *Find and correct the mistakes (10 in total, vocabulary, spelling and grammar mistakes).*

Chief Officer Stratos Sotiriou demonstrates a high level of loyalty. He is resourceful, he takes good care of the equipment that are handed to him and he executes his duties successful. He is also a highly vigilant officer which has a sharp-eyed attitude that enables him to monitor all operations at the bridge.

Capt. Dimitra Alexiou takes initiative without hesitating, and she demonstrated this qualification when she spontaneously undertook to inform the local authorities of an unidentified object she spotted on the quay in the Port of Rotterdam. Her high level of loyalty is evidence in her respect for company policies. She is fit to be employed as a marine superintended.

Mr Markos Kesidis shows a low level of vigilance, he tends to be absent-minded and lucks concentration. He can't be recommended to work like a watchkeeper.

Chief Officer Rania Pastroumatzi has a high level of safety awareness and she is readily involve in the organisation of drills. She instructs the crew in crucial safety-related matters and she is also able to plan and execute exercises and drills effectively.

H. Write an appraisal report for a member of the crew. Use the corrected paragraphs above and the marine appraisal system as a model. Include personality adjectives in your report. Write whether the crew member has a high or low level of planning / loyalty / safety awareness / sense of order / vigilance.

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

- ☐ analyze problems on board (such as fatigue, fitness) and suggest appropriate solutions
- ☐ understand marine appraisal & describe expected standards of work and behaviour on board
- ☐ complete appraisal forms after listening to suggestions
- ☐ discuss how cross-cultural issues can affect team work at sea

B. Class Project.

- Fatigue was a key factor in the following grounding accidents: *Cita* (container feeder, in 1997), *Jambo* (general cargo vessel, in 2004), *Pasha Bulker* (bulk carrier, in 2007), *Shen Neng I* (bulk carrier, in 2010). Choose two of these casualties and present to class details of what happened and the role of fatigue in each case.
- What are the attitudes towards women at sea? Do gender stereotypes and prejudices still prevail in the shipping industry? In Greece, are female cadets given the chance to prove they have the abilities required by the job? Are women seafarers positively accepted when they reach leadership positions? According to the findings of a research paper on attitudes towards the employment of women at sea, the younger generation of male ship officers in Greek ships appears to be more confident in accepting cooperation with female colleagues[11]. Raise the questions, organize a discussion and get feedback in class.

11. "Employment of women at sea. Perceptions, attitudes and experieces of male seafarers in the Greek context" by Ioannis Theotokas and Chrysa Tsalichi, IAME 2013 Conference.

C. Fill in the correct preposition in the following phrases.

1. good _____ finding excuses
2. involvement _____ drills
3. have an effect _____ your life
4. violation _____ regulation
5. free _____ hazards
6. fit _____ the job
7. taken _____ surprise
8. stand _____ for a company policy

D. Match to make collocations.

1. keen .....
2. highly .....
3. administrative .....
4. drug .....
5. fair .....
6. situational .....
7. legal .....

tasks
awareness
precedent
involved
interest
abuse
treatment

E. Fill in the gaps using the words in the box.

sharp-eyed	distraught	capacity	embraced	adherence	diminish	shortcomings

1. The shipping industry has eagerly _____ modern technology and is keeping up with all technological advancements.
2. I don't wish to _____ the importance of your contribution to this company, on the contrary I appreciate it very much.
3. A _____ vetting inspector spotted the mistake in the checklist.
4. We expect strict _____ to all anti-pollution rules and regulations.
5. He's still too _____ to speak about the fire accident on board.
6. I had a discussion with an analyst; she made me aware of my own _____.
7. You have a _____ to understand people's problems and you can sympathize with them.

F. Look for adjectives that describe personality in the word grid. (5 horizontally and 5 vertically).

M	B	D	I	T	I	V	A	D	E	L	M	S
A	R	E	L	I	A	B	L	E	M	O	I	O
T	C	C	J	D	O	U	B	I	O	Y	U	C
U	A	I	K	Y	S	C	O	N	C	A	T	I
R	E	S	O	U	R	C	E	F	U	L	Z	A
E	F	I	L	D	I	F	F	E	R	Y	X	B
D	H	V	M	Q	P	U	N	C	T	U	A	L
A	L	E	R	T	F	S	N	O	W	V	W	E
G	T	H	O	R	O	U	G	H	P	G	O	T

UNIT 10

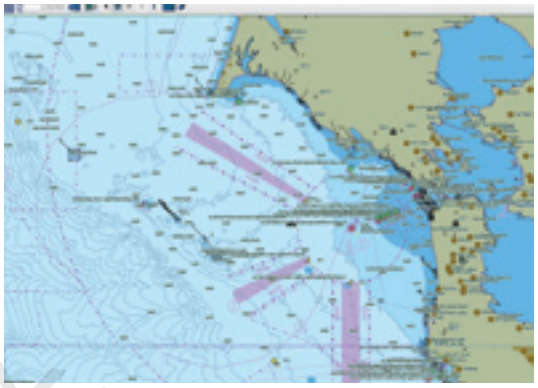
Navigation Aids and Systems

1. *A bridge tour / ECDIS*
2. *Stages in onboard procedures: Passage planning / Lifeboat launching*
3. *On the telephone: Clarifying misunderstandings / Cargo care*

Round-up

Lead-in:

i. What navigation aids are shown in the following pictures? What is their purpose?

ii. Do you know the answers to the following questions?

- What is a Notice to Mariners?
- What is Passage or Voyage Planning?
- What is an Electronic Navigation Chart?

iii. Match the following answers to the questions above.

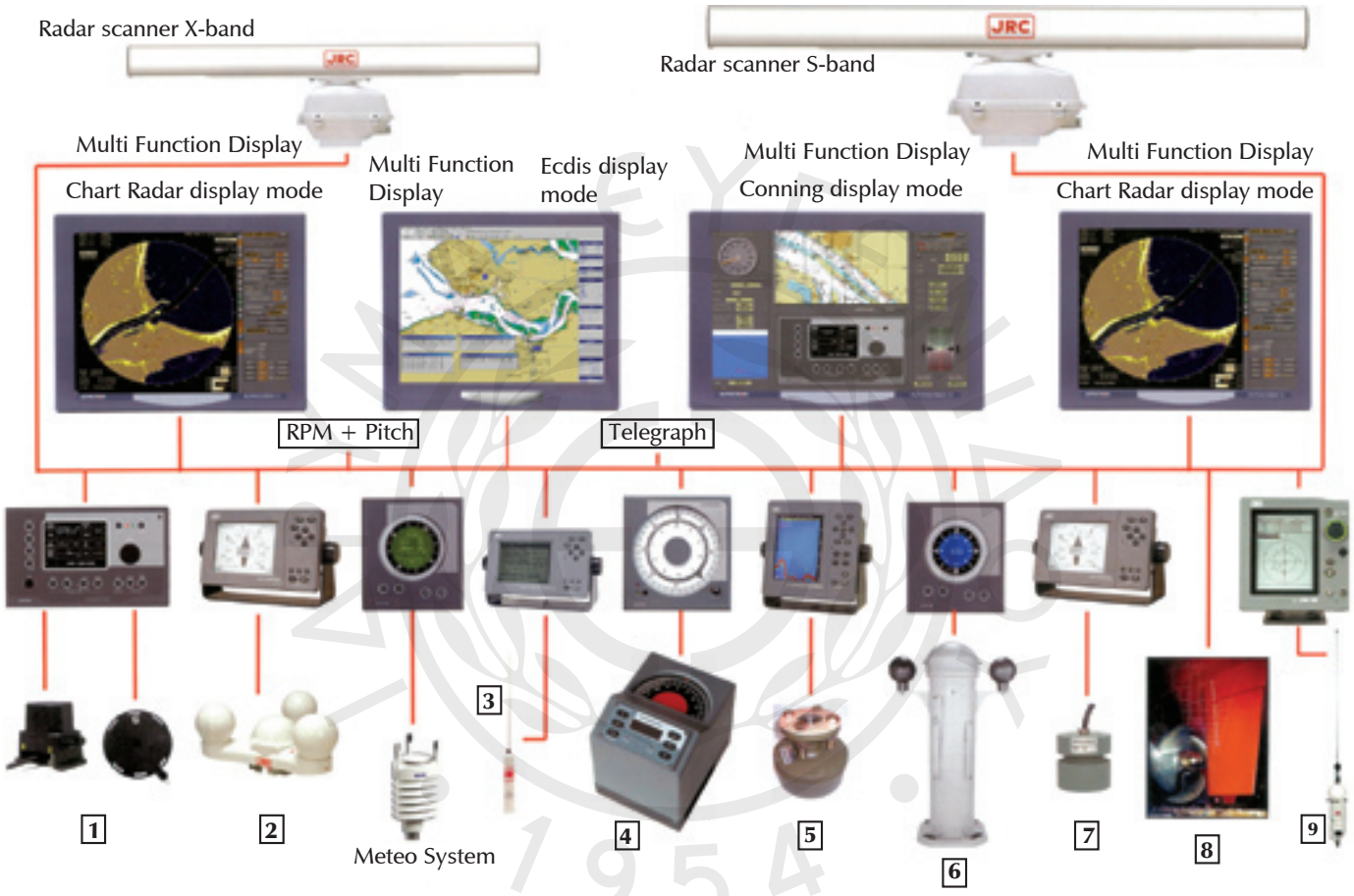
an official database created by a national hydrographic office for use with an Electronic Chart Display and Information System	a publication whose purpose is to provide corrections to navigational publications and nautical charts; it advises mariners of important matters affecting navigational safety	a procedure to develop a complete description of a vessel's voyage from start to finish; it includes leaving the dock and harbour area, the route of a voyage, approaching the destination and mooring

1. A bridge tour / ECDIS

- **Navigation(al) aid**: An onboard instrument, device, chart, method, etc., intended to assist in navigation, e.g. a radar.
- **Aid to navigation**: A device or structure *external* to the ship, designed to assist in determining the ship's position, to define a safe course, or to warn of dangers or obstructions, e.g. buoys or lighthouses.

A. ***Look at the following*** **navigation aids.** ***Identify the items in the picture and write up their names. The first and last letters are given for help.***

1. A _ _ o p _ _ _ t
2. GPS c _ _ _ _ _ s
3. N _ _ _ _ x
4. G _ _ o c _ _ _ _ _ s
5. E _ _ o s _ _ _ _ _ r
6. M _ _ _ _ _ _ c c _ _ _ _ _ s
7. S _ _ _ d l _ g
8. R _ _ _ _ r
9. A _ _ _ _ _ _ _ c I _ _ _ _ _ _ _ _ _ _ _ _ n S _ _ _ _ m



B. ***The First Officer is on the bridge of a cruise ship. He is giving some passengers a tour of the bridge and shows them the navigation aids. Listen and circle the words in the box you can hear. Then answer the questions.***

marine radar	compass	targets	GPS	electronic charts
fin-stabilizers	rudder	echo sounder	AIS	autopilot
speed log	paper charts	speed vectors	wheel	ship's heading

1. How does the cruise ship avoid rain? Why does it do that?
2. What information can you see if you click on a ship on the AIS display unit?
3. Why do paper charts require more space and time?
4. What piece of equipment reduces rolling?
5. What equipment is the GPS connected to in order to give an updated position?

C. *Write the missing half to make full SMCP statements that provide a briefing on the status of navigational aids and equipment.*

1. The radar is .....
2. GPS is not in .....
3. Echo-sounder is at .....
4. The echo-sounder recordings are .....
5. I changed to .....
6. Navigation lights are .....

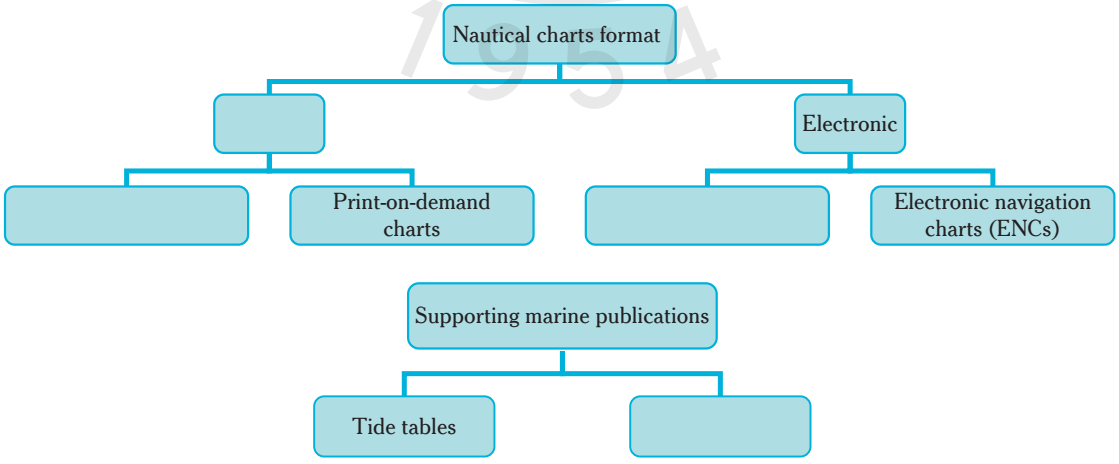
operation
3 miles range scale
true-motion north-up
manual steering
unreliable
switched off

D. *What is a nautical chart[1]? You will listen to two excerpts of an interview on nautical charts given by a scientist who works for the US National Ocean Service.*

a) Read the following sentences, listen to the first part of the interview and fill in the missing words:

1. A _____ shows what is on land.
2. A _____ shows what is under, in, on and around the water.
3. Nautical charts are working documents: mariners add _____ lines, turning points and _____.
4. Vessels are required to keep charts and publications updated using weekly Local _____ to Mariners.
5. Numbers on a nautical chart represent _____, which tell us how deep the water is in that particular area.
6. Charts include locations of dangers to navigation such as coral reefs, rocks, _____ and shoals.
7. Other data on nautical charts include the _____ rose as well as latitudes and _____.
8. You may also find pipelines and submerged cables, lighthouses and _____, channels and tunnels.

b) Listen to the second excerpt of the interview and fill in the diagram:



1. Source: Podcast "Diving Deeper: Episode 5 (Mar. 23, 2009) — What is a Nautical Chart?", Weekly news of NOAA (US National Oceanic & Atmospheric Administration) National Ocean Service.

An ECDIS system displays the information from electronic navigational charts and integrates position information from position, heading and speed reference systems and other navigational sensors. Other sensors which could interface with an ECDIS are radar, Navtex, AIS and echo sounders. ECDIS provides continuous position and navigational information. The system generates audible and visual alarms when the vessel is in proximity of navigational hazards.

E. ***What are your views on paperless navigation (a.k.a. ECDIS)? If you compare paper charts and ECDIS, which of the two requires less...***

space, time, money, training, maintenance?

F. ***You will read a text on the pros and cons of ECDIS. First look at the titles of the paragraphs and see how many you agree with. Then read the text and match the pictures below to their titles.***

Pros and cons of paperless navigation (aka ECDIS)

(from www.marineinsight.com)

ECDIS has brought a drastic transformation in ship navigation. A mere 15 years back, navigators would have scoffed at the idea of Paperless Navigation on big ocean going ships. After all, for centuries, nautical paper charts had been the heart and soul of ship navigation. However, the unthinkable did happen. Armed with the IMO mandate for compulsory ECDIS carriage, super tankers and giant container vessels are now running smoothly without paper charts.

The Pros:

1. **Availability:** One great advantage of ECDIS over paper charts is the availability of electronic charts – especially when voyage orders are received at the last minute. Gone are the days when Second Mates used the good old NP 131 (chart catalogue) to determine what charts they require for the voyage. All the Second Mate needs to do now is plot a rough course in the voyage planner and a list of all the required paper charts is populated. The Master then emails this list to the chart supplier, who will then send the activation codes for those charts.
2. **Speed and Accuracy:** With ECDIS as the primary source of navigation, the Navigating Officer can plan and summarise the passage much faster than on Paper Charts. Most ECDIS units have a facility where the waypoints can be imported into an excel format which reduces the effort to manually input the waypoints when compiling the Voyage Plan.
3. **Corrections:** Before the advent of paperless navigation, the largest chunk of the Navigating Officer's work time was consumed in correcting charts. The Navigating Officer now receives weekly updates to the Electronic Charts via Email which s/he has to download onto a zip drive and upload them to the ECDIS.
4. **Continuous Monitoring of Vessel's Position:** One of the single biggest advantages of the ECDIS over paper charts is its ability to enable the user to see the vessel's position in real time without user action. The ECDIS is interfaced with the vessel's independent GPS transceivers. However, we all know that GPS signals can be unreliable. This problem can be overcome by using the Radar Overlay and Echo Referencing facility in the ECDIS and Radar. Once the radars are interfaced with the ECDIS, the user activates the overlay tab of the ECDIS which will super impose the Radar Screen on the ECDIS.
   By checking that the Radar Echo is matching with the ECDIS display, one can be assured that the positions can be relied upon. Another feature enabling continuous position monitoring, especially during coastal navigation, is ARPA Echo Referencing. This is done by acquiring a fixed / stationary target such as a small island, lighthouse, rock etc. on the Radar (ARPA) and then activating the ARPA tab on the ECDIS. Next step is to deselect the Secondary Position Source on the ECDIS as

GPS and select Echo Reference in its place. Once enabled, this gives the user visual indication of the past tracks of both the Primary (GPS) and Secondary (Echo Reference) position fixing modes.

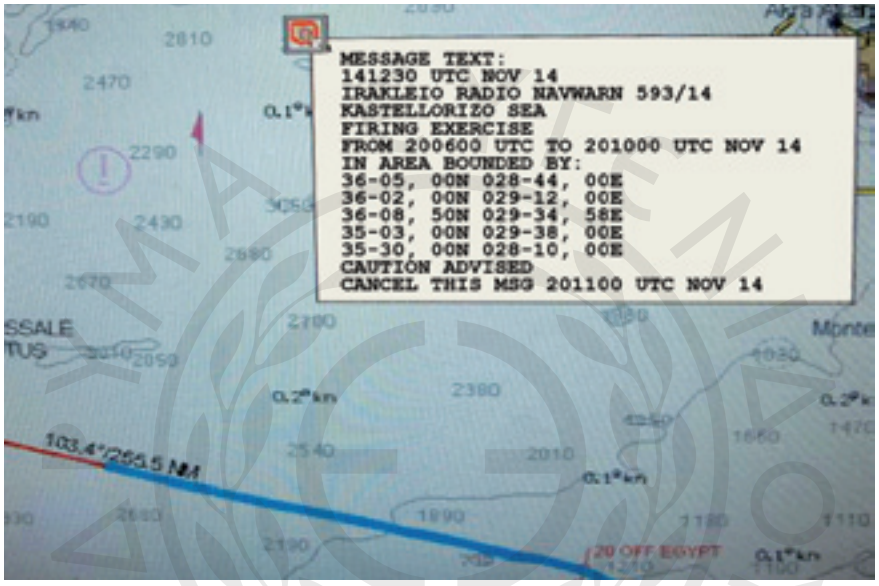
5. **Anti-Grounding Alarms and Settings:** The ability of the ECDIS to warn the user of approaching shallow waters makes it one of the most useful pieces of equipment on the bridge. The user has complete flexibility to determine these settings, and companies have strict guidelines on minimum safety parameters.
   Shallow Contour: This setting indicates the non-navigable area (by deep blue colour) and marks the boundary outside of which the vessel may safely navigate. Crossing this boundary will result in the vessel running aground.
   Safety Depth: This marks and highlights the minimum depth required for the vessel to remain safely afloat. As a thumb rule, Safety Depth = Deepest Static Draught + Anticipated Squat + Company's Min UKC.
   Safety Contour: In general, the Safety Contour (indicated by a grey coloured area) may be set equal to but not lower than the Safety Depth setting. Waters with depths lower than the Safety Contour should be construed as No-Go Area.
   Deep Contour: This setting (indicated by a white coloured area on the ECDIS screen) is very handy for vessels engaged in operations such as Tank Cleaning or Ballast Water Exchange, where it is mandatory to carry out the operation in waters exceeding a certain depth. This should not be lower than the Safety Contour.
6. **Enhances SAR Capability onboard:** Modern ECDIS units have the option of interfacing NAVTEX and EGC with the ECDIS display. Warnings and Alerts are automatically displayed on the ECDIS screen, while at the same time giving an audible and visual indication on the unit itself. Quick Range and Bearings are obtained by the Electronic Range and Bearing Line (ERBL) function. This enables the user to quickly determine if the vessel is in a position of providing assistance to the distressed craft. The ECDIS unit also has a Man Overboard (MOB) function which can be activated in the event of a person falling overboard. This marks the position which is used as a reference for Recovery and Rescue.

The Cons:

1. **Over-Reliance:** With an equipment which is seemingly fool-proof, there is a tendency for navigators to over rely on it. The consequences can be disastrous. The need to keep a proper visual lookout cannot be over-emphasised here. No matter how good the ECDIS is, its performance still largely depends upon the inputs. A vessel could have switched off its AIS and hence might not be displayed on the ECDIS. If the Radar Overlay is not turned on, the vessel will just not be seen on the ECDIS display. Hence, Navigators should continue to maintain an efficient lookout and a good radar watch. The purpose of the ECDIS is to facilitate efficient navigation, not to substitute it.
2. **Garbage In Garbage Out (GIGO):** ECDIS, at the end of the day, is a machine and depends solely on the type of inputs that it receives. Erroneous position inputs from the GPS or loss of GPS signal can have grave consequences with the ECDIS going in DR [dead reckoning] mode. If the alarm is missed out, the result can be disastrous. Hence, it is vitally important to check the performance of sensors and to carry out frequent comparisons between the primary and secondary means of position fixing. Other inputs such as the GYRO, Anemometer, Echo Sounder, Navtex, etc should be frequently verified independently to ensure smooth operation.
3. **Wrong Settings:** Feeding in wrong parameters for safety critical settings such as the Safety Depths, Safety Contours etc can give a false sense of safety. It is extremely important that the Master checks these settings each time they are changed. These settings should be password protected and the OOW should verify them prior to taking over the watch. Alarms should not be deactivated without strong reason and never just for the sake of avoiding frequent alarms.
4. **Alarm Deafness:** If alarms start going off too frequently, the navigator could end up in a dangerous situation called Alarm Deafness. This leads to the watch keeper acknowledging the alarm even without checking what it was. S/he will eventually run out of luck and there could be an occasion where s/he might miss out on a critical warning such as approaching shallow contour. Every single alarm should be checked and investigated prior to acknowledging.
5. **System Lag:** Modern ECDIS software has a lot of data to display. And with various equipment interfaced with the ECDIS, the system can slow down very easily leading to system lag. Frequent upgrades are necessary.

6. Different Types: Navigation on paper charts was a skill which had to be mastered just once. However, different vessels will have different types of ECDIS equipment, and even if the essential features are the same, it still takes a lot of fiddling around until one gets comfortable with the machine. With officers taking orders at the very last moment, it is usually left to colleagues onboard to familiarise a navigator with various equipment. To overcome this problem, many flag states have made it mandatory for every seafarer to undergo type specific ECDIS training, imparted by the manufacturer, prior to joining the vessel. To ease the training, some companies have decided to select a single manufacturer to supply the company's fleet with ECDIS equipment. (e.g. TRANSAS is a common supplier).

1. Shallow Contour (deep blue), Safety Contour (grey), Deep Contour (white)
2. Alarm settings / Area alert settings
3. Navwarning on ECDIS
4. Navtex Urgency Message on ECDIS
5. Man Overboard Function in ECDIS



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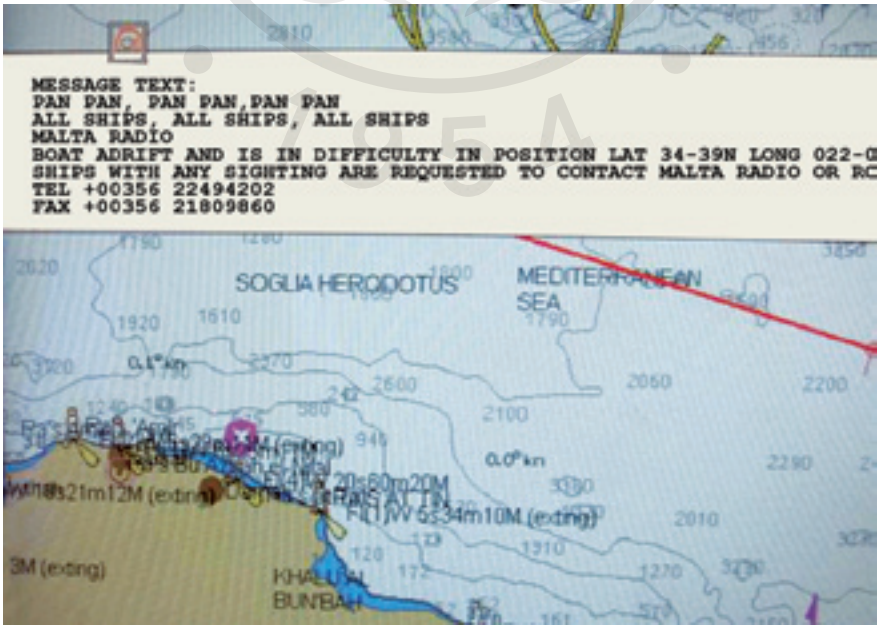

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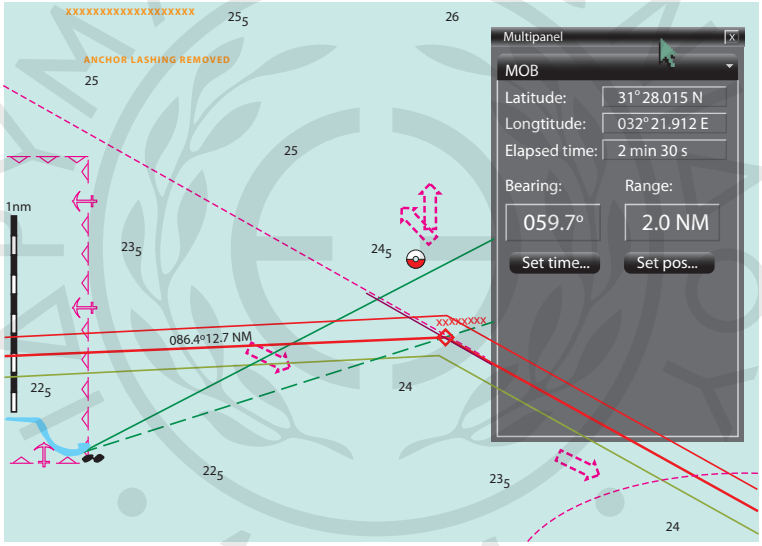


Route Monitoring | Safety Alarms | Navigational Alarms

Safety frame

Ahead:	15	min
Port:	0.20	NM
Starboard:	0.20	NM

- Show safety frame

Safety parameters

Shallow contour:	10	m
Safety contour:	30	m
Safety depth:	30	m
Deep contour:	30	m

Antigrounding alarms

- Nan. danger
- Land danger
- AIDS to navigation
- Safety contour

Monitoring on:

- Best scale chart
- All scales

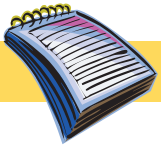
Area alerts

Basic Areas | Additional Areas

- Anchor prohibited
- Areas to be avoided
- Cargo tanship
- Deepwater route
- Dumping ground
- Fairway
- Fishing prohibited
- Incineration area
- Marine Farm Culture
- Offshore prod. area
- Anchorage area
- Cable area
- Caution area
- Dredged area
- Env. Sens. Area
- Fishing ground
- Ice area
- Inshore traffic zone
- Military area
- Part. Sens. Area

G. ***Describe the ECDIS system using the pictures and the bridge diagram in exercise A (p. 179) as visual aids. Answer the following questions in your description.***

1. What other systems is ECDIS interfaced with?
2. How do you monitor position by ECDIS?
3. What are some anti-grounding settings in ECDIS?
4. What alarm settings can be selected by the user?
5. How does ECDIS display NAVWARNING and SAR information?



Glossary

scoff	mock an idea because you think it is ridiculous
mandate	an official order to do something, *e.g. IMO mandate*
populate	*(computing)* to fill in/add data to a document
compile	produce something by assembling information collected from other sources
the advent of	the coming of an important invention
chunk	*(informal* a large/significant amount of something
interface (with)	*(computing)* to connect two or more pieces of equipment, such as computers
construe as	understand the meaning of a word or an action in a particular way; interpret
handy	*(informal)* useful
foolproof	infallible, perfect
grave	serious and important, giving cause for alarm
lag	delay; period of time between one event and another
fiddle around (with)	spend time doing small things that are not important or necessary

2. Stages in onboard procedures: passage planning / lifeboat launching

A. ***The following text gives you* an introduction to passage planning*. Read the text and fill in the blanks with the words in the box.***

fixing	efficient	current	regulations	stores	route

A good passage plan will include a track line laid upon the largest-scale charts available which cover the vessel's track. The navigator will draw and redraw the track line until it is safe, (1)_____ and in line with all applicable laws and (2)_____. When the track is finished, it is becoming common practice to also enter it into electronic navigation tools such as an Electronic Chart Display and Information System, a chartplotter or a GPS unit.
Once the voyage has begun, the progress of the vessel along its planned (3)_____ must be monitored. This requires that the ship's position be determined, using standard methods including dead reckoning, radar (4)_____, celestial navigation, pilotage and electronic navigation, to include usage of GPS and navigation computer equipment;
Passage planning software can greatly simplify the process and ensure that nothing important is overlooked; a good passage planning software program will include great circle waypoint/distance calculators, tide and tidal (5)_____ predictors, celestial navigational calculators, consumables estimators for fuel, oil, water, and (6)_____, and other useful applications.

B. *Passage planning procedures[2]. Passage planning procedures are specified in IMO Resolutions, in the law of countries and a number of professional books. Read the following two extracts from the relevant IMO Annex. Fill in the phrases below in the second extract.*

1. in the implementation
2. from berth to berth
3. gathering all information
4. a pilot

The Annex to IMO **Resolution A.893(21) (ANNEX 25),** "Guidelines for Voyage Planning", should be followed on all vessels. The key elements of the Voyage Plan are:
- **Appraising** all relevant information
- **Planning** the intended voyage
- **Executing** the plan taking account of prevailing conditions
- **Monitoring** the vessel's progress against the plan continuously

"Voyage and passage planning includes **appraisal**, i.e. _____ relevant to the contemplated voyage or passage; detailed **planning** of the whole voyage or passage _____, including those areas necessitating the presence of _____; **execution** of the plan; and the **monitoring** of the progress of the vessel _____ of the plan."

C. *Which stage do the following activities belong to? Choose two activities for each stage. Three of them have already been done for you.*

- ☐ *laying out the track line upon charts & entering the track line into ECDIS, ARPA etc.*
- ☑ *recording deviations from the plan*
- ☑ *particular tasks such as checking the reliability and condition of navigational equipment, as well as meteorological and traffic conditions*
- ☐ *communicating the plan to team in a pre-voyage conference*
- ☐ *consulting nautical charts, checking local regulations and warnings*
- ☑ *captain reviewing or changing plan in case of special circumstances*
- ☐ *determining the ship's position to check the progress of the vessel along its planned route*
- ☐ *weather forecasting, prediction of tides*

1. appraisal
   a. .....
   b. .....
2. planning
   a. .....
   b. .....
3. execution
   a. *captain reviewing or changing plan in case of special circumstances*

2. Source: IMO Resolution on "Passage planning" from the Maritime Coastal Agency, UK, in mcanet.mcga.gov.uk/public/c4/solas/solas_v/Annexes/Annex25.htm.

b. *particular tasks such as checking the reliability and condition of navigational equipment, as well as meteorological and traffic conditions*

4. monitoring
   a. .....
   b. *recording deviations from the plan*

D. *Which maritime terms are the ones explained in the definitions below? Look for them in the texts on passage planning above.*

1. a position a vessel has to pass or alter course according to its voyage plan ➡
2. to calculate your position using time, the position of celestial bodies (the sun, moon, planets and stars), and mathematical tables ➡
3. place assigned to a vessel when anchored or lying alongside a pier, etc. ➡
4. a method of estimating the ship's position, by applying to a previously determined position the course and distance travelled since ➡
5. formal statement of a decision adopted by an IMO assembly ➡
6. planned, intended voyage ➡
7. an addition to a document ➡
8. predominant conditions existing or encountered at a given time ➡

E. *Match the verbs to their definitions. Draw arrows.*

necessitate	state that a specified event will happen
appraise	ignore or disregard, fail to notice or consider
predict	make necessary or unavoidable, require
overlook	make something simpler
simplify	assess the nature or quality of, evaluate

F. *You will read instructions on the use of survival craft. Read the instructions and fill in the glossary that follows.*

GENERAL INSTRUCTIONS

Lifeboats and liferafts are a means of life saving in case of emergency. Remember it is important to:

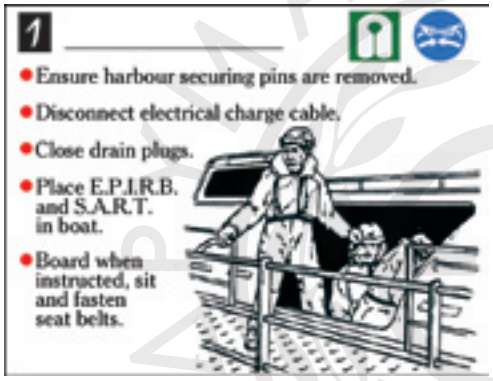
- Ensure easy and unobstructed access to these appliances in order to be able to use them without any time delay.
- Inspect the equipment periodically as per the regulations to ensure seaworthiness.
- Conduct drills periodically to make sure the ship's crew is confident to use the appliances in case of emergency.
- Display posters on board on launching procedures.

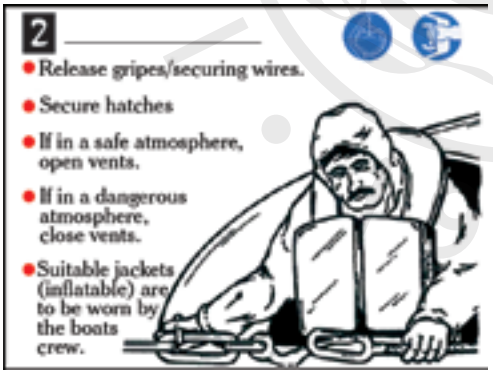
Glossary

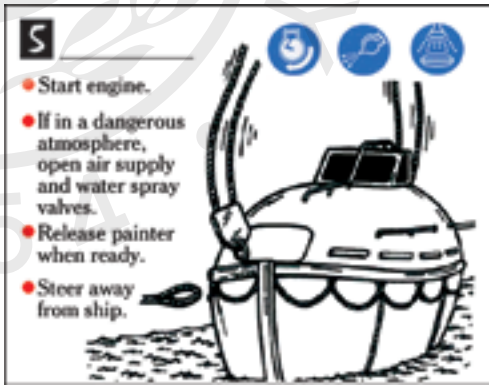
..... the fitness of a ship to sail on the sea
..... organize and carry out
..... free from obstructions, clear, unblocked
..... hold up to public view, lay out in a prominent place so as to be seen
..... the means to approach or enter a place

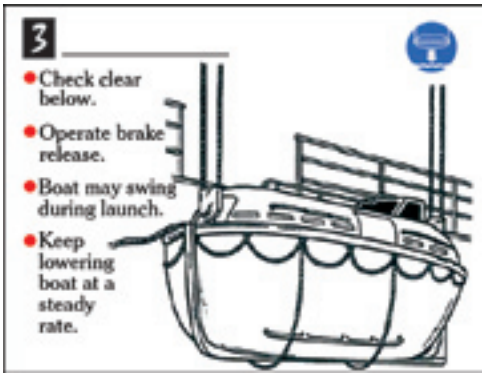
G. ***The following pictures illustrate how to launch an "enclosed lifeboat". There are six steps in the procedure. Write a title in each picture, using the following titles. Then describe the procedure orally.***

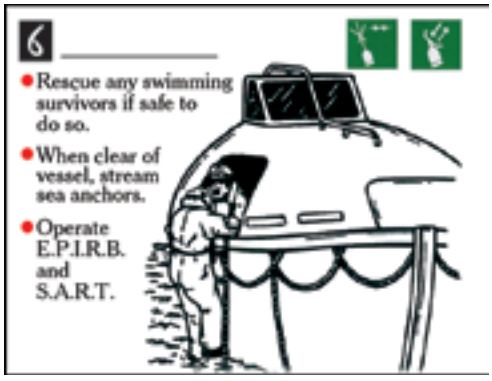
Lower to water	Entering water	Final actions
Launch actions	Letting go	Initial preparations











3. On the telephone: clarifying misunderstandings / cargo care

Lead-in: a. Check what you know on the language of telephone conversations.

1. *When you telephone a company, the person answering the phone asks...*
   a) Who's calling please? b) Who is it? c) Who calls?
2. *Which phrase means the same as "just a second"?*
   a) I'll put you on. b) Hang on a moment. c) Go ahead.
3. *Choose the correct word to complete the sentence: Please _____ and I'll put you through.*
   a) stay b) stop c) hold
4. *What is the expression used to connect two people on the telephone?*
   a) I'm sending you through b) I'm putting you through c) I'm taking you through
5. *Choose the correct word to complete the sentence: You _____ have the wrong number.*
   a) would b) must c) can
6. *You hear the sentence above, you respond: I'm _____ to have troubled you.*
   a) upset b) apologize c) sorry
7. *You hear "Thank you for your time", you respond:*
   a) Nothing. b) Not at all. c) Please.
8. *Finish the sentence: She's not in her office at the moment, can I ....*
   a) take your message? b) ring off later? c) ask you to pick up later?

b. Use the table with the verbs commonly used in telephone conversations and fill in the missing prepositions in the sentences below.

multi-word verbs used in telephone conversations		***meaning***
hold on, hang on	➡	*wait*
hang up, ring off	➡	*put down the phone, you have finished speaking*
ring up	➡	*make a phone call*
pick up	➡	*answer a call when the phone is ringing*
put through	➡	*connect somebody by telephone*
call back	➡	*return a phone call*
get through	➡	*contact someone on the phone*

1. Can you put me _____ to the chartering department, please?
2. He rang _____ before I could explain!
3. After I hung _____ I remembered what I'd wanted to say.
4. I'll ring you _____ later. I can't talk at the moment.
5. She couldn't reach you but she said she'll call _____ at around 15:00.
6. I tried calling you several times but I couldn't get _____.
7. Can you hold _____? I'll see if he's here.
8. Are you still there? Hang _____ a moment, he's talking on the other line.

Case study – Look at the following information regarding an accident:

The accident took place in the Great Belt Area, Denmark. It was twilight, very clear weather with good visibility. At 1907 hours *K.D.* made heavy contact with the Great Belt West Bridge, at a speed of 11.5 knots. It appears that a waypoint change wasn't made according to the passage plan. The ship's engine was at full speed ahead upon impact.

The vessel's damaged superstructure after the allision with the bridge

Great Belt bridge pillars with motorway section on the right and rail section on the left

The investigator for the accident report took the following notes while interviewing some of the people involved in the case.

Chief Engineer

- 19:09, in Engine Room with 2nd Engineer
- felt the impact
- started the auxiliary generators to prevent blackout
- ordered 2nd Engineer to stop the Main Engine

Second Officer

- 19:09, in crew mess room, heard four successive impacts
- ran out on deck and saw that the vessel was under the bridge
- found Master injured at the bottom of the wheelhouse stairway
- Master instructed him to send a Mayday
- went to the wheelhouse and sent the Mayday

VTS Operator

- 19:09, at the operator's desk
- heard a «Mayday» call
- located the vessel at the radar monitor
- activated the alarms
- ordered guard vessel VTS3 to sail towards the bridge

VTS Great Belt alarm panel

The investigator then received the following signed statements.

> I was at my operator's desk at 1909 when I heard a Mayday call. I couldn't locate the vessel at the radar monitor. Then I heard the caller saying the vessel was locked under the bridge. I activated the alarms and ordered a guard vessel to run to the rescue.
>
> Timothy B., VTS Operator

I was in the Engine Room with the 2nd Engineer at 19:09 when I felt the impact and realized something was seriously wrong. I started the auxiliary generators to prevent a blackout. Then the 2nd Officer entered the engine room and shouted for us to stop the Main Engine because the ship had hit the Great Belt Bridge.

James N., Chief Engineer

I was in the crew mess room, at around 19:09 I heard a crash, the first of four in succession. The ship rolled severely. I ran out on deck to see that the vessel was under the Bridge. I tried to go to the wheelhouse and found the master injured at the bottom of the wheelhouse stairway. I helped him to a comfortable position. The engines were still going at this time and the master instructed me to stop the engines. I ran to the engine room and ordered the emergency stop of the main engine. I then returned to the injured master who instructed me to transmit a Mayday call. I couldn't enter the wheelhouse, I came up against the underside of the West Bridge. I went to my cabin to get one of the handheld emergency VHFs and I called "Mayday" on VHF Channel 16 advising that *"K.D."* had hit the Great Belt Bridge.

Chris T., Second Officer

A. ***The investigator cross-checks his own notes upon the statements and needs to clarify some misunderstandings. Fill in the telephone conversations. Then go back to his notes to correct them.***

Calling the VTS operator

	VTS call centre. Paul Brown s _ _ _ _ _ _ g. How can I help you?
Good morning. Can I speak to Timothy B. please?	
	Of course. Please h _ _ d and I'll put you t _ _ _ _ _ h. Who shall I say is c _ _ _ _ _ g?
Mr Andrews, from Marine Accidents Investigations.	
	Mr Andrews, how can I help you?
I have received your report of the accident. I need to clarify something, if you don't m _ _ d.	
	Sure, what is it?
Did you order a rescue vessel without l _ _ _ _ _ _ g the *K.D.* on the radar?	
	I did, yes. I couldn't see the echo of *K.D.* on the radar, but the caller said the vessel was locked under the bridge, so I ordered a rescue vessel to sail to the bridge.
Thank you Mr B. That's all I need.	
	Don't m _ _ _ _ _ n it.

Calling the Second Officer

Hello, t _ _ s is Mr Andrews from Marine Investigations.	
	Good morning Mr Andrews, how are you?
I'm fine thanks. Do you have a moment? I need to ask you something before I submit the official investigation report of the accident.	
	Certainly, I'm at your d _ _ _ _ _ _ l.
Well, first of all, did you send the Mayday call from the bridge?	
	No, I sent it from my cabin, using the portable VHF. Each officer has a handheld VHF in his cabin.
One more thing, I see here in the Chief Engineer's account of the facts that it was you who o _ _ _ _ _ d the ME to stop.	
	Yes, it was me. I was i _ _ _ _ _ _ _ _ d to do so by the Master. I rushed down to the Engine Room before sending the Mayday.
So, the master gave you two instructions, to stop the Main Engine and send a Mayday?	
	Yes, he did.
Okay, that's all. Thanks for clearing this up.	
	Not at all. Have a nice day.

B. *Simulate the VHF distress communication after the accident.*

Role A:
Second Officer of M/V K.D.
Send the "Mayday" message on the VHF.
[Call sign: D6SW4, IMO number: 9508070,
Position: 55° 19'N - 010° 53'E].

Role B:
VTS operator for Great Belt VTS,
You need to know the nature of
distress, exact position, number of
casualties or injured persons.

C. *Read about the types of container used in the industry and give a title for each picture below, choosing from the words in bold.*

Container types[3] (available in 20′ and 40′)

There are **standard containers** (general purpose containers,), **hard-top containers** (with a removable steel roof), **open-top containers** (the roof consists of a removable tarpaulin), **bulk containers** (with three loading hatches in the roof and 2 discharge hatches in the doors, used for grain,

3. From Transport Information Service: Cargo loss prevention from German marine insurers, GDV, Berlin www.tis-gdv.de

spices, foodstuffs and general cargo), **tank containers** (for liquid cargo such as foodstuffs – fruit juices, spirits or edible oils – as well as chemicals, toxic substances or fuels), **flatracks** (with two folding end walls that can be converted to a platform, used to transport heavy-lifts and overheight or overwidth cargoes) and **refrigerated** and **insulated containers** (used for chilled and frozen goods, principally fruit, vegetables, meat and dairy products, such as butter and cheese). A distinction can be drawn between two systems, when it comes to refrigerated and insulated containers:

Integral unit (integral reefer container or integrated unit)

This type of container has an **integral refrigeration unit** for controlling the temperature inside the container. When being transported by ship, integral units are connected to the on-board power supply system. When at the terminal, the containers are connected to the terminal power supply system. For transport by road and rail, they are operated by a generator set (genset).

Porthole containers

This type of container is often referred to as an insulated rather than a refrigerated container, as it has no integral refrigeration unit. On the opposite end wall from the door, the containers are provided with sealable openings (portholes) for supply and return air. On board, the inside of the container is supplied with cold air via the ship's central cooling plant and there are special **connections with supply and return air openings** for porthole containers. Off the ship, the temperature is controlled by "**clip-on units**".

a) 

d) 

b) 

e) 

c) 

f) 

D. ***During loading operations on a container ship, the electrician calls the master on the walkie-talkie. Read the dialogue and fill in the missing words.***

spares	refuse	displayed	properly	duration

– Captain, I just finished checking the reefer containers.
There are three reefer containers that don't work (1) _____.
– What seems to be wrong?
– The temperature is not (2) _____ in the monitor and the noise of the clip-on unit is also not normal. They won't hold for the whole (3) _____ of the voyage.
And we don't have the appropriate (4) _____ to repair them on board if they break down.
– We should (5) _____ to load them, then?
– Yes, I think that would be wise.

E. ***The master calls the chartering company to tell them that the containers cannot be accepted for loading. Act out the dialogue, on the phone. Follow the instructions given in italics.***

Secretary ***Master***

SB shipping, reefer cargo department, how can I help you?

Hello, this is Capt. Ioannou. I need to speak to Mr. Taylor about a consignment.

Please hold. I'll put you through.
Tell Mr. Taylor who it is and what they want.

Mr. Taylor ***Master***

Greet the captain. Ask what the problem is.

Tell Mr. Taylor that, after a physical inspection, the vessel's electrician found that three reefer containers don't work properly and you can't accept them on board. Explain what is wrong with them.

Tell the captain you are sending a technician right away. Ask whether they will be accepted if they are fixed within the stipulated time.

Tell Mr. Taylor that if the problem is fixed and the containers are reexamined and found ok they will be loaded, but they only have 4 hours to do this.

Thank the captain, tell him you will contact him as soon as the technician gives you an update. Also, you will order a surveyor to certify the condition of the cargo before loading.

Okay Mr. Taylor. Otherwise, if you don't manage to fix them, please make the necessary changes in the cargo manifest and other relevant documentation. Bye for now.

F. *What is the appropriate SMCP response when you hear the following questions or instructions?*

- Is the equipment for cargo care operational?
- Check all lashings and report.
- Enter all checks into the log-book and report.
- Is the Certificate of Survey available?

G. *Write the appropriate verb. The first letter is given.*

1. I _ _ _ _ _ _ _ the crew how to connect reefer plugs and clip-on units.
2. C _ _ _ _ out an inspection.
3. I _ _ _ _ _ _ the holds before loading.
4. T _ _ _ measures for cargo care.
5. C _ _ _ _ the reefer holds for proper loading preparation.
6. S _ _ the correct temperature.
7. S _ _ _ _ _ on the hold ventilation to supply air.
8. L _ _ _ the containers that are on deck.
9. P _ _ _ the reefer containers on B deck.
10. S _ _ _ _ _ the shifting cargo.
11. M _ _ _ sure the temperature recorder is running.

H. *Match the two halves to make full sentences from the SMCP that describe damage to cargo.*

1. The holds	☐ of the plates is rusty.
2. The pallets	☐ on the boxes are illegible.
3. The metal	☐ are free of smell.
4. The labels	☐ are torn.
5. The bales	☐ is partly infected with vermin.
6. The flour	☐ are in a bad condition, they are broken.

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

- ☐ describe an onboard procedure (lowering a lifeboat)
- ☐ explain stages in processes (in passage planning)
- ☐ describe a navigational system (ECDIS) using visual aids
- ☐ comprehend communications by telephone and walkie-talkie
- ☐ review SMCP vocabulary for cargo care and navigation aids status

B. Class Project.

- Why do they say *"human eyes are the most valuable tool at a navigator's disposal"*? What is the role of a visual lookout in connection to electronic systems like ECDIS or radar?

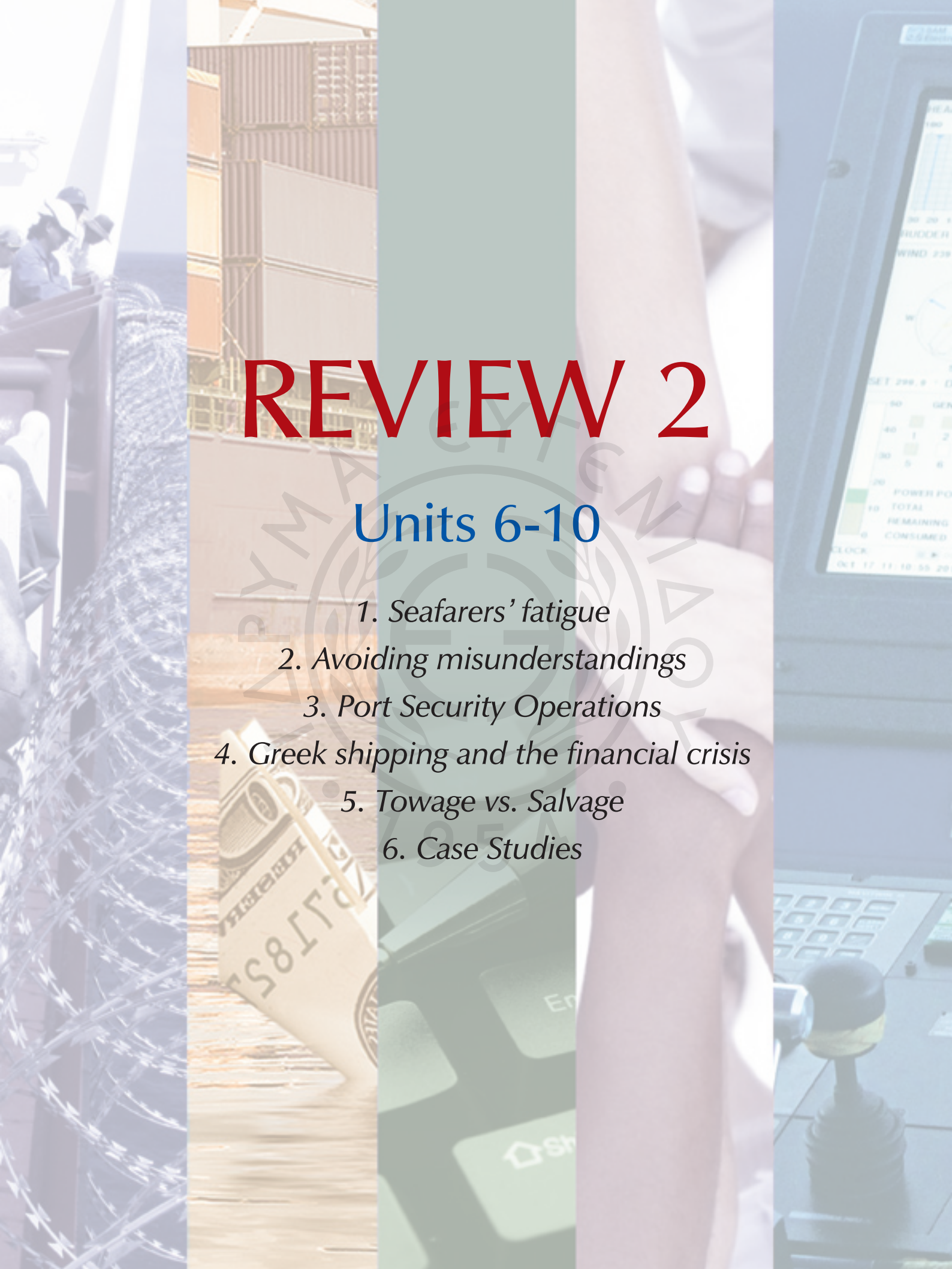
C. Fill in the gaps with the words in the box.

fixed	replug	monitor	below	detects
chunk	construed	grave	manually	handy

1. The containers were damaged during loading. The temperature in the integrated container is _____ normal.
2. _____ the reefer containers.
3. The ECDIS system is connected to the echo sounder, AIS and Navtex. It _____ dangerous situations and alerts the operator. But it gives too much information on one screen.
4. I've already written a big _____ of the article.
5. Ship piracy is a _____ money-making industry in Somalia.
6. An allision is the striking of a vessel against a _____ object.
7. His words were _____ as a dismissal of the whole proposal.
8. Don't throw that away; it might come in _____.
9. There is a _____ of possibilities after you graduate from this school.
10. Lack of implementation of safety regulations is a matter of _____ concern.
11. To _____ a vessel's position, one can use the ECDIS option of _____ plotting the position using the Range / Bearing method. You take the range and bearing from a suitable radar object and plot this on the ECDIS by using the Range / Bearing function of the ECDIS itself. In ECDIS terminology, this is referred to as a Line of Position (LOP).

D. Fill in the missing words in the description of ECDIS functions below. For help, the words are given in jumbled letters.

1. The chart radar system is presenting electronic chart information and full radar picture at one screen as a(n) _____ .
   [l / a / e / r / o / y / v]
2. A safety depth _____ is a setting that highlights the minimum depth required for the vessel to remain safely afloat.
   [n / r / t / c / o / o / u]
3. Why must you be careful when using the zoom facility of the ECDIS? SCANMIN can be used for ENC chart features to be suppressed above a certain display _____ .
   [a / s / c / l / e]
4. The main function of SCANMIN is to de-_____ the chart display, enabling the user to focus on the most useful navigational information. But since critical safety information may be removed, zoom-in and zoom-out should only be used for short periods.
   [e / r / u / t / l / t / c]



REVIEW 2

Units 6-10

1. Seafarers' fatigue

2. Avoiding misunderstandings

3. Port Security Operations

4. Greek shipping and the financial crisis

5. Towage vs. Salvage

6. Case Studies

1. Seafarers' fatigue

You will read two texts related to seafarers' fatigue. Analyze their point of view by answering the following questions. Write the correct number (1 or 2, or both) in each box.

i. *What is the purpose of each text?*

☐ to inform ☐ to instruct ☐ to illustrate ☐ to advise

ii. *What topics are covered / questions are answered in each text?*

- ☐ the organizations which conducted research on fatigue
- ☐ the cost of fatigue to all parties involved
- ☐ the facts and figures that illustrate the extent of fatigue
- ☐ how seafarers themselves experience the effects of fatigue
- ☐ the importance of fatigue for insurers and shipowners

1. "Don't fall asleep on the job"

(from Gard News 186, May/July 2007)

A small (approximately 6,000 GT) container feeder vessel ran aground on an island in the Aegean Sea. This vessel had cover for loss of hire with Gard, and her P&I cover was with another Club. The chief officer was the OOW and was alone on the bridge at the material time. Due to fatigue, he fell asleep, the vessel failed to change course as planned and grounded at full speed. The vessel sustained serious bottom damage. Oil from her bunker tanks was spilt. An LOF salvage agreement was signed with salvors. The vessel was refloated and repaired.

The vessel was out of service for over 94 days. The bill for the repairs came to around EUR 2 million. The amount awarded to or agreed to be payable to the salvors is not yet known. Nor is the amount paid by the P&I Club for the oil pollution, but it is clear that the cost to owners and their various insurers arising from the chief officer's fatigue and the lack of anyone (or anything) to alert either him or another member of the crew to the problem was substantial.

In addition, the chief officer was criminally prosecuted by the Greek authorities for causing oil pollution. He was found guilty and sentenced to 18 months in prison. The sentence was appealed and suspended. Nevertheless, he too has a criminal record.

2. Surveys on seafarers' fatigue

(from Cardiff Seafarer Fatigue Research, 2006)

An ITF report (International Transport Federation) based on responses from 2,500 seafarers of 60 nationalities, serving under 63 flags, demonstrates the extent of excessive hours within the industry. Almost two-thirds of the respondents stated that their average working hours were more than 60 hours per week and 25% reported working more than 80 hours a week (42% of masters). Beyond simply long working hours, however, it was found that 36% of the sample were unable to regularly obtain 10 hours rest in every 24, and 18% were regularly unable to obtain a minimum of 6 hours uninterrupted rest. Over half the sample (55%) considered that their working hours presented a danger to their personal health and safety. The survey also showed that over 60% reported that their hours had increased in the past 5 to 10 years. Respondents also provided many examples of incidents that they considered to be a direct result of fatigue. The early hours of the morning were the most difficult in terms of feeling the effects of fatigue. Also, port turn-around times were reported as being an important factor influencing fatigue.

In the MAIB 'Bridge Watchkeeping Safety Study' (2004) evidence from 66 collisions, near collisions, groundings or contacts between 1994 and 2003 was reviewed. Using the grounding of MV Jambo as an illustrative example, the MAIB report highlights how under-manning is one of the causal factors in collisions and groundings.

Similarly, in an analysis sponsored by the U.S coastguard, mariners were asked about accidents and fatigue was implicated as a cause in 23% of cases. The analysis pointed out, though, that admitting to fatigue is difficult and seafarers are unlikely to officially report their experience.

All three surveys agree that the underlying issues associated with seafarers' fatigue include: *the extra burden of paperwork; the additional burden of ISPS drills; falsification of documentation about rest hours; reduction in crew sizes*.

2. Avoiding misunderstandings

Fill in the gaps. Use the words in the box.

valid	standing	ambiguous	acknowledged
non-adherence	recipient	displayed	justified

Giving orders: How can you avoid misunderstandings in communications?

Orders (from Gard, *Guidance to Master*)

Any order given by the Master should be understandable, clearly worded and should not be (1) _____ or misleading.

- any verbal order should be repeated by the (2) _____ to avoid misunderstandings.
- (3) _____ orders should be written and (4) _____ on the vessel's notice boards, showing the date the order was made and its period of validity.
- bridge night orders should be written in the Bridge Night Order Book and (5) _____ in writing by each officer taking over the watch.
- orders which are no longer (6) _____, should be removed and/or replaced to avoid confusion.

The Master should regularly check that orders are followed and are not deviated from. Any departure from or (7) _____ to such orders needs to be documented in writing and (8) _____ by the person responsible for the action.

3. Port Security Operations

A. Read the text and answer the questions that follow.

Contemporary Port Security Operations, by Kim Petersen*

(*Abstracts on Maritime Security*, www.uscg.mil)

While having always been important, port security operations have become even more critical in light of continuing increases in transnational terrorism, piracy operations, and sophisticated criminal operations. Intermodal shipping companies, insurance firms and P&I Clubs, are all showing increasing concern that port authorities demonstrate well considered and effective measures in physical, personal, and information security.

One client in particular, the cruise industry, has seen a meteoric rise in both passenger loads and ports served. It is commonly recognized that cruise ships handle all security from the gangway on to their vessel; the port is responsible for all security from the gangway inland. Companies such as Princess Cruises visit over three hundred ports on every continent save Antarctica. To meet this expanding market, cruise lines are making tremendous financial investments, and, consequently, have begun to scrutinize itineraries carefully.

**The views expressed in this abstract do not necessarily represent those of Princess Cruises.*

Unwilling to risk injury to the industry by way of a terrorist incident like the seizure of ACHILLE LAURO, cruise lines are weighing the relative safety and security of their ports of call and are fully prepared to cancel visits that carry undue risk or that compare unfavorably with nearby ports.

Additionally, it is important that a port commit itself to implementing a sound program that stands to protect the interests of the part and its various constituents. A port security program must contain elements designed to meet current needs.

1. Why is it important nowadays to design new and better port security operations?
2. Is the port responsible for security onboard a cruise ship when the vessel is in port?
3. What measures should, in your opinion, a successful port security program include?

B. Fill in the correct passive form of the verbs in brackets.

There was an accident onboard *MV Kansas* last night in the Port of Rotterdam.

The incident _____ (investigate) by the local port authorities but no results _____ (announce) yet.

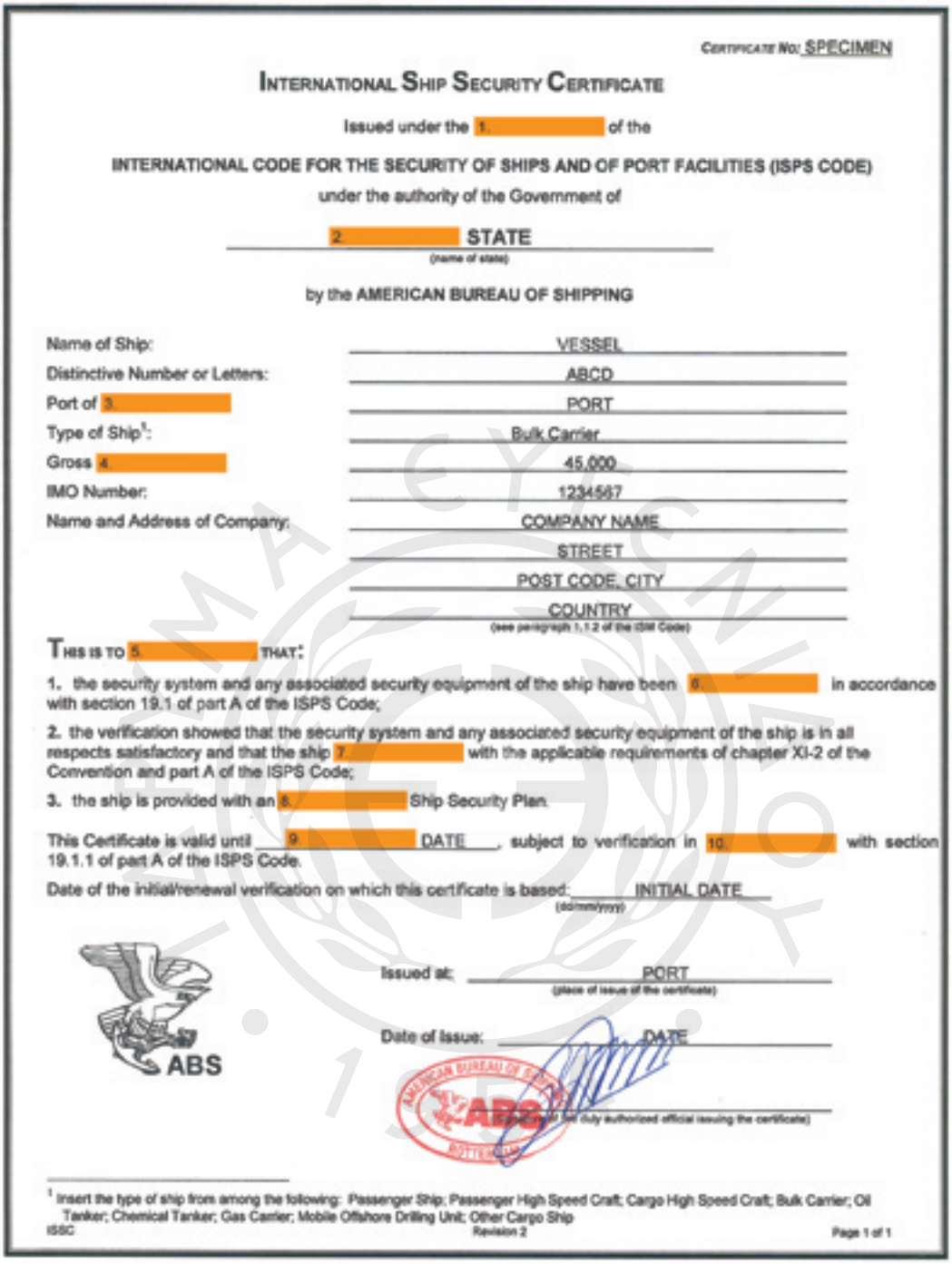
It _____ (report) that two members of the crew _____ (injure). The seafarers _____ (take) to hospital, and, unfortunately, their condition is critical.

C. Turn the following sentences into passive.

1. You must prepare a surface carefully before you apply paint.
   .....
2. Insufficient maintenance has probably caused such extensive damage to the hull plating.
   .....
3. Paint and solvents create flammable and toxic vapours in the bosun's store.
   .....
4. They believe that the collision happened in thick fog.
   .....
5. The surveyor estimated the damage to the ship at two million euros.
   .....
6. International regulations require all passengers to assemble in a drill within 24 hours of leaving port.
   .....
7. We suspended the SAR operation due to bad weather conditions.
   .....

D. Fill in the missing words in the following certificate. The first letter is given. The certificate is compulsory under a particular Code. Which one?

1. p _ _ _ _ _ _ _ _ _
2. f _ _ _
3. r _ _ _ _ _ _ _ _
4. t _ _ _ _ _ _
5. c _ _ _ _ _ _
6. v _ _ _ _ _ _ _
7. c _ _ _ _ _ _ _
8. a _ _ _ _ _ _ _
9. e _ _ _ _ _
10. a _ _ _ _ _ _ _ _ _



CERTIFICATE NO: SPECIMEN

INTERNATIONAL SHIP SECURITY CERTIFICATE

Issued under the 1. of the

INTERNATIONAL CODE FOR THE SECURITY OF SHIPS AND OF PORT FACILITIES (ISPS CODE)

under the authority of the Government of

2. STATE
(name of state)

by the **AMERICAN BUREAU OF SHIPPING**

Name of Ship:	VESSEL
Distinctive Number or Letters:	ABCD
Port of 3.	PORT
Type of Ship[1]:	Bulk Carrier
Gross 4.	45,000
IMO Number:	1234567
Name and Address of Company:	COMPANY NAME STREET POST CODE, CITY COUNTRY

(see paragraph 1.1.2 of the ISM Code)

THIS IS TO 5. THAT:

1. the security system and any associated security equipment of the ship have been 6. in accordance with section 19.1 of part A of the ISPS Code;
2. the verification showed that the security system and any associated security equipment of the ship is in all respects satisfactory and that the ship 7. with the applicable requirements of chapter XI-2 of the Convention and part A of the ISPS Code;
3. the ship is provided with an 8. Ship Security Plan.

This Certificate is valid until 9. DATE, subject to verification in 10. with section 19.1.1 of part A of the ISPS Code.

Date of the initial/renewal verification on which this certificate is based: INITIAL DATE
(dd/mm/yyyy)

ABS

Issued at: PORT
(place of issue of the certificate)

Date of Issue: DATE

(Signature of the duly authorized official issuing the certificate)

[1] Insert the type of ship from among the following: Passenger Ship; Passenger High Speed Craft; Cargo High Speed Craft; Bulk Carrier; Oil Tanker; Chemical Tanker; Gas Carrier; Mobile Offshore Drilling Unit; Other Cargo Ship

ISSC Revision 2 Page 1 of 1

E. Vocabulary revision. Fill in the missing words. Use the words in the box.

perception	transit	tolerance	razor	sharp-eyed
freeboard	excuses	assessment	negligence	hooked
skiffs	deter	evasive	alongside	citadel

Marine profile appraisal

An individual with a high level of sense of order has low (1) _____ of messiness and dirt. A person with a low level of sense of order is good at finding (2) _____

and is ready to blame others for his own (3)_____. A person with a high level of vigilance has a (4) _____ attitude and is very concentrated. This individual is capable of simultaneous (5) _____.

The Best Management Practices for Protection Against Somalia based Piracy advice:

- use the Internationally Recommended (6) _____ Corridor and the national convoy of your country.
- consider (7) _____, speed & sea state when doing your risk (8) _____.
- put (9) _____ wire around the vessel and physical barriers against (10) _____ ladders to make pirate boarding difficult.
- go to the (11) _____ when the pirates board the vessel and wait for military help.
- In a typical attack, the pirates are using a mother boat and two (12) _____. If you notice them approaching, you must make (13) _____ manoeuvres to (14) _____ the pirates from coming (15) _____ your vessel.

F. Derivatives. Fill in with the correct form of the word in brackets.

1. Seafarers who are not happy with the working conditions on board should fill in a _____ (complain) form and submit it to ILO representatives, as per MLC.
2. The new SMS requires the _____ (approve) of the classification society before it is adopted by the company.
3. Fuel _____ (consume) is an important factor influencing trade routes.
4. The Ship Security Officer must encourage security _____ (aware).
5. The number of _____ (qualification) officers is rising sharply in Greece.
6. I hope my presentation has been _____ (inform) and would like to thank you all for coming.
7. If you notice any _____ (suspicion) activity, notify the master immediately.

G. Match the adjectives to the nouns to make correct collocations.

1. Governing	quarters
2. Contributory	berth
3. Sub-aquatic	charter party
4. Wide	factor
5. Close	requirements
6. Applicable	survey

H. Put the sentences in order to make an introduction to a presentation. Write the correct number in the boxes.

☐ I've been asked to speak to you about how the recent economic crisis has affected the shipping industry.

☐ Please feel free to interrupt if there's something you'd like to ask about.

☐ By way of introduction, I am Mr. Georgiou and work as a training manager for Mercury Shipping.

☐ Before going into detail, let me put the situation in context.

☐ It's nice to see so many of you here today. Thank you all for coming.

4. Greek Shipping and the financial crisis

A. You will listen to an analysis entitled "Greek shipping may emerge stronger" from a financial reporter[1]. The reporter covers two shipping conferences, one in Athens and one in Hamburg, and gets short interviews with ship operators. Are the statements true or false?

☐ The crisis in Greek shipping has started since late 2009.
☐ Greek shipowners had not anticipated the crisis and didn't put any money aside to be able to see it through.
☐ German shipping depends on small private investors, who are currently reluctant to invest.
☐ German investors are likely to put in cash in the future, in order to help German shipowners overcome the crisis.
☐ Greek shipping companies have access to more capital than their German counterparts.

B. In your opinion, how has the economic crisis affected Greek shipping? How has it affected seafarers?

C. Fill in the missing prepositions.

1. I am _____ your disposal for any further questions.
2. I would like to thank you _____ behalf of the company for the professionalism you showed during the incident.
3. The OOW must give due regard _____ any special circumstances during his/her watch.
4. Prior _____ departure, make sure the passage plan is ready.
5. Warning. Search and rescue _____ progress in the Straits of Gibraltar.
6. The vessel is _____ voyage charter.
7. The cargo interests made a claim _____ the shipowner for breach _____ the COA.
8. They claimed that _____ the provisions of the charter party they should be compensated for cargo loss.

D. Fill in the gaps. Use the words in the box.

resumed	sufficient	stand	lit	detained
vicinity	updated	converging	specify	

1. The Ship Security Plan should be ..... regularly based on new information and security drills.
2. The goods were …… at customs for lack of certain import papers.
3. To prevent drug smuggling, you must keep all areas of the vessel well ……., limit access to the vessel and keep a log at the point of entry/exit.
4. The regulations …… that calculators may not be used in the examination.

1. Robert Wright, Shipping Correspondent, Financial Times.

5. M/V MADNESS, this is Genova VTS. ..... on, you are now .... to the agreed route.
6. Information. Tug services will not be ..... until 1200 hrs LT.
7. Warning. The depth of water is not ..... in your position.
8. Warning. Derelict vessel adrift in ..... of buoy C4.

5. Towage vs. Salvage

A. Six sentences have been extracted from the text. Write the correct number in each box.

☐ …albeit rendered on a fixed price basis.

☐ …in determining both the nature of services and the amount of compensation.

☐ The motivation for the towing service is convenience not safety.

☐ It is sufficient if the property is in danger.

☐ …and payment of such claims is the owner's responsibility.

☐ …to a huge reward for such services.

The argument that services rendered by a salvor which brings in a disabled vessel at the end of a hawser were «simple towage» is one frequently heard. Often, insurance companies make such arguments because, while they are liable to pay a claim for salvage, in many cases, the insurance companies are not liable for claims for towage (1) …… . However, admiralty courts have addressed the difference between «simple towage» and salvage services on numerous occasions and have made it abundantly clear that, in most such situations, the services rendered are salvage. Indeed, the act of rescuing a ship at sea by towing her to a place of safety is the «prototypical» act of salvage. This does not necessarily mean, however, that the salvor will be entitled (2) …… .

A salvage service implies that there was some degree of danger or some need of extraordinary assistance to the vessel. Although a marine peril to the salved property is a necessary ingredient of a valid salvage claim, the peril required in a salvage service does not need to be one that is necessarily imminent or an absolute danger (3) …… .

Simple towage, on the other hand, is a service that is based on the employment of one vessel to expedite the voyage of another when nothing more is required than the acceleration of her progress. Simple towage takes place when a tow is taken by a sound vessel as a mere means of saving time, or for considerations of convenience. The hallmark of «towage» is the absence of peril. (4) ……. An example would be where a sailboat, proceeding under sail in light air without difficulty, requests towing assistance from a power vessel to expedite the vessel's return to her mooring in order to allow the passengers to meet an appointment.

A salvage case would arise when a power vessel has run out of fuel or is disabled and adrift at sea, but the only assistance required is a tow to a safe mooring. In such cases, the level of salvage services would be extremely low when the service is rendered in harbor or close to shore, in calm weather and when numerous other vessels or towboats were available to render the same service. Indeed, because of the relatively low order of salvage in such cases, coupled with the ready availability of numerous other companies to render such services on fixed price hourly rates, it is the almost universal practice of salvors to provide such services on a fixed price basis or hourly rate. However, the services remain salvage services (5) …… . The distinction is important because if the good weather and calm seas are replaced with high seas and an approaching hurricane, if the locale is moved many miles offshore where no other assistance is available, the entire context of the services, and their value, changes radically. Context is very important (6) ……. .

B. Circle the correct alternative of the words in blue.

Under the ***Clause on Stowaways, Refugees and Persons Rescued at Sea***[2] the insurer covers ***capability/liability***, costs and expenses, such as the costs of ***diversion/variation*** of the insured vessel, necessarily ***incurred/reoccurred*** in meeting its legal obligations in respect to stowaways, person rescued at sea or refugees, including the cost of ***reassuring/repatriating*** such persons.

6. Case Studies

A. Case study I: Damaged cargo[3]*. Read the case study and answer the questions.*

- Is the cargo damage covered by the insurance taken?
- Who can make a claim against the shipper?
- Who/what do you think is to blame for the damage to the cargo?

In January 2012, Fresh-Produce Co contracts with Dimple Ltd of Hong Kong for the sale of 15 MT of stilton cheese, 15 MT of gorgonzola cheese and 30 MT of cheese spread in jars. Fresh-Produce engages S&H Forwarders to arrange for door-to-door carriage from its Melbourne cool store to Dimple's Hong Kong cool store. The consignment of cheese is stuffed into 4 reefer containers by S&H at Fresh-Produce's Melbourne cool store. The stilton is in one container, the gorgonzola in another and the cheese spread in two others. All of the cheese is to be carried chilled but the stilton and the gorgonzola are to be carried at much lower temperature than the cheese spread.

Best Trading fills out an insurance certificate which covers two things: "*all risks of loss of cargo insured, other than loss or damage resulting from any variation in temperature howsoever caused*" and "*damage to the cargo insured resulting from any variation in temperature attributable to breakdown of refrigerating machinery resulting in its stoppage for a period of not less than 24 consecutive hours*". Best Trading sends a copy of the completed certificate to the insurers.

S&H arranges road carriage of the four containers to Melbourne container terminal where they remain for five days awaiting arrival of the "Platter", the ship on which they are to be carried to Hong Kong. During their stay at the container terminal, the settings and Partlow charts on the containers are monitored by Transport Monitors Co. The weather is very hot and unseasonably humid. On arrival of the "Platter" at Melbourne, the containers are shipped on board and Tribunal Inc, the operator of the "Platter", issues a bill of lading naming S&H as the shipper. The ship's departure is delayed for three days because of engine problems. The weather continues to be hot and humid. Finally, the "Platter" departs Melbourne.

After departure from Melbourne, the "Platter" experiences further engine trouble necessitating a salvage tow to Sydney, the next port of call. The vessel is detained there for a week, while spares are air-freighted from Singapore and repairs are undertaken. Sydney is now experiencing hot and humid weather. Finally, the "Platter" departs Sydney.

By the time the vessel arrives in Brisbane, nearly three weeks after leaving Melbourne, the crew members have noticed an overpowering and unpleasant smell of decay from two of the four containers. Tribunal Inc contacts S&H, saying that the ship's crew is revolting (as, by their smell, are the contents of the containers), and that the containers should be discharged from the ship in Brisbane. S&H contacts Fresh-Produce. Further investigation reveals three things:

2. From British Marine Charterers, Terms and Conditions 2014.
3. Adaptation from Overview of Marine Insurance Law, by Dr Marko Pavliha, IMO International Maritime Law Institute.

1. that the powerful smell is coming from the two containers containing the stilton and the gorgonzola;
2. that the temperature setting on those two containers is at the level intended to chill the cheese spread;
3. that the temperature setting on the two containers containing the cheese spread is at a level colder than that intended for the stilton and the gorgonzola.

Fresh-Produce agrees that the two foul smelling containers should be discharged from the ship at Brisbane, saying that it wishes to protect its commercial relationship with Dimple. It also requests the discharge of the two containers of cheese spread as it suspects it may have been damaged by overchilling. Tribunal Inc discharges the goods in return for the original bill of lading which had not yet been sent to Hong Kong. When the containers are opened in Brisbane, it is found that the stilton and the gorgonzola are in an advanced state of decay. Much, but not all of the cheese spread has frozen solid.

B. Case study II: Once on Demurrage, Always on Demurrage[4]? Read the case study. Do you think the arbitrators were correct in allowing demurrage to be interrupted?

The time-honoured maxim *"once on demurrage, always on demurrage" means that* once Charterers have used up their laytime and the vessel is on demurrage, all time used will fall for their account, whatever the apparent cause.

However, to what degree is this maxim reliable? The English courts had, in the case of the *"Agios Dimitrios*", been asked to consider whether or not demurrage could be interrupted. The facts of the case are not unusual. The vessel was chartered on an amended Gencon form to carry a cargo of phosphate, potash and salt to Amsterdam. Upon arrival at the load port, NOR was tendered and Charterers instructed a surveyor to inspect the vessel and her holds. Following the inspection, which was merely superficial, NOR was accepted by Charterers on 8 May 2003 and time began to run. Loading commenced on 12 May 2003. Laytime expired at 1801 on 20 May 2003. On 21 May, however, it was discovered that the holds still contained significant traces of the previous cargo of barley. Accordingly, loading was stopped and the vessel left the berth for further cleaning. Following cleaning, loading re-commenced on 29 May and was completed on 3 June 2003.

Owners brought a claim for demurrage and made no allowance for the time between 21 and 29 May when the vessel's holds were being cleaned. The vessel had gone on demurrage the day before the barley was discovered. Therefore, Owners contended, if the maxim *"once on demurrage, always on demurrage"* was correct, the vessel would remain on demurrage during the period when the holds were cleaned. Owners argued that when Charterers accepted the NOR they waived their right to allege Owners were in breach of a clause of the C/P which provided that the vessel's holds should be fit to receive the intended cargo at the time the NOR was tendered. Charterers argued that the failure of the crew to properly prepare the holds entitled them to deduct time lost in accordance with another clause which referred to time deductible for demurrage.

The matter went to arbitration where it was held that the holds were, in fact, unclean at the time of the NOR on 8 May, that (i) demurrage was interrupted upon discovery of this fact and (ii) acceptance of the NOR did not amount to a waiver. The arbitrator allowed demurrage to be interrupted. Owners appealed. The court agreed with the arbitrator and found that Charterers were entitled to deduct the time lost for secondary cleaning from time on demurrage. The case of *"Agios Dimitrios*" is not the first of its kind. So, *once on demurrage, <u>not</u> always on demurrage*.

4. Dec 2004, Steamshipmutual.

UNIT 11

Marine Pollution

1. *How do ships pollute the environment?*
2. *Pollution prevention / MARPOL 73/78*
3. *Oil spills / Oily water discharge*
4. *Sewage / Garbage*
5. *Air pollution*

Round-up

1. How do ships pollute the environment?

A. ***Look at the following Guidance[1] on pollution. As a future officer, which of these issues do you feel you are well-informed about? Circle and discuss.***

Pollution

Due to the increased global focus on environmental issues, pollution, irrespective of the substance and cause involved, not only attracts immediate public attention, but constitutes a criminal offence in most countries, often with severe personal consequences for the ship's personnel involved. Therefore, officers should be well-informed about the following issues:

- general environmental issues and major causes of marine pollution
- pollution prevention and contingency planning
- international and national historical and legislative background
- MARPOL 73/78, including all Annexes
- other relevant environmental conventions
- national response systems
- liability and compensation schemes.

B. ***What measures are there to prevent marine pollution? Mention one for each pollutant listed below. Where can you find the rules for these ways of avoiding pollution?***

Pollutants – Different types of substances and operations or accidents can cause pollution of the environment. Major pollutants are:

- oil and oily substances – bunker oil, lube oil and oil cargoes
- cargoes such as noxious liquid substances in bulk, i.e. chemicals and harmful substances carried in packaged form, i.e. dangerous goods
- sewage
- garbage and waste
- air pollutants such as soot and sulphuric acid from the ship's exhaust
- ballast water.

Here are some ideas. Add your own. *You can avoid/prevent pollution...*

...by not discharging non-biodegradable waste to the sea

...by having a sewage treatment plant on board cruise ships

...by using fuel that reduces harmful emissions

1. From Gard (P&I Club, www.gard.no), *Guidance to Masters*, 2nd ed. Sept. 2006.

C. *Fill in the missing adjectives given in the box.*

efficient	costly	stringent	minor	catastrophic	deliberate	chemical

Types and causes of pollution

A. Pollution by oil

Pollution by oil cargoes receives a lot of attention in the media but is actually a (1) _____ contributor to oil pollution worldwide. The most common type of pollution is caused by bunker heavy fuel oil. Pollution by heavy fuel oil is serious due to its (2) _____ consistency and properties, thus having a more harmful impact on the maritime environment and making clean-up more difficult and expensive.

Pollution by fuel oil can occur

- during bunkering operations (alongside the berth, on the roads, in the open sea)
- during shipboard operations such as re-pumping and/or ballasting measures
- due to an accident (collision, contact with FFO – fixed or floating object, grounding)
- as a (3) _____ act of discharging oil into the sea, which constitutes a criminal act.

During bunkering operations, whether in port, alongside or at anchor, utmost care and attention is required by all crew members involved. The prevention of pollution by oil is covered by MARPOL 73/78 Annex I.

B. Pollution by noxious liquid substances

Pollution by chemicals is rare and occurs mainly during cargo operations, or as a consequence of an accident such as a collision. However, the damage to the environment may be (4) _____, depending on the nature of the chemicals escaping from the vessel, and the effects are immediate and long lasting. The prevention of such pollution is covered by MARPOL 73/78 Annex II.

C. Pollution by harmful substances in packaged form

Pollution by dangerous goods occurs occasionally by accident when cargo is lost overboard and, to a lesser extent, during cargo operations. The prevention of dangerous packaged goods pollution is covered by MARPOL 73/78 Annex III.

D. Pollution by sewage

More (5) _____ regulations to prevent pollution by sewage and thus avoid detrimental effects on the marine environment and its flora and fauna have been required due to the increasing number of passengers carried by ships. MARPOL 73/78 Annex IV sets out regulations for the Prevention of Pollution by Sewage from Ships.

E. Pollution by garbage

Pollution by disposal of ship's garbage is not only prohibited under MARPOL Annex V, but also constitutes a criminal offence similar to pollution by oil in most jurisdictions. Pollution by garbage is mainly caused by careless or intentional disposal overboard. It has various impacts on the environment. Garbage not only pollutes beaches and estuaries but also harms marine fauna. It can seriously disrupt factories which are located on waterways and use water for cooling purposes, by blocking their suction cages. In ports with garbage disposal facilities, garbage disposal should be carried out in accordance with the vessel's Garbage Management Plan. Garbage includes ship's domestic waste, wrappings from provisions and stores delivered on board, sweepings from the cargo holds.

F. Pollution by ballast water

Ballast water from vessels is one of the major sources of the global introduction and spread of harmful aquatic organisms and pathogens. On 1 December 1997, the IMO Assembly adopted *Guidelines for the Control and Management of Ship's Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens (A20/Res.868).* Certain port States have imposed significant control procedures, detentions and fines on vessels discharging ballast water in their jurisdictions.

G. Air pollution

Air pollution is caused by deficiencies in vessels' exhaust pipe filters when burning heavy fuel oils. Air pollution from exhaust gases contributes to global warming and can be reduced by achieving a more (6) _____ combustion of fuel oils. Although less prevalent today, pollution of air by soot from the ship's funnel may still occur. In such instances, not only can soot particles be carried for miles, but also clean-up is labour intensive and (7) _____. Annex VI to MARPOL 73/78 sets out regulations for the prevention of air pollution. Also, there are EU directives on restrictions on the use of MDO (Marine Diesel Oil).

2. Pollution prevention / MARPOL 73/78

A. ***First do the following MARPOL True/False quiz. Then read about the Convention to check your answers.***

1. You can only throw plastic bags into the sea 25 miles from the nearest land.
2. Toxic chemicals are handled in MARPOL Annex III.
3. Bilge water management is regulated in MARPOL Annex I.
4. You must record fuel bunkering in the Oil Record Book, as specified in MARPOL Annex II.
5. Annex V tells you the distance from land you are allowed to discharge garbage.
6. Annex VI restricts ship emissions of substances which attack the ozone-layer.

International Convention for the Prevention of Pollution from Ships (MARPOL)

MARPOL 73/78 is the main international convention covering prevention of pollution of the marine environment by ships, *both accidental pollution and that from routine operations.* The Convention was adopted in 1973, modified by the Protocol of 1978 and has been updated by amendments through the years. The MARPOL Convention has been ratified and implemented by virtually every maritime country and is applied, through a combination of flag state and port state control, to the entire world merchant fleet. The Convention currently includes six technical Annexes. "Special Areas", which are considered to be at risk from pollution, with strict controls on operational discharges are included in most Annexes.

Annex I Regulations for the Prevention of Pollution by Oil

It specifies tanker design features intended to minimize oil discharge into the sea. It provides regulations about the treatment of engine room bilge water and ballast and tank cleaning waste. The first half of Annex I deals with engine room waste. There are many new technologies and equipment that have been developed to prevent waste such as: Oily Water Separators (OWS), Oil Content Meters (OCM), and Port Reception Facilities. The second part of Annex I is about clea-

Annex	*Control of ships causing pollution by…*	*Entry into force*
I	Oil and oily water	1983
II	Noxious liquid substances in bulk	1987
III	Harmful substances in packaged form	1992
IV	Sewage	2003
V	Garbage	1988
VI	Exhaust gas (air-pollution)	2005

ning the cargo areas and tanks. Oil Discharge Monitoring Equipment (ODME) is a new technology that has helped improve sanitation in these areas.

Annex II Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk

It details the discharge criteria and measures for the control of pollution by noxious liquid substances carried in bulk; some 250 substances, like toxic chemicals, were evaluated and included in the list appended to the Convention; the discharge of their residues is allowed only to reception facilities; no discharge of residues containing noxious substances is permitted within 12 miles of the nearest land. Stricter restrictions apply to «special areas».

Annex III Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form

It contains general requirements for the standards on how to package, label, stow, report and document harmful substances. "Packaged harmful substances" are those substances which are identified as marine pollutants in the International Maritime Dangerous Goods Code (IMDG Code).

Annex IV Prevention of Pollution by Sewage from Ships

It contains requirements to control pollution of the sea by sewage; the discharge of sewage into the sea is prohibited, except when the ship has an approved sewage treatment plant in operation or when the ship is discharging comminuted and disinfected sewage using an approved system at a distance of more than three nautical miles from the nearest land.

Annex V Prevention of Pollution by Garbage from Ships

It deals with different types of garbage and specifies the distances from land and the manner in which they may be disposed of; the most important feature of the Annex is the complete ban imposed on the disposal into the sea of all forms of plastic.

Annex VI Prevention of Air Pollution from Ships

It sets limits on ozone depleting emissions from ship exhausts. It regulates the emission of Nitrogen Oxides (NOx), Sulphur Oxides (SOx), Volatile Organic Compounds (VOCs) and shipboard incineration. It also establishes requirements for reception facilities, for wastes from exhaust gas cleaning systems, incinerators, fuel oil quality, for off-shore platforms and drilling rigs and for the establishment of SOx Emission Control Areas (SECAs). A chapter adopted in 2011 covers mandatory technical and operational energy efficiency measures aimed at reducing greenhouse gas emissions from ships.

B. *IMO's* PSSAs. *Listen and answer the questions.*

1. Can you give a definition of PSSAs in English?
2. Why are often vessels re-routed to avoid PSSAs?
3. Can other areas be designated as PSSAs in the future?
4. What is "sustainable development"?

C. ***Five phrases have been extracted from the text. Fill them in the appropriate place. Write the correct number in each box.***

1. could even lead to imprisonment
2. should be notified
3. in the vessel being detained
4. carefully comply with the special regulations in force
5. are not familiar with their obligations under MARPOL

Control and measures to avoid pollution

Special areas

When entering Particular Sensitive Sea Areas (PSSA) the Master and his/her officers are advised to ...☐..., such as the absolute prohibition of discharge of oil, oily substances or ship's grey water (the latter permitted only by strict compliance with special requirements). Before entering PSSAs the appropriate authorities ....☐... Any contravention of these regulations may have serious financial consequences for the Company and sometimes the P&I insurer.

Accuracy of records

The Master and his/her officers are advised to keep proper and accurate records in the Oil Record Book and Garbage Record Book. The slightest irregularity in these records may lead an authority to not only carry out a more detailed inspection but to also impose a fine on the person responsible as well as the Master. Irregularities in these record books may, in some countries, constitute a criminal offence and ...☐...

Special care is needed for the entries in the oil record book. Errors or false entries will result in problems or investigations when discovered by a port State control officer or the US Coast Guard.

The Master must ensure that the crew member(s) responsible for completing the oil record book has adequate training and understanding of how to correctly complete the book. The Master should also ensure that all tanks identified in the oil record book are in accordance with the IOPP certificate.

Port State control inspection

Under MARPOL, port State control officers may at any time carry out an inspection when there are clear grounds for believing that the Master or crew ...☐... Such inspections may result ...☐... without notice until steps have been taken to rectify the situation.

3. Oil spills / oily water discharge

A. ***Look at the SMCP environmental protection communication. Choose the correct word in italics.***

I have ***unconscious/accidental*** spillage of oil.
Can you stop spillage?

No, I cannot stop spillage.

What kind of assistance is required?

I require oil ***disinfectants/dispersants*** and floating ***barriers/booms***.

Stay in ***vicinity/proximity*** of pollution and co-operate with oil ***cleaning/clearance*** team.

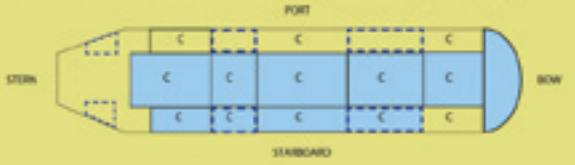
B. ***One of the most widely known spills is the Exxon Valdez oil spill. Read about it and answer the questions below.***

The incident 1

On the evening of 24 March 1989, the supertanker the *Exxon Valdez* left the Valdez oil terminal (Alaska, USA) for Long Beach (California, USA), after having loaded 180,000 tonnes of crude oil. During the night, the vessel grounded on Bligh Reef.

It gradually became apparent over a number of days that the accident had damaged several tanks and caused a spill of 38,500 tonnes of oil.

The *Exxon Valdez* was emptied of her cargo and then towed away and repaired at a shipyard. She was then rebaptised *Exxon Mediterranean*, then *Sea River Mediterranean* after being sold to another company.



Location of segregated and protected seawater ballast tanks
Area flooded due to grounding
C Cargo

Cause of accident	Pollutant	Quantity transported	Quantity spilled	Waste collected	Length of coastline polluted
Grounding	Crude oil	180,000 t	38,500 t	25,000 t	1,700 km

Response 2

The Governor of Alaska declared the situation an emergency and placed responsibility for clean-up in the hands of the oil group Exxon. The company acknowledged its responsibility and stated that it would take full charge of the organisation of clean-up and cover the costs.

Floating booms and skimmer barges were rapidly deployed. To prevent the whole cargo from spilling into the sea, the oil within the *Exxon Valdez* was rapidly transferred onto the tanker *Exxon Baton-Rouge*.

In two months, 2,000 km² of drifting slicks polluted 800 km of coastline (1,700 km including all the inlets and islets). Tens of thousands of professionals and volunteers, with unprecedented means (1,400 vessels, 85 helicopters), were deployed to save seabirds and mammals and to clean up the shoreline, beach by beach.

The main response techniques used were manual and mechanical clean-up, pumping, washing (cold water low pressure washing and high pressure washing with hot water and washing agents) and bioremediation.

Removing the cargo from the Exxon Valdez © Photo courtesy of the EVOS TC

Clean-up by flooding with cold water © Photo courtesy of the EVOS TC

1. What happened to the ship?
2. Was the oil spill collected in full? Were there any parts that drifted away?
3. What was the immediate response (means of avoiding a bigger spill)?
4. What means were used as a secondary response (to fight the spill)?

C. *How has the Exxon Valdez accident changed the shipping industry? Scan the following two texts and underline the changes (especially in legislation) it brought about.*

Twenty-six years later, the *Exxon Valdez* oil spill is remembered for the maritime regulation reform it established as well as for the immense damage the accident inflicted on the environment. The incident brought about significant and much-needed changes in maritime regulations regarding prevention and oil spill response. The maritime industry was forced to develop contingency plans for large oil spills and create regional and national response organizations. The event resulted in the Oil Prevention Act of 1990 (OPA90), and the formation of national response groups like the Marine Spill Response Corporation (MSRC). The *Exxon Valdez* incident promoted amendments to the IMO's MARPOL Convention that called for double-hulled tankers by 2015, which was also a mandate of the U.S. OPA90. MARPOL also required the ISM Code, which was adopted in 1993, and the 1995 amendments to the STCW, which further set standards for deck officers on the bridge of a vessel.

(*article in* ***Maritime Executive*** *magazine)*

The *Exxon Valdez* incident changed tanker shipping for good. It had a lot of far reaching consequences with regards to different factors such as ship design. Double hull technology protects in case of low intensity collisions and grounding. But it is still debatable how much it saves the tanker from spilling oil in a major accident. So the biggest change that came out of the *Exxon Valdez* incident was the implementation of the International Safety Management Code of ships and the protection of the environment. The ISM Code focuses on human factors. The captain of the *Exxon Valdez* was reported to be drunk and the third mate, who had the conn at the time of the accident, fatigued. You can have a very good ship, high quality operation but one small error from any person on the bridge or any other officer can lead to a disaster. The operations are still handled by the people on board. Human error still counts for roughly 80% of all accidents at sea. In spite of these 80% of accidents caused by human error, I think humans still can assure and provide the key element of instant risk management that include decisions which need to be taken instantly.

In the late 80s, a passenger ship ran aground on the North American continent. The crew was relying exclusively on their satellite receiver for navigation. They ventured out of the shipping channel but didn't realize it. What happened was: the wiring had become loose so the satellite receiver in the wheel house had lost the signal. The receiver defaulted to dead reckoning, that means a basic mode of operation that only measures the ground speed and course, but doesn't take into account other significant factors like the current or wind. Not watching anything other than their satellite navigation system, the crew ran aground.

(interview with a marine insurer)

• Did you know?

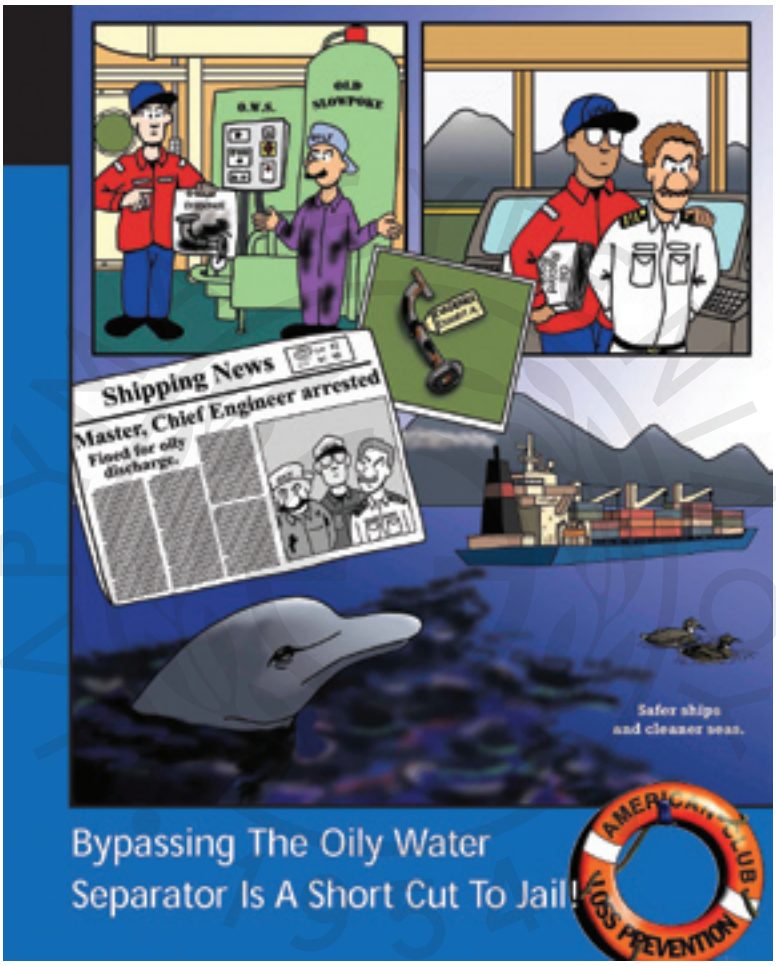
Oil pollution happens at sea. Who is going to pay the compensation?

(from imo.org)

Liability and compensation for oil spills is internationally regulated by two conventions - The Civil Liability Convention - CLC - (i.e. International Convention on Civil Liability for Oil Pollution Damage - 1969) which regulates the shipowners' liability, and The Fund Convention (i.e. Interna-

tional Convention on the Establishment of an International Fund for Oil Pollution Damage, 1971), under which a fund financed by the cargo owners (oil companies) is there to pay compensation if the shipowner cannot be held responsible, or if the compensation paid is not adequate. The limits of liability and compensation set out in these conventions have been greatly increased through amendments. The CLC and the Fund divide financial and criminal liability between the shipowner and the oil industry. And, oil spill claimants are now guaranteed pay regardless of fault.

D. *If you dump oily water into the sea, you will pay a fine. What else can happen?*



• Did you know?

If a separator, which is normally used to extract the oil from the bilge water, is faulty or is deliberately bypassed, untreated oily bilge water is discharged directly into the ocean, where it can damage marine life. Bilge water is water from condensation mixed with oil, metal shavings and other debris in ship bottoms. Crews must run the mixture through a cleaning machine and then an oil content meter, which sets off an alarm. If the water entering the discharge system contains too much oil, ships are required to record any treatment and release of tainted water in an oil record book for review by the Coast Guard. A number of ship operators have been charged with environmental violations related to this issue in recent years. In the late 1990s, a big cruise line company fitted its ship with a secret "bypass pipe" (referred to as a "magic pipe") to release bilge water without running it through the oil water separator and falsified the records in the ORB (the company's own engineers referred to the log as the "Eventyrbok", Norwegian for the "fairy tale book"). The company pleaded guilty and paid a $27 million fine for multiple violations (including discharging

chemicals from the cruise ship's photo shop) in 1999. Under US legislation, a "whistleblower" reward (up to 50% of the fine) is given to crew members who give information that leads to conviction. Oil fingerprinting technology can match the oil found in the ocean to the oil tank.

4. Sewage / Garbage

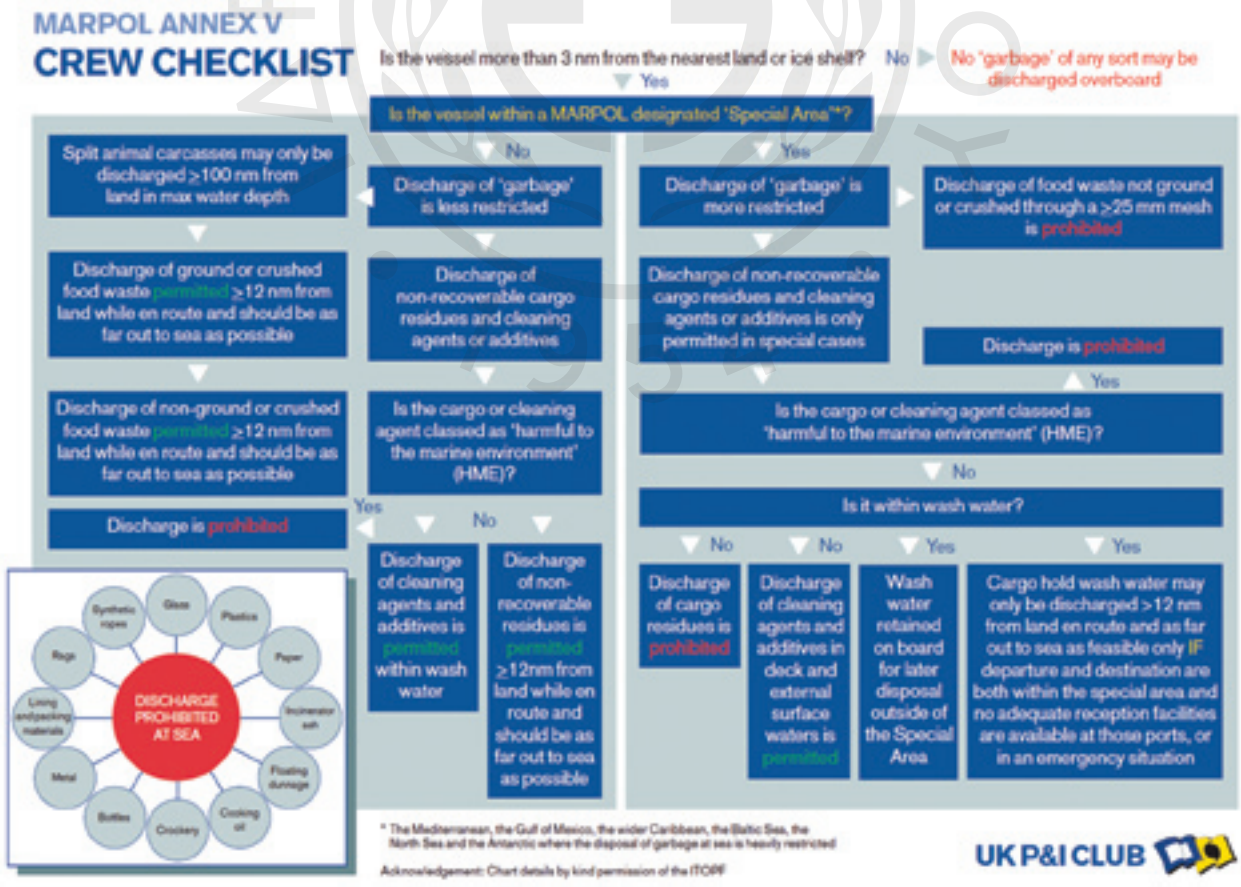
A. *Fill in the gaps with the words in the box.*

residue	laundry	plastic	management	incinerator	condensing	chemical

This is an example of waste _____ in a passenger ship:

- Liquid waste, sewage grey water (from the galley and _____) and black water (from the toilets), undergoes biological and _____ treatment before going overboard.
- Food and wet waste is collected and made free of water by _____ and drying. The water goes to the grey water system. The dry _____ is bagged automatically and burned in a(n) _____.
- Tin and glass is crushed, cleaned, dried and split, for collection and transportation ashore. Together with compacted tin and glass, _____ goes ashore too.

B. *Study the poster on MARPOL ANNEX V and circle YES or NO for the questions that follow.*



1. You are 20 nm from nearest land. Can you throw bottles at sea?	YES / NO
2. You are 2 nm from nearest land. Can you throw overboard cleaning water that contains non-HME detergent?	YES / NO
3. You are in the Gulf of Mexico. Can you throw overboard cargo hold wash water?	YES / NO
4. You are 15 nm from nearest land. Can you throw food waste to the sea?	YES / NO

Did you know?

- The Convention for ***Dumping Waste*** and Other Matter (so-called "London Convention") restricts all dumping (except for a permitted list that still requires permits), and regulates incineration and anti-fouling coatings.
- If solid waste, like glass, paper, steel, plastic, enters the ocean, it becomes ***marine debris***.

C. *Put the words in the correct order to make full SMCP phrases.*

1. with IMDG Code marks/adrift/warning/three drums/reported/near your position.

   .....

2. of MV Brio/located/in/oil spill/the wake.

   .....

3. located/I/chemicals/incinerating/a vessel.

   .....

4. the polluter/you/identify/can?

   .....

5. polluter/the/the/scene/left.

   .....

5. Air pollution

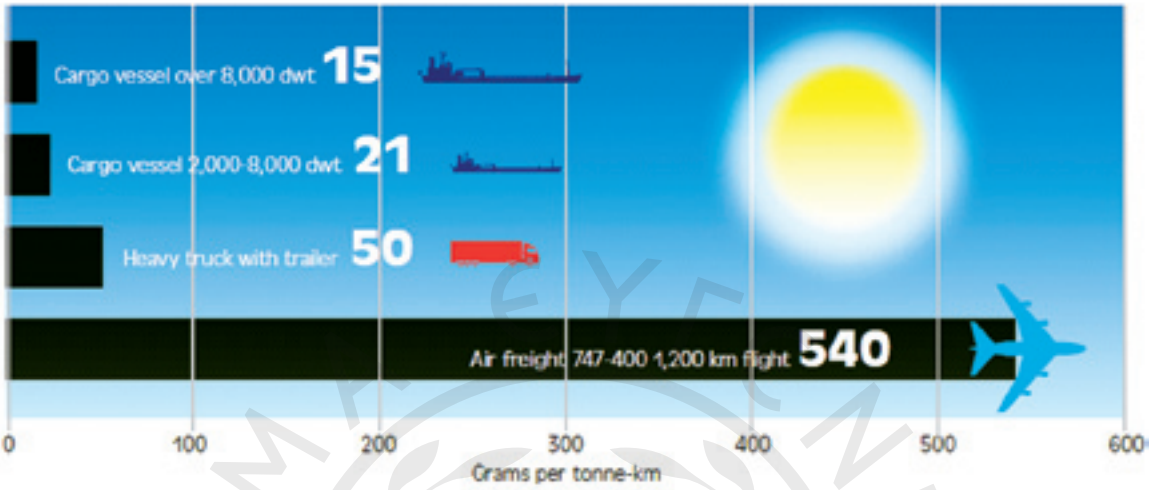
A. *How is shipping reducing its harmful greenhouse emissions? Listen and fill in.*

1. Ships carry _____ of the world trade.
2. Shipping is the most environmentally friendly mode of transport, especially compared to _____.
3. Solutions that can help the shipping industry reduce its CO_2 emissions include:
   a) bigger ships, reducing the CO_2 emitted for every ton of cargo carried.
   b) improvements to _____ and _____ designs making ships move more efficiently through the water.
   c) CO_2 abatement technologies, such as special exhaust filters.
   d) speed management, improved voyage _____ and weather routing.

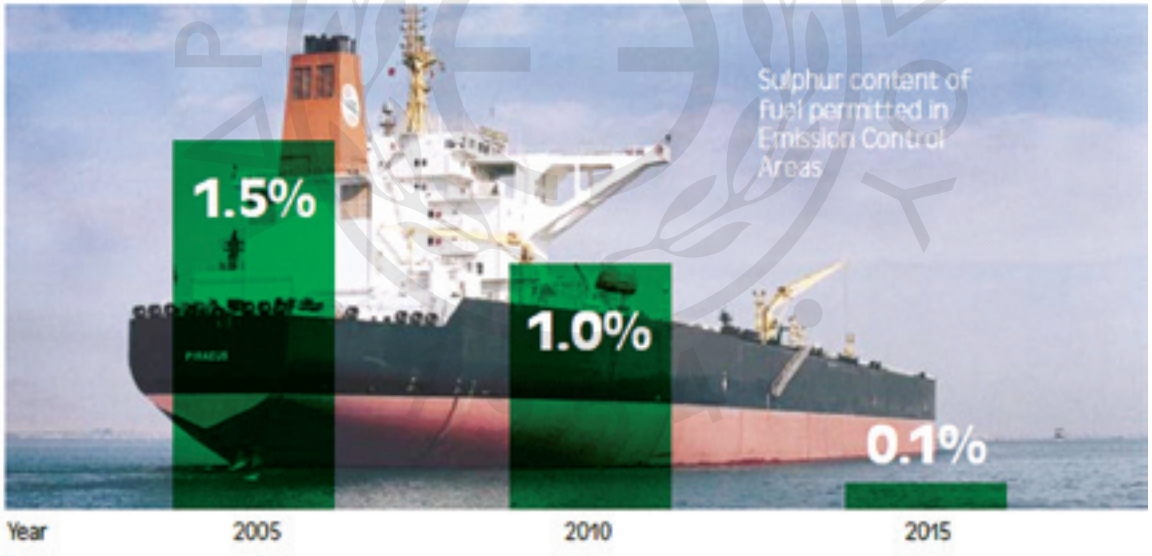
e) _____ of engine power and use of different fuel types.
f) _____ energy, such as solar or wind power.
g) third generation bio-fuels, an alternative to oil that is more carbon friendly.

Comparison of CO_2 emissions between different modes of transport

Source: NTM, Sweden



IMO agreement to reduce atmospheric pollution from ships



Did you know?

- Through its greenhouse gas reduction program, the IMO believes the measures could reduce CO_2 **emissions** by 180 million tons annually by 2020 and save $34 billion to $60 billion in fuel costs.
- **Scrubbers** remove pollutants from ship exhausts. Some believe that retrofitting ships with equipment like "scrubbers" could help the industry reduce CO_2 emissions. Critics of existing scrubber technology however point out that the technology only removes the toxic chemicals from the atmosphere at the expense of depositing them in the ocean as contaminated waste water. An emissions abatement system has been developed, though, that avoids this problem because it removes not just sulphur dioxide but also carbon dioxide and nitrogen oxides.

- **Low-sulphur fuel** can cost almost twice as much as ordinary bunker fuel.
- **Slow-steaming** saves fuel. Wärtsilä calculates 50% less fuel consumption for container ships that reduce from 27 to 18 knots at the cost of an additional week in sailing time on Asia-Europe routes.

B. *Look at the pictures. This is the Nichio Maru. Listen to a report entitled "shipping goes green" about this vessel and answer the questions.*

- What type of ship is it?
- How does it provide power for the accommodation spaces?
- What is the vessel's environmentally conscious design?

C. *According to the text, are the following statements true or false?*

1. Sulphur content in ship fuel in the Mediterranean must be 0.1 after 2020.
2. Sulphur emissions can cause breathing problems to people.
3. Scrubbers are a widespread solution for ships.
4. Ships crossing the Atlantic on bunker fuel should have a tank of low-sulphur fuel to be used when entering the English Channel.

Sulphur Directive pushes shipping into stormy waters[2]

The European Union's Sulphur Directive limits sulphur emissions from commercial shipping to 0.1%, in a zone that extends from the English Channel to the Baltic Sea. Enforcing the regulation is proving problematic for member states.

Air quality in the English Channel, the Baltic Sea and the North Sea has received a boost. On 1 January 2015, this Sulphur Emissions Control Area (SECA) tightened its restrictions on the sulphur content of fuel used by commercial ships from 1% to 0.1%. Sulphur content in ship fuel is hardly regulated in other areas, including the Mediterranean, where it can be as high as 4%. A global limit will be set at 0.5% from 2020; a challenge for the industry, but an essential measure for the environment. Sulphur emissions cause acid rain, which is harmful to plant life, and can also lead to major respiratory problems. The sulphur emitted by the maritime industry is responsible for around 50,000 deaths per year in Europe.

Filtering exhaust gases or switching fuels

There are very few options available for limiting sulphur emissions. Ships must either filter their exhaust gases, switch to a sulphur-free fuel or convert their fuel supply to gas. But the industry

2. by Aline Robert, March 2015, in www.euractiv.com, EU news and policy debates.

is struggling to come up with a standard. The installation of exhaust gas filters is technically very difficult, and only 100 to 150 ships in the world are currently fitted with these exhaust "scrubber" systems, from a total fleet of 50,000 commercial ships.

The option of using low-sulphur fuels, like marine diesel or methanol, is not currently an economically viable alternative to exhaust filtration. These highly refined fuels cost 30-40% more than those traditionally used by commercial ships; a cost that hits short distance shipping routes particularly hard. Long-distance freight ships from Asia or Africa are expected to switch to a low-sulphur fuel when they enter the Channel. This means they should carry multiple fuel reserves, which is not always the case.

2020 sulphur and CO_2 targets

The restriction of sulphur emissions is the main environmental constraint to be imposed on the industry. By 2020, sulphur emissions will be subject to a 0.5% limit worldwide. Developing countries, which depend heavily on marine transport to feed their growing economies, are following the matter closely and trying to have the date pushed back to 2025.

D. ***In March 2015 a Swedish ferry operator launched the world's first vessel converted to be powered with methanol. Listen to a report on the conversion and fill in the missing information.***

1. The ferry's "dual-fuel" engine uses methanol as its primary fuel with _____ as a back-up power source.
2. SOx emissions are expected to be cut by _____.
3. NOx emissions are expected to be cut by _____.
4. Particles are expected to be cut by _____.
5. CO_2 emissions are expected to be cut by _____.
6. The emissions from methanol are comparable to _____ but the requirements for handling and infrastructure are much lower.
7. Other techniques for emission purification that are being looked at include: electric propulsion and _____.

E. ***Now read the article to find out more about this vessel.***

The world's first methanol ferry

Stena Germanica, a ROPAX ferry, is the first commercial marine vessel to run on methanol. Operating the route Kiel-Gothenburg, carrying 1.500 passengers and 300 cars, the 240 m long vessel is part of a pilot project that aims to test methanol as a possible future sustainable fuel for the shipping industry.

During the 6-week conversion of Germanica at a shipyard in Poland, with guidance from the class society Lloyd's Register, rigorous risk assessments were done of the whole fuel system on board the ship. Some examples of new features in the installation: *double-walled methanol pipes* were used to contain a possible leak and *nitrogen inert gas* was used in the methanol tanks to make sure that no oxygen can be present, as well as *enhanced fire detection and extinction systems*. The engine type selected for the project is the Wärtsilä-Sulzer eight-cylinder Z40S, which offers a combined propulsion power output of 24MW. The upgraded vessel is fitted with new dual-fuel injection nozzles, which are capable of injecting both methanol and diesel. Each of the ship's four engines is equipped with a high-pressure (600 bar) methanol pump.

Facts about methanol

Methanol is a biodegradable, low flash point, environmentally friendly and cost efficient fuel that reduces the emissions of sulphur and particles to almost zero. An important advantage of the use of methanol is simplified transportation and storage, since the fuel is liquid at room temperature. Methanol is a colourless liquid that can be produced from natural gas, coal, or CO_2.
Another major advantage is that methanol can also be produced from biomass, which opens the possibility to operate on a completely renewable fuel.

Conditionals

a) Look at the following conditional sentences. What does each one speak about? Draw arrows.

(scientific) fact	***If the methanol is a success, they will convert more vessels.***
prediction	***Unless you plug scuppers, the oil overflow will escape into the sea.***
warning	***If you cause an oil spill, you should report it to the Coast Guard.***
instruction	***When you burn methanol, there is no smoke or soot in the air.***

Note: *For information on conditional sentences go to page 397.*

b) Complete the warnings and predictions by matching the two clauses in each column.

1. As long as you check ullages in all the tanks,	☐ you will lose valuable time.
2. If there is no VRP for you to follow,	☐ it is illegal (exceeding 15 ppm).
3. If you fit a scrubber,	☐ it will clean the exhaust gas.
4. If the oily water discharge is visible (produces a visible sheen),	☐ you will be fined by the Coast Guard.
5. If you discharge oily water,	☐ marine pollution will not be reduced.
6. Unless seafarers acquire an environmental awareness,	☐ there will not be an overflow.

c) Match the two clauses in each column that make full sentences. They give instructions and warnings on pollution control.

What should you do if pollution occurs?

1. If your own vessel causes pollution,	☐ you may increase the extent of the damage.
2. If you use chemicals for dispersing an oil spill,	☐ the Master should not direct the crew to lie, destroy, tamper with or hide evidence.
3. If you feel your vessel is wrongly accused or any response action taken by the authorities is incorrect,	☐ you should seek assistance and implement the relevant SOPEP for the particular jurisdiction in which the pollution has occurred.
4. If you discover pollution of air or water not caused by your own vessel,	☐ they shouldn't admit liability without consulting the P&I insurer first.
5. If the Master and/or engineers talk to the authorities,	☐ you should immediately contact the Qualified Individual (appointed under OPA'90, contact details in VRP).
6. If there is a criminal investigation on the oil spill,	☐ he/she may be charged with obstruction of justice.
7. If the Master directs the crew to lie,	☐ you may tender a note of protest.
8. If pollution occurs in US waters,	☐ you should gather as much evidence as possible of the suspected source and the polluter.

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

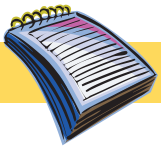
☐ discuss the potential problems of marine pollution
☐ explain MARPOL regulations regarding marine protection
☐ describe pollution avoidance procedures

B. Class Project.

- The MARPOL convention came about after the Torrey Canyon oil spill in 1967. Find out about the spill, the damage it caused, how it was tackled, and present to class.
- What uses are there for renewable energy, like wind power, in shipping? What is the future of energy efficient experimental "green" ship design? Find examples of vessels where such ideas are applied and present them to class.

C. Revise the following marine pollution key words found in this unit. Say what they mean and give example sentences using each word. Then, fill in the glossary, choosing words from the list.

waste management	contingency plan	annex	noxious	(accidental or deliberate) discharge
ocean dumping	oil dispersant	marine debris	incinerate	
biodegradable	CO_2 emissions	slow-steaming	scrubber	energy efficient
low-sulphur fuel	soot	sewage	pollutant	



Glossary

_____ harmful, poisonous

_____ operating transoceanic cargo ships, especially container ships, at significantly less than their maximum speed

_____ equipment that filters fuel exhaust gas to make it have less green house emissions

_____ a substance that pollutes water or the atmosphere

_____ a black powdery substance consisting largely of amorphous carbon, produced by the incomplete burning of organic matter, coming out of the vessel's funnel

_____ chemical substance used to break up oil floating in the sea into tiny pieces so that it spreads over a wide area and causes less harm

_____ destroy waste material by burning

_____ (of a substance) it can be changed to a harmless natural state by the action of bacteria, and will therefore not damage the environment

_____ involving the use of natural products and energy in a way that does not harm the environment

_____ the deliberate disposal at sea (in the ocean) of wastes or other matter from vessels

D. Match the verbs to the nouns to make collocations found in this unit.

1. keep .....
2. constitute .....
3. rectify .....
4. notify .....
5. contravene .....
6. impose .....
7. make .....
8. tamper .....

a crime
records
the authorities
with evidence
the regulations
the problem
a fine
a claim

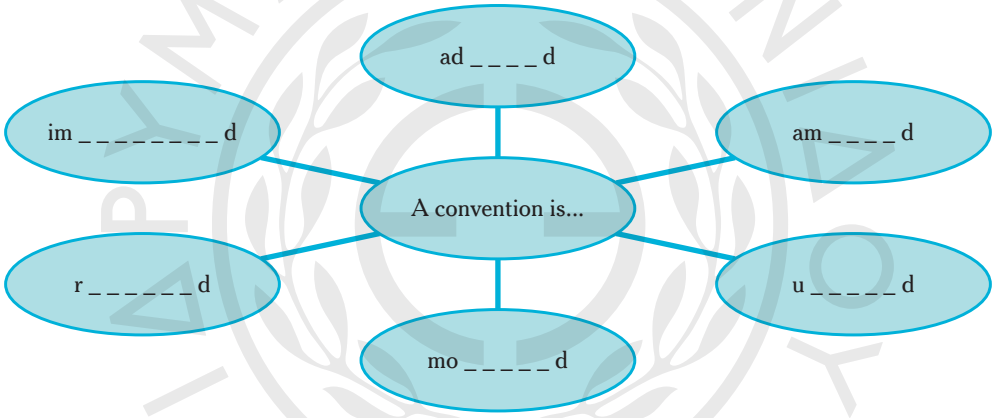
E. Fill in the missing words.

anti-fouling	ballast	threat	alternative	allowed
invasive	grey	pollution	endangered	mandatory

1. Methanol is a good _____ for ferries and short sea shipping.

2. You can prevent pollution by not using _____ paint that harms the marine environment.
3. Sewage _____ water (used for washing in the galley) can be stored in a tank and, subject to regulations, is _____ to be pumped into the sea.
4. Under amendments to MARPOL Annex I it was made _____ for oil tankers to have double hulls.
5. _____ water discharge contains a variety of biological materials that often include non-native _____ species that can cause extensive ecological and economic damage to aquatic ecosystems along with serious human health problems.
6. Ocean noise is a potential _____ to marine life. Noise produced by ships travels long distances and marine species who rely on sound for their orientation, communication and feeding, can be harmed by this sound _____.
7. If a ship travels at a speed of only 15 knots, it will kill a whale after collision; 35% of deaths in _____ species, such as the North Atlantic right whale of which 400 or less remain, are due to collisions/lethal strikes.

F. What happens to a convention, like MARPOL, after it is created? Write up the missing letters in the verbs.



UNIT 12

Emergency Response

1. *IAMSAR / Search and rescue communications*
2. *Safety on board communications: emergency announcements/orders*
3. *AMVER*
4. *Emergency response and training*

Round-up

1. IAMSAR / Search and rescue communications

The IAMSAR Manual[1] contains information on appropriate procedures for performing/co-ordinating SAR, as well as emergency response procedures for on-board emergencies.

A. ***The following definitions of terms are given in IAMSAR, and are used exclusively for SAR operations. Match each term to the appropriate definition.***

drift	AMVER	distress alert	leeway	SRR (Search and Rescue Region)
false alarm	NAV-AREA	ditching	scene	

1. ..... : notification by any means that a distress situation exists and assistance is needed
2. ..... : alert initiated when no distress situation actually exists
3. ..... : when an aircraft makes a forced landing on water
4. ..... : the movement of a search object through water caused by winds against exposed surfaces
5. ..... : one of 16 areas into which the oceans are divided for dissemination of navigation and meteorological warnings
6. ..... : the search area or the actual distress site
7. ..... : movement of a search object caused by environmental forces
8. ..... : an area of defined dimensions within which SAR services are provided
9. ..... : a worldwide vessel reporting system for SAR

B. ***What skills are needed by deck officers in order to be able to respond appropriately to a SAR operation? Look at the relevant extract from the IAMSAR manual. Why do you think the skills required are important? Talk about the points in blue and explain their importance.***

What is required by Deck Officers?

Training of deck officers should include all training required for crew members **plus**:

Organization

- knowledge of the SAR organization
- knowledge of available SAR facilities, including those of adjacent SRRs
- ***knowledge of legal aspects, particularly as regards to towing and salvage, etc.***

Procedures

- search patterns and techniques for air and surface facilities
- communication procedures
- rescue procedures
- supply dropping procedures
- ditching assistance, stand-by and escort procedures
- ***debriefing of survivors***

1. International Aeronautical and Maritime Search and Rescue Manual, London/Montreal, 1998, jointly published by IMO and ICAO (International Civil Aviation Organization).

Seamanship

- navigation in difficult conditions and in close proximity to disabled vessels
- use and understanding of all electronic navigational equipment used on SAR craft, including their accuracy and limitations, especially proper use of radar
- knowledge of charts, sailing directions, buoys, lights and aids to navigation in the SRR
- use of publications on tides and currents relating to the SRR and the calculations of tidal conditions, as applicable
- use of weather and wave charts, pilot charts
- estimating the drift of survival craft
- ***methods of recovery of survivors both close inshore and in the open sea from all kinds of craft in adverse weather conditions***
- good seamanship
- methods of calculating search patterns

C. *A vessel requires assistance. You have received their message. When you contact the distressed vessel, according to the IAMSAR manual, you must give them the following information.*

☐ Name (identity)
☐ Call sign
☐ Acknowledge receipt
☐ Speed
☐ Position
☐ Intention
☐ ETA to site
☐ Distressed craft's true bearing

Which of the required information is contained in the following message? Tick ☑

This is MV JUAN. Received your MAYDAY. My position 32°14'59"N,030°24'36"E. I will proceed to your assistance. ETA at distress position within 3 hours.

D. *Fill in the missing verbs (change the form of the verb by adding an ending if you need to).*

abandon	transmit	launch	require	stay	report	proceed

1. I _____ assistance.
2. I am _____ to your assistance.
3. _____ number of persons on board.
4. Will you _____ vessel?
5. Is your EPIRB _____?
6. How many lifeboats will you _____?
7. How many persons will _____ on board?

E. *Put the words in the correct order to make full SMCPs used for SAR operations.*

1. will/as/act/On-Scene/I/Co-ordinator.
   .....
2. you/proceed/can/to/position/distress?
   .....
3. your/position/is/what/ETA/at/distress?
   .....

4. are/vessels/advised/to position 45°5'20"N,128°50'51"W/to proceed/to start rescue.
.....

5. parallel track search pattern/starting at 0700 hours UTC/out/carry.
.....

6. for/sharp/keep/liferafts/look-out.
.....

7. obtain/information/survivors/try/from/to.
.....

8. was/of/total/persons/number/on board/24.
.....

9. with/you/stop/search/may/and/voyage/proceed.
.....

10. hope/is/to/more persons/there/no/rescue.
.....

F. *Match the pictures to the words that describe rescue equipment.*

rescue tether	rescue seat	rescue litter	rescue sling	rescue net	rescue basket

a) .....

b) .....

c) .....

d) .....

e) .....

f) .....

G. ***Fill in the correct preposition.***

1. _____ fire, _____ collision _____ , _____ danger _____ capsizing
2. SART transmitting _____ mistake, danger(s) _____ navigation
3. pick _____ survivors, survivors _____ good condition
4. arrange _____ radio medical advice, vessel _____ distress

H. ***Look at the appropriate response in emergencies related to fire on board and damage to the hull, given by IAMSAR. Fill in the verbs.***

report	establish	~~identify~~	sound	check
continue	assign	abandon	cut off	determine

Shipboard Fire

1. _____ fire alarm
2. _____ location of fire to bridge
3. _____ the class of fire, the appropriate extinguishing agent and method of attack as well as how to prevent the spread of the fire
4. _____ the required personnel for fire-fighting
5. _____ proper communications between bridge and location of fire
6. begin procedures for attacking the fire and _____ until fire is extinguished

Hull Damage

1. .... identify ..... location of incoming water
2. _____ all electrical power running through area
3. _____ bilge pump for operation and auxiliary pumps for back-up operation
4. _____ vessel as a last resort, if needed

2. Safety on board communications: emergency announcements/orders

A. ***Imagine you want to inform passengers in the event of an emergency. Circle the correct alternative of the phrases in blue italics to make a full announcement.***

Attention please. *I am/this is* your captain *speaking/talking*, with an important announcement. We have a minor fire in the accommodation. There is no *immediate/real* danger to crew, passengers or vessel, and there is no reason to *worry/be alarmed.*
For safety reasons I *request/would like* all crew members to go to their assembly stations. As soon as I have *further information/something else to tell you* I will make another announcement – there is no danger *at this time/right now*. Fire-fighting teams are fighting the fire. The fire is *taken care of/under control.* We also have radio contact with other vessels.

B. ***How must you talk to passengers in an emergency? Which sentences below sound more reassuring?***

1. Please remain calm.
2. Keep cool.
3. Don't be scared.
4. Don't panic.
5. There is no reason to be alarmed.

C. ***The following announcement is made of six sentences which have been split to two. Arrange the phrases in the box in the correct order to recreate the announcement.***

The fire is not	~~I have~~	another announcement
immediately	Assemble	under control yet.
This is	routes shown	~~on the ship's outdoor promenade~~
Follow the escape	~~Leave your cabins~~	your captain speaking.

.....

I have .....

.....

Leave your cabins .....

.....

.....

.....on the ship's outdoor promenade.

D. ***Read the announcements the captain makes to the crew. Fill in the missing words.***

via	call	minor	evacuate	further
recovered	operational	according	up	

1. We have _____ flooding. All officers to report to the bridge. Watchkeepers remain at stations until _____ order.
2. The flooding is not yet under control. Leave your stations, I repeat, leave your stations. Take your emergency equipment with you _____ to the muster list.
3. Check the fuel in the lifeboat engine and report.
4. The fuel tank of number 4 lifeboat engine is not full.
5. Fill _____ fuel.
6. Operate the lifeboat engines and report.
7. All lifeboat engines are _____.
8. _____ all spaces and report missing persons.
9. No persons missing. All persons are outside the danger area.
10. This is a roll _____. Report number of crew members at assembly station.
11. Number of all crew members at assembly station is 22.
12. Missing crewmembers not _____ yet. Search is continuing.
13. Enter the lifeboats _____ the ladders. Do not push each other when entering the lifeboats.

E. ***Work in pairs. One student gives the order. The other student answers the orders have been executed, or not (yet).***

e.g. Student A: Swing out number 2 lifeboat.
Student B: Number 2 lifeboat swung out. OR
Number 2 lifeboat not swung out yet.

Ordering abandon vessel

1. Swing out number 2 lifeboat.
2. Lower number 2 lifeboat alongside the embarkation deck and report.
3. Let go number 2 lifeboat and report.
4. Throw overboard number 2 liferaft and report.
5. Rescue boat, stand clear of the vessel and report.
6. Stand by pumps and report.
7. Contact the lifeboat on radio and report.
8. Start the engine and report.

F. ***You are asked to check the condition of fire-fighting equipment. You find it is not in a good condition. Match the equipment to the problems and make sentences that describe the status of fire-fighting equipment. Then use the verbs in the third column to give the correct order to fix each problem. There are many different possible combinations, make at least five.***

e.g. The water pipe is leaking.
Repair the leaking water pipe.

Equipment	***Problem***	***Order***
smoke alarms		
portable extinguishers	broken	
portable extinguisher inspection tags	not in order	
hydrants	not operational	
hoses to hydrants	expired	replace
nozzles to hydrants	worn	repair
water pipes	missing	free
fire mains	leaking	clear
fire pumps	blocked	
fixed foam system	painted stuck	
sprinkler system	not available	
fire dampers		

G. ***Damage control communications: reporting flooding. Fill in the gaps.***

muster	flooded	diving	capacity	blackout	openings

1. We have flooding in the engine room. Flooding not under control. Imminent danger of _____.
2. _____ damage control team. Damage control team must have _____ equipment.
3. Close all _____ and valves. Switch on power. Switch on bilge pumps.
4. Engine room station _____. Stopping flooding from inside not possible. Flooding is above _____ of bilge pumps. Quantity of water in engine room space is dangerous.

H. *An officer reports fire to the bridge. Put the sentences missing in their correct place to recreate the communication.*

- ☐ Fire hoses run out.
- ☐ Fire on board! Fumes in engine room.
- ☐ Fire area checked – no reignition.
- ☐ Main engine shut down. Fuel stopped.
- ☐ Cool down bosun's store door with water.
- ☐ Close all openings in accommodation and report.
- ☐ Minor damage to cell guides.
- ☐ What is on fire?
- ☐ CO_2 station standing by.
- ☐ Is smoke toxic?
- ☐ Report damage.
- ☐ No persons injured.

Reporting fire / reporting readiness for action	***Response from the bridge / orders for fire fighting***
1.	
	Report injured persons.
2.	
	3.
Containers with dangerous goods on fire.	
	4.
Yes, smoke is toxic. Fire is spreading to bosun's store.	
	5.
6.	
	Pressure on fire mains! Shut down main engine, stop fuel and report.
7.	
	8.
Openings in accommodation not accessible.	
	Switch off ventilators. Turn stern to windward. Stand by CO_2 station.
9.	
	Have rescue team on stand by. Have lifelines with you.
Rescue team standing by.	
	Maintain radio contact on walkie talkie. Run out fire hoses and report.
10.	
	Water on!
Water is on.	

	11.
Door cooled down.	
	Is the fire extinguished?
Fire extinguished. Smoke restricted to cargo area.	
	Rope-off fire area and report.
Fire area roped off.	
	Check the fire area every 15 minutes for re-ignition and report
12.	
	The fire alarm is cancelled with the following restriction: prohibited access to cargo spaces.

I. *Fill in the missing words in the following communication regarding grounding.*

decreasing	ahead	transfer	closed	force
state	seaworthy	veer	re-distribution	expected

Orders for grounding	***Report readiness for action***
We are aground aft. Stop engines. Close watertight doors and report.	
	Engines stopped. Watertight doors (1) _____.
Is vessel still making way?	
	Yes, vessel is still making way (2) _____.
Stand by forward station and aft station and report damage.	
	Cracks and fractures in double bottom plating. Imminent danger of (3) _____ stability and breaking apart.
What is nature of sea-bottom?	
	Sea-bottom rocky.
What is state of tide?	
	No tide.
What is wind (4) _____ and direction?	
	Wind force Beaufort 5 from SE. Wind expected to (5) _____ within the next hours.

What is sea (6) _____?	
	Sea moderate – (7) _____ to increase.
We will make an effort to refloat by (8) _____ of cargo. Transfer cargo from number 2 hold to number 3 hold.	
	Cargo transferred.
Pump out forepeak tank and report.	
	Forepeak tank pumped out.
(9) _____ ballast from number 2 double bottom tank to number 4 double bottom tank and report.	
	Ballast transferred.
Vessel has not refloated. The vessel is not (10) _____. I will request tugs.	

3. *Person-overboard activities. Draw arrows to make full sentences.*

Drop	the person in water.
Sound	visual contact to person in water.
Hoist	lifebuoy.
Locate	for recovering the person from shipboard.
Maintain	"man overboard" alarm.
Stand by	flag signal "Oscar".

Conditionals (II)

The following conditional sentences speculate about hypothetical situations.

> *If I **was** in charge, I **wouldn't** stop the SAR operation so soon.*
> *If passengers **saw** fire, they **would** panic.*
> *What **would** you do if you **heard** an explosion on board? I **would** call the captain.*

Note: *This is the 2nd conditional. For information on the 2nd conditional go to page 397.*

Imagine a PSC inspector asks you the following questions. Use "would" to answer.

What would you do if...

... you heard the general alarm?
... there was smoke in the accommodation?
... there was a blackout onboard?
... you saw someone fall overboard?
... you saw a crewmember fall from height while doing maintenance work?

3. AMVER

Ship reporting systems are part of SAR procedures. The IAMSAR manual refers to one such system, AMVER, mentioning that there is no charge for ships to participate in AMVER, nor for RCCs to use the system, and that benefits of participation include improved likelihood of rapid aid during emergencies and reduced response time to provide assistance.

A. ***Find out about the AMVER system. Look at the following information, coming from three different types of text. Supply titles to the texts. Choose from the ones below and write them in the space provided.***

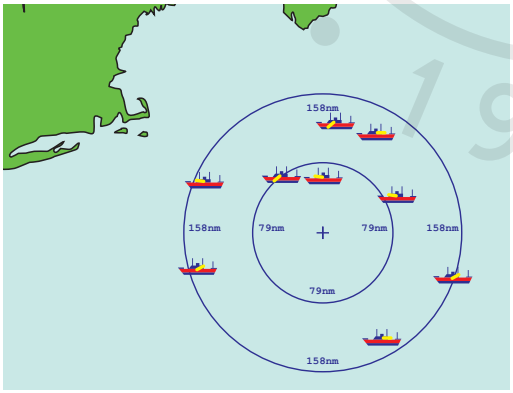
Press Release by Amver	History of the Amver System	2014 Amver Business Report

Text I: .....

The genesis of the AMVER system ultimately finds its roots in the TITANIC disaster in 1912. Ships passing within sight of the ill-fated passenger liner were unaware that it had hit an iceberg and was sinking. Upon later investigation, those who had seen the distress flares from the stricken ship admitted they thought they were merely part of the maiden voyage celebrations!

However, the resultant idea of a ship reporting system that could identify other ships in the area of a ship in distress, which could then be sent to its assistance, would not become a reality until the advent of computer technology.

Originally known as the Atlantic Merchant Vessel Emergency Reporting (AMVER) System, it became operational on July 18, 1958. Amver began as an experiment, confined to waters of the North Atlantic Ocean, notorious for icebergs, fog and winter storms. The basic premise of Amver, as a vehicle for mariner to help mariner without regard to nationality, continues to this day.



The system's first computer was an IBM RAMAC (Random Access Method Accounting Control), characterized as being able to "evaluate information and determine the position of vessels through dead reckoning." The product of the computer was a "Surface Picture" or "SURPIC" of an area of the ocean, indicating the AMVER-participating ships in the vicinity.

(You can see a SURPIC on the left)

By 1963, AMVER was plotting vessels on voyages worldwide. The system's technology allowed international SAR agencies to locate a ship in distress, and determine how many and what type, vessels were in the vicinity. In the early years, AMVER-participating ships responded to situations as varied as an engine room explosion which seriously injured two crewmen aboard the M/V CHRYISSI; a 17-year old Norwegian seaman injured in a fall aboard the M/V GYLFE; a 10-year old boy experiencing sharp abdominal pains aboard the M/V WOLVERINE STATE. AMVER's name required revision to reflect its global reach. But the AMVER acronym was so well known in the industry that the Coast

Guard was reluctant to change it. Instead, the title was changed to the “Automated (computerized) Mutual-assistance (its basic premise) Vessel Rescue (its stated purpose) System”. Today, due to its global acceptance and familiarity, it is simply called AMVER.

On October 4th, 1980, AMVER made its mark in the world news media by orchestrating the response to an engine room fire and flooding aboard a Dutch liner, carrying 519 passengers and crew. The 1,095-foot tanker WILLIAMSBURGH diverted and arrived on scene in less than 7 hours, ultimately taking 175 survivors aboard from lifeboats, motor launches and liferafts.

In October of 1982, the first joint AMVER/satellite-alerting rescue occurred, using the experimental Argos and Cospas-Sarsat system. On the occasion of the concurrent 25th Anniversaries of AMVER and the International Maritime Organization in 1983, IMO published an open letter to all mariners, endorsing the value of the AMVER system. That year, AMVER participation grew by 16%.

The decision was made in the late 1980s to become even more proactive in AMVER recruitment by exhibiting at, or attending, industry exhibitions and trade shows, such as Posidonia (Greece); the Seatrade Tanker Show (UK); SMM (Germany); Cruise Shipping (USA).

The USCG also created an annual AMVER Awards Program as a way of rewarding those ships which remain “on plot” for at least 128 days in a calendar year. These awards have become instrumental in AMVER recruitment and retention. AMVER awards are a tribute to the support of a ship’s crew, management, and ownership, which is so integral to the program’s success. AMVER award ceremonies have been hosted by U.S. Embassies abroad and maritime industry organizations, in Norway, Germany, as well as clubs in the ports of Piraeus, London and Limassol, among others. The awards consist of a Letter of Appreciation to the company, a Certificate of Merit to each ship, and a colored AMVER pennant, representing a ship’s continuous participation in the program: blue for (1) year; gold for (5) years; purple for (10) years. A distinctive plaque is presented for (15) years, an engraved pewter plate for (20) years, and an acrylic globe for (25) years.

With the advent of the GMDSS, the role of AMVER was redefined to complement the emerging technology. Rescue coordination centers around the world seized on the value of EPIRBs, Inmarsat-C and DSC terminal auto-alarms to “take the search out of search and rescue.” Then, attention could be turned to AMVER as a tool for the rescue phase of the operation. AMVER-participating ships have been instrumental in investigating potentially accidental alerts, thus saving limited SAR resources for actual emergencies, and saving money and lives.

In 1994, six AMVER-participating ships converged on the burning Italian cruise ship ACHILLE LAURO to recover 504 of the 976 survivors. And, in the largest single AMVER operation in its history, a flotilla of 41 ships from 18 nations searched over a six-day period to recover the only two survivors of the 31 crewmembers from the sunken bulk carrier SALVADOR ALLENDE.

Today, over 22,000 ships from hundreds of nations participate in AMVER. The AMVER Center computer receives over 14,000 messages a day. Over 2,800 lives have been saved by AMVER-participating ships since 2000. AMVER’s success is directly related to the extraordinary cooperation of ships, companies, SAR authorities, communication service providers and governments in supporting this international humanitarian program to protect life and property at sea.

Text II: .....

Cumulative Statistics:

Number of Survivors Rescued	1,330
Number of Ships on Average Daily Plot	7,623
Ships Receiving Participation Awards	9,101

Lives Saved by Countries

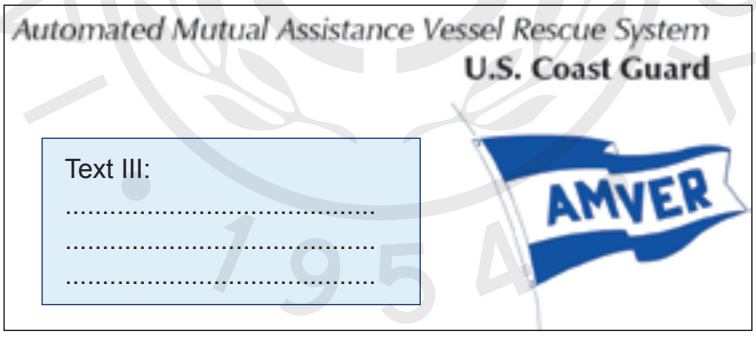
Nation (Ownership, Not By Flag)	*Number of Lives Saved*
Greece	437
Denmark	363
Japan	248
United States	206
Bahamas	24
Taiwan	21
Switzerland	4
Norway	4

Nation (Ownership, Not By Flag)	*Number of Lives Saved*
Netherlands	4
Germany	3
Italy	3
Spain	3
Turkey	3
South Korea	3
Great Britain	3
People's Republic of China	1

Top Ten Countries Earning Awards

Nation	*Number of Awards*
Greece	1,583
Singapore	1,255
United States	948
Germany	761
Japan	675

Nation	*Number of Awards*
Hong Kong	610
Great Britain	509
Norway	444
United Arab Emirates	208
Cyprus	206



Greek Amver boxship saves Canadian sailor

NEW YORK – A 72-year-old Canadian sailor, on a voyage from Maui to Vancouver, was plucked from the sailboat Turicum by a Greek boxship on Tuesday August 7, 2012, 1040 miles north northeast of Hawaii after experiencing a condition that required medical attention. The M/V Hanjin Vancouver initially agreed to divert and assist the sailor but the Greek flagged Navarino was closer and agreed to divert towards the sailboat and help the ill yachtsman.

"We're 320 miles from the Turicum's last reported position," stated the Captain of the Navarino, "we expect to meet in 12 hours. Please pass to the vessel to maintain 150 meridian." The Captain rendezvoused with the Turicum ahead of schedule and manoeuvred the 1,000 foot containership within 4 metres of the sailboat, providing a lee from the wind. The crew of the Navarino then used a tether to transfer the sailor through the pilot entrance. The sailor was uninjured in the transfer.
A U.S. Coast Guard flight surgeon instructed the crew of the Navarino to assess the sailor. The crew

reported the gentleman was still experiencing some health issues, but had normal vital signs and was resting comfortably. The Navarino brought the sailor to its next port, Los Angeles, Calf. on August 10, 2012. The Navarino, managed by Costamare Shipping Company of Athens, Greece, enrolled in AMVER on June 8, 2012 and has earned two awards for participation. The Navarino provides its vessel position through an agreement with Pole Star which gives commercial ships the opportunity to report to the AMVER system automatically and free of charge as part of its Fleet Management system.

AMVER, sponsored by the United States Coast Guard, is a unique, computer-based, and voluntary global ship reporting system used worldwide by search and rescue authorities to arrange for assistance to persons in distress at sea. With AMVER, rescue coordinators can identify participating ships in the area of distress and divert the best-suited ship or ships to respond. Vessels send periodic position reports to the AMVER center until arriving at their port of call. This data is able to project the position of each ship at any point during its voyage. In an emergency, any rescue coordination center can request this data to determine the relative position of AMVER ships near the distress location. On any day there are over 5,000 ships available to carry out search and rescue services. Visit http://www.amver.com to learn more about this worldwide SAR system.

B. *Fill in the appropriate adjective that completes each sentence, based on what you read in Text I.*

supportive	widely known	voluntary	proactive
appreciative	complementary	co-operative	ignorant

1. The role of AMVER in connection to GMDSS is _____.
2. All parties involved in SAR need to work together in a _____ spirit.
3. In the first part of the 20th century, seafarers were totally _____ about how to organize a SAR or its potential dangers.
4. Through media coverage of its operations, the organization became _____.
5. The IMO has been _____ towards AMVER.
6. In recognition of participation, AMVER vessels get an award that is _____ in nature.
7. AMVER tries to recruit vessels in a _____ way by attending many ship industry exhibitions.
8. Ships that report to AMVER do so on a _____ basis.

C. *Which words found in text I complete the following sentences? (the meaning of each missing word is given in brackets).*

1. The ship _____ *(changed course)* to save the man overboard.
2. I fully _____ *(declare my approval and support publicly)* the emphasis put by the maritime community on seafarer well-being.
3. The Greek Red Cross is trying to _____ volunteers *(persuade them to become members)* to help in supporting refugees from Syria who arrive in Thessaloniki.
4. To show their _____ *(gratitude, recognition of how valuable or important someone is),* the students organized a retirement party for their Professor.

D. *Listen to an interview with a USCG Commander on the* International Ice Patrol *service. Answer the following questions.*

What does the Ice Patrol do?
Who does the U.S. Ice Patrol collaborate with?
What convention was the IIP formed under? Who was it formed by?

4. Emergency response and training

A. *Read about the tragic accident of Sewol. Are the statements True or False, according to the text?*

- ☐ The ship reported the capsizing to a VTS 32 minutes after the capsizing had been realized by the passengers.
- ☐ The passengers were not successfully informed that they had to evacuate the vessel.
- ☐ The crew couldn't inform the passengers to wear their lifejackets through the PA system.
- ☐ Reef collision due to fog was one of the causes of the accident.
- ☐ The crew members who stayed onboard the ferry to help passengers were rescued by ROK Coast Guard.

The sinking of the MV Sewol occurred on 16 April 2014. The South Korean ferry capsized while carrying 476 people, mostly secondary school students. The ship departed Incheon at 21:00 of April 15th after a two-and-a-half-hour fog delay. Next morning, the ship began to take on water, in calm sea conditions in an area that did not contain rocks or reefs.

Capsizing: At the time of the accident, the Master was in his private cabin and an inexperienced third mate was at the helm. The Master is reported to have returned to the bridge and attempted to re-balance the ship immediately after the accident. At 08:52, a student called the national emergency service number and reported that the ship was capsizing. The student, who was later found dead, was connected to the Mokpo coast guard and talked for 6 minutes. At 08:58, the Mokpo Coast Guard dispatched a patrol vessel. During this time, the Master told passengers to stay in their rooms. The communications officer, using the ship's intercom, repeatedly ordered passengers not to move. The announcement was recorded on passengers' cell phones, "Do not move from your present location and please stay where you are." The ship began communicating with the Jindo VTS, which was closer to its location, at 09:14, and it was then that the crew confirmed to VTS that the ferry was capsizing. VTS ordered the crew to inform the passengers to wear personal flotation devices. When the crew replied that the broadcasting equipment was out of order, VTS told them to personally order the passengers to wear life jackets and more clothing.

At 09:25, VTS asked the Master to decide quickly whether to evacuate the ship, stating that VTS did not have enough information to make the decision. The Master said the ship's heavy list made evacuation impossible. When the Master inquired about the rescue, VTS replied that patrol boats were due to arrive in 10 minutes and a helicopter in one minute. The Master then replied that there were too many passengers for the helicopter. Around 09:30, the Master gave orders to evacuate the ship, though the order may not have been relayed to all the passengers. At 09:38, all communications were cut off between VTS and the ferry. About three minutes after all communications were cut, about 150 to 160 passengers and crew jumped overboard. The Master of the Sewol, Lee Joon-Seok, was amongst the first to leave the ship and a video of him being rescued was later released by the ROK Coast Guard. The ship took two and a half hours to sink. As of 13:03, the ship was completely submerged.

Direct causes: As of 17 April, the ROK Coast Guard has concluded that an "unreasonably sudden turn" to starboard was the cause of the capsizing. According to the Coast Guard, the sudden turn caused the cargo to shift to the left, causing the ship to experience an incline and to eventually become unmanageable for the crew. The existence of the sudden turn has been confirmed by the analysis of the ship's AIS data. Overloading and the lack of proper securing of the cargo are also being seen as direct causes. The MV Sewol was carrying 3.608 tones of cargo, three times the limit of 987 tons. The overloading was also previously noted by an off-duty captain and the first mate. Lee Joon-Seok has also proposed overloading as a cause. According to the master of the Sewol, the ship owners ignored his warning that the ship should not carry so much cargo because it would not be stable.

Secondary causes: The renovations of adding extra passenger cabins have been proposed as a main secondary cause by investigators and this possible cause has also been supported by the Master. A newspaper argued that the discharging of the ballast water was a cause of the incident. Before the incident, the Korean Register of Shipping stated that the Sewol needed to carry 2,000 tons of ballast water. The crew had reportedly pumped out hundreds of tons of ballast water from the bottom of the ship in order to accommodate the additional cargo, further unbalancing the ferry.

Obsolete theories: At the beginning of the investigation, the ROK Coast Guard thought that the cause was a collision with a reef, believing this likely because the area was foggy. The master denied this was the cause of the accident, and a reef collision has been dismissed as a cause by consensus among experts, and is no longer advocated by ROK C.G.

Captain and crew: On 19 April, the Master of the ferry was arrested on suspicion of negligence of duty, violation of maritime law and other infringements. The captain had abandoned the ship with passengers still aboard the ferry, while South Korean law explicitly requires captains to remain on the ship during a disaster. On 15 May 2014, the Master, the First Mate (who was responsible for managing the ship's ballast), the Second Mate and the Chief Engineer were indicted on charges of homicide through gross negligence (also described as murder), which carry a potential death penalty. Eleven other crew members were charged for abandoning the ship and ship safety offences (such as improper cargo securing). The master was eventually sentenced to 36 years in jail. The sentences of the other crew members were lighter, since the court considered that they took orders from the captain. Three crew members are credited by survivors with staying aboard the ferry to help passengers escape. All three went down with the sinking vessel.

Regulation: The disaster raised questions about the regulation of shipping in South Korea. The Korean Shipping Association, which regulates shipping, is also an industry trade group, which experts consider a likely conflict of interest. In addition, government regulators outside the Association frequently move to jobs as part of the association after their government service. It is noted by analysts that while South Korean regulations are strong, they are often poorly enforced.

B. *Answer the following questions, according to the text.*

1. The Master hesitated to order an evacuation. What were the things he considered before making a decision?
2. What were the causes of the accident according to the Master?
3. What was the illegal act that the Master performed, which violates maritime law?
4. What was the problem with ballast water management on the ship?
5. The government is suspected of not regulating shipping in an objective way. Why is that?

C. *What were the mistakes in relation to emergency response in this tragic accident? What would you do differently?*

The following extract comes from an interview with someone who survived after falling overboard. Do you agree with the survivor?

Having survived an actual man overboard emergency, what did you learn?

Here is my advice: Practise rescue drills on a regular basis. This reduces panic during emergencies and demystifies equipment operation and handling. Professionals train because "doing" reinforces knowledge of what to do.

Interviewer *Survivor*

D. *Read the following guidance and answer the questions.*

1. What are some common accidents that occur while releasing davit-launched lifeboats?
2. What are the reasons for these accidents?
3. How can accidents with on-load-release hooks of lifeboats be prevented?

Safe working during drills and training

For vessels built after 1 July 1986, davit suspended lifeboats are fitted with on load release hooks. There have been many accidents with such lifeboats, and seamen have been killed or injured during training and drills. Boats have fallen down due to being accidentally released at the time of the exercise. The reasons for such accidental releases are human error, lack of training, lack of understanding of how the hook release mechanisms worked, incorrect resetting of hooks the last time the boat was lifted, and lack of maintenance.

The following advice applies to all different types of release systems in use:

- the release systems must be regularly maintained in accordance with the manufacturer's instructions
- the lifeboats should first be firmly secured by short, strong wire slings fitted between purpose built strong points of the davits and the boat, to avoid the risk of an accidental release during examination and maintenance of the hook system
- for lifeboat drills, the davits, wires and the entire release mechanism should be carefully examined to ascertain that they are in proper working condition.

In addition, the sea conditions should be considered. If in any doubt, the test should be postponed and, if permitted under the relevant port regulations, carried out in port rather than at sea.

Inflatable life rafts are subject to an annual inspection by an external service firm. The Master and his/her officers should ensure that the liferafts and the hydrostatic release mechanisms are correctly installed, enabling the rafts to be easily launched by the crew in an emergency or launched automatically if the vessel sinks and the raft becomes submerged.

At no time during training and drills should the personal safety of any crew member be endangered. If such a situation arises, the training or drill must be aborted! The reason for abortion of the actual launch of the lifeboat needs to be recorded in the vessel's log book to avoid the next port State control officer complaining of lack of training and drills.

SOLAS regulations for the inspection and maintenance of "on-load-release" gear (in force from 1 July 2006) require an annual inspection and test of such hooks by a representative of the manufacturer. It is imperative that these inspections are carried out by fully competent and authorised personnel, to limit future risks of further accidents with "on-load-release" hooks.

E. ***How would you organize an abandon ship drill to make it realistic and safe? Use the IAMSAR standard instructions below and build up on them, creating a drill scenario.***

Start like this: *First I would...*

Abandoning Ship

- abandon ship only as last resort
- transmit distress call and message
- wear lifejackets, have adequate clothing
- in waters below 16°C (60°F), put on immersion suits
- have crew members stand by lifeboat or liferaft and prepare to launch
- make sure sea painter is attached to vessel
- load crew and launch
- keep lifeboat or liferaft tethered to vessel as long as possible

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

- ☐ describe emergency response procedures
- ☐ give instructions to passengers in the event of an emergency
- ☐ use SMCP related to Safety on board (fire-protection, damage control, grounding)
- ☐ discuss SAR response (reporting/participating)

B. Class Project.

- The Italian-flagged (under a Greek operator) ferry NORMAN ATLANTIC caught fire in the Adriatic Sea and was evacuated in December 2014. How was the SAR conducted? Find out more information and present to class. Is the vessel in operation now?

C. What do the following acronyms/abbreviations mean? Explain what they refer to.

NAV-AREA, IAMSAR, AMVER, SURPIC, OSC, MRCC, SRR

D. Complete the words.

1. vessel in d _ _ _ _ _ _ s : vessel needing your assistance
2. aircraft d _ _ _ _ _ _ g : when aircraft (rescue helicopter) makes a forced landing on water
3. rescue t _ _ _ _ r : special rope that hooks on a surviror on one side and to a fixed point on the other, enables rescuers to pull them up and prevents them from getting lost out to sea
4. p _ _ _ _ _ _ _ e approach : rather than just respond to a situation, you cause it to happen
5. as a last r _ _ _ _ t : as a last choice, if everything else fails
6. sea p _ _ _ _ _ r : a long strong rope for use on a ship's lifeboat

UNIT 13

Officer Of the Watch

1. *Principles of watchkeeping*
2. *SMCP: Handing over the watch*
3. *ColRegs*
4. *Bridge Resource Management*

Round-up

1. Principles of watchkeeping

Lead-in: Watchkeeping quiz. Check what you know about the duties of the OOW. True or false?

- ☐ Under the STCW the OOW is primarily responsible for the safe navigation of the ship with particular regards to avoidance of collision and grounding.
- ☐ The requirements for watchkeeping are contained in ColRegs, STCW 95, ICS Bridge Procedures Guide and MLC 2006.
- ☐ In a TSS the normal steering and sailing rules apply. Vessels following or crossing a traffic lane have no additional right of way.
- ☐ When you make a mistake in the log book you can either tear out the page or erase it.
- ☐ The OOW must countersign Master's orders and instructions.
- ☐ The officer should not hand over the watch until the vision of the relieving watch members is fully adjusted to the light conditions (especially regarding night vision).
- ☐ When a manoeuvre is in progress during handing over watch, the relieving officer can complete it after s/he takes over the watch.
- ☐ Officers should take over the watch only after the status of all bridge equipment including the settings of the bridge and engine controls have been verified.
- ☐ During watchkeeping in port you can keep navigating lights on while moored alongside.
- ☐ While at anchor, the OOW should constantly monitor the vessel's position, carefully monitor for drag, and observe the movements of other vessels as well as any change in the weather.
- ☐ When you take a navigational fix to assess the proper position of the vessel by GPS you don't need extra verification by other methods.
- ☐ STCW permits one-man bridge during the darkness period; in this case a helmsman engaged in steering can also be a lookout.

A. *Read the Marine Guidance Note by the Maritime and Coastguard Agency and fill in the missing phrases. Write the correct number in the boxes.*

- ☐ that may have a detrimental effect on the officer's judgments
- ☐ expected to be encountered during the watch
- ☐ when determining fitness for duty
- ☐ so that a safe navigational watch can be maintained at all times
- ☐ including the stopping distance
- ☐ that the relieving officer is not capable of carrying out the watchkeeping duties effectively

Keeping a Safe Navigational Watch on Merchant Vessels

(MGN 315, MCA, 2006)

- The OOW is the Master's representative and is primarily responsible at all times for the safe navigation of the vessel and for complying with the International Regulations for Preventing Collisions At Sea (**ColRegs**).
- It is of special importance that the OOW ensures that at all times an efficient look-out is maintained and that ColRegs are complied with.

- Officers and Masters are reminded that the vessel must at all times proceed at a safe speed.
- The vessel's engines are at the disposal of the OOW and there should be no hesitation in using them in case of need. Where possible, timely notice of intended variations of engine speed should be given to the duty engineer. The OOW should know the handling characteristics of the vessel, **__[1]__**, and should appreciate that other vessels may have different handling characteristics.
- Officers in charge of a navigational watch are responsible for navigating the vessel safely during their periods of duty with particular concerns for avoiding collision and stranding.
- The OOW shall also be aware of the serious effects of operational or accidental pollution of the marine environment and shall take all possible precautions to prevent such pollution.
- It is dangerous and irresponsible for the OOW to act as sole look-out during periods of darkness or restricted visibility.

Fitness for Duty

- There should be a minimum of 10 hours rest in any 24-hour period and 77 hours in any seven day period. Hours of rest may be divided into no more than two periods, one of which should be at least six hours long, and the intervals in between should not exceed 14 hours.
- The watch system shall be such that the efficiency of watchkeeping personnel is not impaired by fatigue. The Master shall take into account the quality and quantity of rest taken by the watchkeepers **__[2]__**.
- It is the overall responsibility of the Master and the responsibility of every watchkeeping officer and rating to ensure that they are sufficiently rested prior to taking over a navigational watch. It is the responsibility of the owner or operator to ensure that the vessel is manned with a sufficient number of personnel **__[3]__**by appropriately qualified and rested personnel in all foreseeable circumstances.
- In circumstances where the Regulations cannot be met there should be established procedures and contingencies in place to ensure that the vessel is brought to or remains in a place of safety until a safe navigational watch can be established. In some circumstances this may require delay to a vessel's departure.
- Watchkeepers should ensure they remain alert by moving around frequently and ensuring good ventilation. Marine Accident Investigation Branch (**MAIB**) reports have shown that it is all too easy to fall asleep, especially while sitting down in an enclosed wheelhouse.
- The OOW shall be free from the effects of alcohol and any other substance, including prescription drugs or other medication **__[4]__**.

Handing Over the Watch

The OOW shall:

- Ensure that the members of the relieving watch are fully capable of performing their duties.
- Ensure that the vision of the relieving watch is fully adjusted to the light conditions.
- Ensure that all standing orders and the Master's night orders are fully understood.

The OOW shall not hand over the watch:

- If there is reason to believe **__[5]__**, in which case the Master should be notified.
- When a manoeuvre is in progress until such action has been completed.

Taking Over the Watch

The relieving officer shall:

- Verify the vessel's estimated or true position prior to taking over the watch.
- Confirm the vessel's intended track, course and speed.
- Note any dangers to navigation **__[6]__**.
- Be aware of prevailing and predicted tides, currents, weather, visibility and the effect of these factors upon course and speed.
- Note any errors in gyro and magnetic compasses.
- Note the status of all bridge equipment.
- Note the settings of bridge/engine controls and manning of engine room.

- Be aware of the presence and movement of vessels in sight or known to be in the vicinity.
- Give watchkeeping personnel all appropriate instructions and information which will ensure the keeping of a safe navigational watch, including maintenance of a proper look-out.

B. *Listen to a short presentation on the seven most important factors which need to be taken into account while taking over a bridge watch, along with some good practices to be followed. Answer the questions and put the factors, given below, in the order they are presented.*

1. What are some of the "miscellaneous activities" on board the OOW must be informed about?
2. What must you do if any of the briefing you receive before you take over watch is unclear?
3. Why is it a good idea to arrive 15 minutes early before you take over watch?

☐ Bridge equipment and dimmers
☐ Weather conditions and night vision
☐ Ship position – speed – course
☐ Traffic density
☐ Inform the Master if required
☐ Miscellaneous activities on deck or in engine room
☐ Logbooks – Checklists – Daily orders

C. *Choose the correct one from the prepositions in blue.*

The essence of handing/taking over a navigational watch as a procedure is that it safeguards ***against/to*** errors. The changing over of watch is an opportune time to check all aspects of navigation and to ensure that no errors or omissions are being carried ***over/through***. The types of errors or omissions include position fixes from various sources that do not match, position fixes that are obtained from only one source and not verified by other aids, charted depths that do not match ***with/by*** the obtained soundings.

The watchkeeping officer may carry ***off/on*** with these errors without realising it. This is the reason why the relieving officer is required to review the navigational status all ***with/over*** again. These errors are not figments ***from/of*** imagination. An officer laid a course ***on/at*** the chart as 256° but set the autopilot to 265°. The error was observed only at the handing over process. These errors, if not rectified early enough, could result ***in/to*** formation of an error chain.

An effective way to detect and eliminate an error is by cross checks. Errors can be corrected at the time of handing/taking over watch as the crosschecks are now carried ***forward/out*** by a second person. The value of checks is traditionally explained as 'a stitch ***in/on*** time saves nine". All the aspects need to be watched and cared ***after/for*** by every watchkeeping officer, irrespective ***from/of*** his or her rank or experience.

D. ***Imagine you are the OOW. What actions would you take in the following emergencies? What must you do? First, say what you think must be done in each situation, based on your knowledge and experience. Then, match to the answers below.***

1. You are on watch and there is onset of heavy weather.
2. Vessel starts to swing rapidly and the off course alarm is ringing.
3. On plotting the positions by visual bearings and GPS, you notice that a difference of three miles is observed.
4. Your charts are corrected up to date. In the approaches to a port, it is observed that a buoy in the channel is displaying lights of a wreck-marking buoy but it is not marked on the chart.
5. In the middle of your watch, you are feeling very sick.

[ ] Accept it as a warning, proceed with caution, engines on stand-by, re-check with port authorities.

[ ] Call the Master and tell him/her your problem. Do not feel embarrassed, it is unsafe to continue watchkeeping.

[ ] Call out the crew to tighten the deck cargo lashings, ensure that all weathertight doors, hatch coamings and tank openings are closed properly, secure sounding pipes and air pipes, ensure that the anchors are properly secured and the spurling pipes are closed.

[ ] Re-check the position by an alternate method. It is possible that a fault was developed without giving an alarm. In coastal waters call the master if close to danger.

[ ] Switch over to manual steering, call the master, if in traffic bring engines on stand-by and inform the engine room of the malfunction of the steering.

2. SMCP: Handing over the watch

A. ***What is the proper communication for handing over and taking over watch?***

1. The officer handing over the watch should say: *You have the watch now.*
   The relieving officer should confirm and say: _____
2. The Master, when called to the bridge and formally taking over the watch, should say:
   I have the watch now.
   The officer of the watch should confirm and say: _____

B. ***Imagine there is heavy traffic in the area. Look at the briefing given on the traffic situation and complete the words (some of the missing letters are given for help).***

Attention! There is heavy traffic in the area.

1. There are dangerous t _ _ _ _ _ s on the radar.
2. A vessel is o _ _ r _ _ _ _ _ g south of us.

3. A vessel is on o _ _ _ _ _ te course.
4. A vessel is p _ _ s _ _ g on port side.
5. A vessel is c r _ _ _ _ _ g from starboard side.
6. The vessel is s_ a _ _ _ _ g on.
7. The vessel will alter course to g _ _ e way.

C. *The officer of the watch should brief the relieving officer on certain things. Identify the type of briefing given in the SMCPs below. Write the correct number for each phrase in the box (there are two sentences for each type of briefing).*

1. briefing on special navigational and machinery events
2. briefing on record keeping
3. briefing on meteorological conditions
4. briefing on bridge organization and routine activities/checks on board
5. briefing on pumping of ballast water

☐ Gale warning for the area at 2300.
☐ The notebook entries will be copied into logbooks after the watch.
☐ We require a further generator to ope-rate an additional pump to fill double bottom tanks.
☐ There was an engine alarm at 2230 due to pipe leakage.
☐ We are filling double bottom tanks.
☐ Speed was reduced at 1600 hours UTC due to fog.
☐ Mist is in the area.
☐ The look-out is standing by.
☐ Refill the toner of the data logger to make a printout.
☐ The latest fire patrol was at 1400 hours UTC. Everything is in order.

D. *Fill in the gaps in the following sentences used for briefing the officer taking over watch.*

received	passes	approaching	switched
leeway	even	restow	good
requires	clearance	manual	changes

1. We are _____ buoy B32 on starboard side.
2. We are making 5 degrees _____.
3. Underkeel _____ is 4.5 meters.
4. I changed to _____ steering at 2200
5. Navigation lights are _____ off.
6. Call the Master if any vessel _____ with a CPA of less than 2 nm.
7. Following nav-warning was _____ on NAVTEX at 1300 hours UTC: ordnance exercise in the area.
8. The VTS station _____ MAREP POSREP.
9. Take notice of _____ in the standing orders.
10. The vessel is on _____ keel at present. Present stability is _____.
11. Present list is 10 degrees to port. We must _____ deck cargo to correct the list.

3. ColRegs

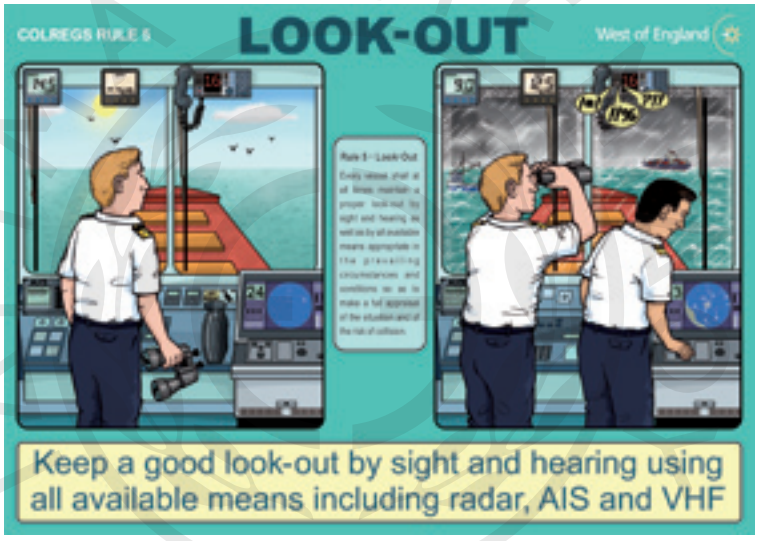
A. ***The following verses, written 150 years ago, aim at helping seafarers remember the "Rule of the Road"[1]. What situation or principle do they refer to?***

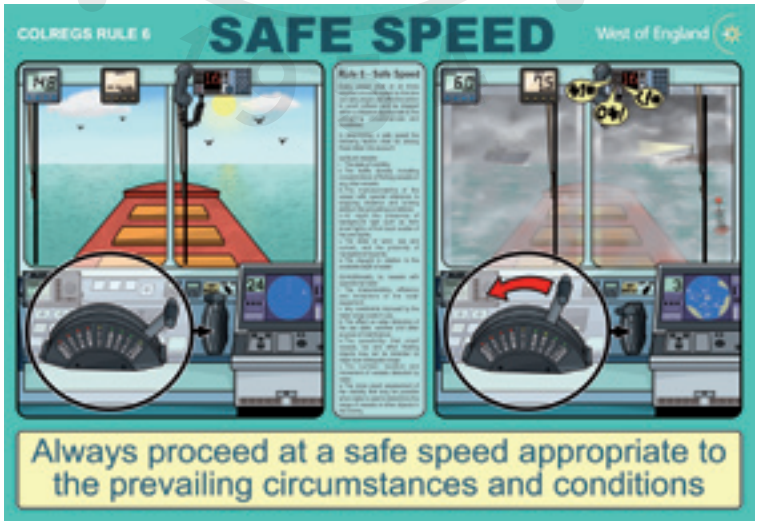
GREEN to GREEN – or, RED to RED
Perfect safety – go ahead.

If to your starboard RED appear,
It is your duty to keep clear;

Both in safety and in doubt
Always keep a good look-out;
In danger, with no room to turn,
Ease her, Stop her, Go astern.

B. ***The Rules shown in the posters below constitute two of the most important principles of watchkeeping. Why? What can go wrong when they are not observed?***





1. Aids to memory of the Rule of the Road, by Thomas Gray, *Rule of the Road at Sea*, 1867.

C. *Now read what the Marine Guidance Note states about these two vital rules. Are the statements true or false, according to the text?*

- ☐ In clear daylight, on a small vessel that is far out to sea, it is still not possible for the helmsman to also be a look-out.
- ☐ The OOW can reduce speed as a precaution, to have more time to make the right decisions.
- ☐ Decreasing operational costs by increasing speed is detrimental to safety.
- ☐ Excessive speed may be a contributory factor to accidents but rarely contributes to owners' liability.

Look-out

- The ColRegs require that every vessel shall at all times maintain a proper look-out by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of risk of collision.
- The look-out must be able to give full attention to the keeping of a proper look-out and no other duties shall be undertaken that could interfere with that task. The duties of the look-out and helmsman are separate and the helmsman should not be considered to be a look-out except in small vessels where an unobstructed all round view is provided at the steering position and there is no impairment of night vision or other impediment to the keeping of a proper look-out.

Safe Speed and Stopping Distance

- The ColRegs require that every vessel shall at all times proceed at a safe speed so that proper effective action can be taken to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. In cases of need, the OOW shall not hesitate to use the engines to reduce speed further and allow more time for consideration and assessment of a developing situation. However, timely notice of the intended variations of engine speed shall be given to the engineers where possible or effective use made of UMS engine controls.
- Whatever the pressure on Masters to make a quick passage or to meet the wishes of owners, operators, charterers or port operators, it does not justify vessels and those on board them being unnecessarily put at risk. In the well- known case of THE LADY GWENDOLEN, the Court of Appeal stated that "excessive speed in fog is a grave breach of duty and vessel owners should use their influence to prevent it." Because of their failure to do so, it was held in that case that the owners could not limit their liability.

D. *Which rule is depicted in each poster? Match the ColReg Rules to the pictures.*

Rule 14
HEAD-ON SITUATION:
Alter course to starboard and pass port to port

Rule 15
CROSSING SITUATION:
Keep out of the way and avoid crossing ahead of the other vessel

Rule 13
OVERTAKING:
Keep out of the way of the vessel being overtaken

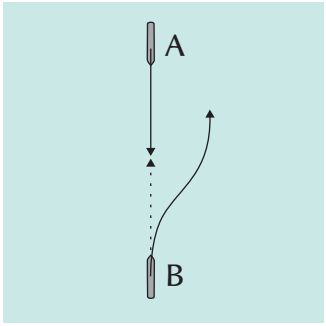
E. ***Look at the following four scenarios of vessels in a head-on situation[2] where Rule 14 must be applied. First, match the pictures to the scenarios: write the correct number under each picture. Then, apply the rule and make comments. What must the vessels do to pass each other at safe distance?***

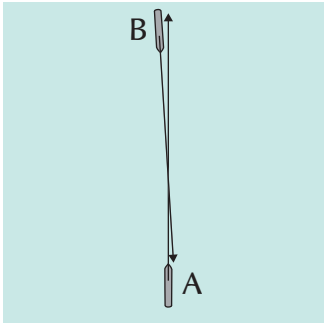
Rule 14 (Head-on situation)

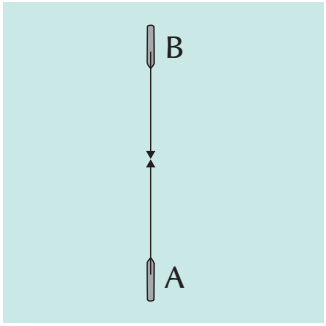
(a) When two power-driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve risk of collision, each shall alter her course to starboard so that each shall pass on the port side of the other.

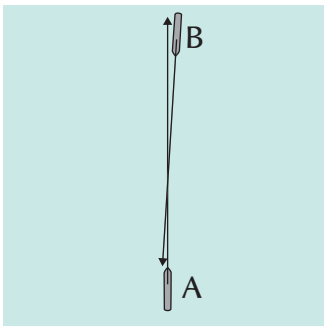
(b) Such a situation shall be deemed to exist when a vessel sees the other ahead or nearly ahead and by night she could see the masthead lights of the other in line or nearly in a line and/or both sidelights and by day she observes the corresponding aspect* of the other vessel.

(c) When a vessel is in any doubt as to whether such a situation exists she shall assume that it does exist and act accordingly.









2. From www.ecolregs.com

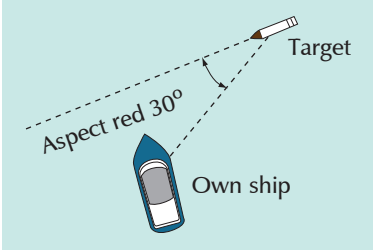
Scenario 1:	***Vessels are meeting on reciprocal course***
Description of scenario:	Vessel A: power-driven vessel / Vessel B: power-driven vessel Area: On the high seas Visibility: Good (vessels in sight of one another) Vessel A is meeting vessel B on reciprocal courses so as to involve risk of collision Vessel A has vessel B right ahead (relative bearing 000°)

Scenario 2:	***Vessels are meeting on nearly reciprocal courses (vessel A has vessel B on STBD bow)***
Description of scenario:	Vessel A: power-driven vessel / Vessel B: power-driven vessel Area: On the high seas Visibility: Good (vessels in sight of one another) Vessel A is meeting vessel B on nearly reciprocal courses so as to involve risk of collision Vessel A has vessel B nearly ahead on starboard bow

Scenario 3:	***Vessels are meeting on nearly reciprocal courses (vessel A has vessel B on PORT bow)***
Description of scenario:	Vessel A: power-driven vessel / Vessel B: power-driven vessel Area: On the high seas Visibility: Good (vessels in sight of one another) Vessel A is meeting vessel B on nearly reciprocal courses so as to involve risk of collision Vessel A has vessel B nearly ahead on port bow

Scenario 4:	***One of the vessels which are required to alter their course to starboard is not taking appropriate action***
Description of scenario:	Vessel A: power-driven vessel / Vessel B: power-driven vessel Area: On the high seas Visibility: Good (vessels in sight of one another) Vessel A is meeting vessel B on nearly reciprocal courses so as to involve risk of collision Vessel A has vessel B right ahead (relative bearing 000°) Vessel A which is required to alter her course to starboard is not taking appropriate action

*The navigation term ***"aspect"*** describes the heading of another vessel from your perspective. It is a crucial point in collision avoidance, esp. at night, as it directly reflects what lights you should see. Before altering course to avoid collision, you need to know which way the other ship is heading with respect to your own vessel. This is called her aspect. It is defined as the relative



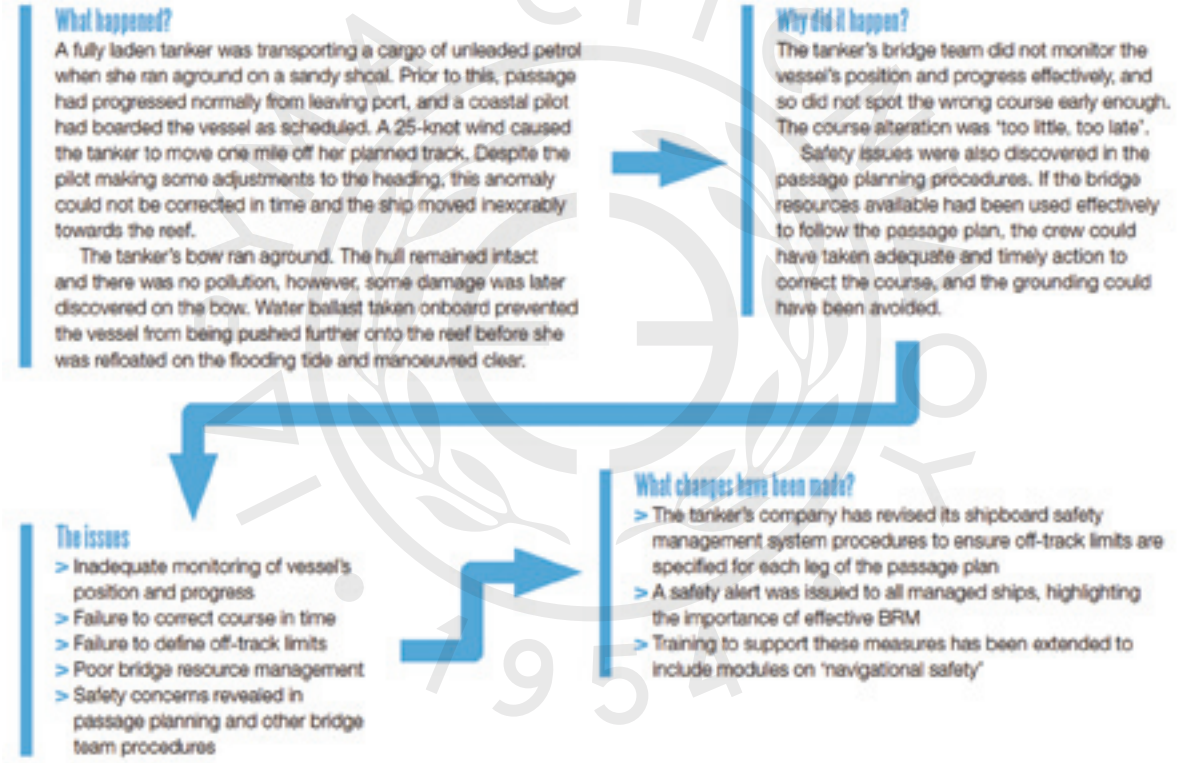
bearing of your vessel as seen from the other vessel. It is labelled red when we are on the port side of the vessel or green when we are on the starboard side.

4. Bridge Resource Management

A. ***Read about an accident that involves poor BRM[3]. Then use the text below, which analyzes BRM, to answer the following questions.***

- Which BRM resources could have prevented the accident?
- Which components of BRM has the company strengthened by the changes it made?

If the bridge resources available had been used effectively... the crew could have taken adequate timely action to correct the course



What is Bridge Resource Management[4]?

Bridge Resource Management (BRM), or as it is also called Bridge Team Management (BTM), is the effective management and utilization of all resources, human and technical, available to the Bridge Team to ensure the safe completion of the vessel's voyage. BRM focuses on bridge officers' skills such as teamwork, teambuilding, communication, leadership, decision-making and resource management and incorporates this into the larger picture of organizational and regulatory management. BRM addresses the management of operational tasks, as well as stress, attitudes and risk. BRM begins before the voyage with the passage plan and continues through the end of the voyage with the passage debrief.

3. *The Navigator*, issue 07 on "BRM: Working as a cohesive team", Oct. 2014, published by the Nautical Institute & The Royal Institute of Navigation.
4. Bridge Procedure Management Guide, Department of Ecology, State of Washington, 2009.

What Are My Available Resources To Manage?

A mariner has many resources available to him/her for safe passage planning and execution. Some examples include:

- Electronic equipment (i.e. radar, depth sounder, GPS/DGPS, ARPA, gyro compass)
- Charts and publications, including electronic publications
- Environmental factors (i.e. tide, wind, currents)
- Electronic Charting and Display Information Systems (ECDIS)
- Vessel Traffic Services (VTS)
- Passage plan
- Internal and external communication equipment
- NAVTEX
- Automatic Identification System (AIS)
- Persons with local knowledge (i.e. Pilot)
- Bridge Personnel (i.e. Master, Officer On Watch (OOW), helmsman, lookout)

What are the objectives of Bridge Resource Management?

- Share a common view of the intended passage and the agreed procedures to transit the passage with all members of the Bridge Team.
- Develop and use a detailed passage plan to anticipate and manage workload demands and risks.
- Set appropriate manning levels and make contingency plans based on anticipated workload and risks.
- Make roles and responsibilities clear to Bridge Team members.
- Involve all team members in problem solving.
- Acquire all relevant information early and anticipate dangerous situations.
- Team members clearly understand the chain of command including the way decisions and instructions are made, responded to, and challenged.

How do I implement Bridge Resource Management on my vessel?

You can implement BRM by considering and addressing the following:
Passage Planning – covering ocean, coastal and pilotage waters. Particular attention is paid to high traffic areas, shallow waters, or pilotage waters where the plan incorporates appropriate margins of safety and contingency plans for unexpected incidents.
Passage Plan Briefing – all bridge team members are briefed on the passage plan and understand the intended route and procedures to transit the route.
Bridge Manning – Master uses passage plan to anticipate areas of high workload and risk and sets manning levels appropriately.
Bridge Team Training (ashore and on-the-job) – is given to all bridge crew members and they are sure of their roles and responsibilities, both for their routine duties and their duties in the event of an incident/emergency.
Master's Standing Orders – are read and signed before the commencement of the voyage. Orders are clear on the chain of command, how decision and instructions are given on the bridge and responded to, and how bridge team members bring safety concerns to the notice of the Master.
Master/Pilot Exchange – the passage plan is discussed by the Master and the pilot and changes are made as necessary. Any new information is communicated to the rest of the bridge team. When the pilot is onboard he/she should be supported as a temporary bridge team member.
End of Voyage Debriefing – provides the opportunity for the bridge team to review the passage plan's strengths and weaknesses, make suggestions for improved safety or communications, and improve team problem solving skills.

What are the benefits of BRM when correctly practised on my vessel?

When BRM is practised correctly onboard the result should be a Bridge Team that:

- Maintains its situational awareness;
- Continually monitors the progress of the vessel making appropriate adjustments and corrections

as necessary to maintain a safe passage;
- Acquires relevant information early;
- Appropriately delegates workload and authority;
- Anticipates dangerous situations;
- Avoids becoming pre-occupied with minor technical problems and losing sight of the big picture;
- Undertakes appropriate contingency plans when called for;
- Recognizes the development of an error chain and breaks the error-chain sequence.

B. ***Read the 10 points below. Complete the sentences that summarize them by matching the two halves that make up each summary sentence.***

10 points to bear in mind next time you are on the bridge:

1	**Only human** Individuals make mistakes. Through teamwork and effective use of resources, these mistakes can become lessons learned, rather than catastrophes.
2	**Strength or weakness?** BRM is an essential defence mechanism against the "single person error". It can be a vessel's greatest strength – or its weakest point.
3	**Working both ways** The Master is an integral part of the bridge team, but also has a larger role to play to facilitate effective BRM and challenge and response.
4	**No 'I' in TEAM** Both in training and in operation, it is essential to involve all team members. 'Tell me and I will forget, show me and I may remember, but involve me and I will understand'.
5	**Happy talk** Team discussions are essential for learning and refining BRM. Accident and near-miss reports are excellent material for starting a discussion.
6	**Pilot scheme** Good passage plans are essential for ensuring the bridge team, including the pilot, are focused, share a common understanding and can jointly monitor the voyage.
7	**Good decisions** Using information technology effectively, and ensuring good teamwork with the equipment, can aid good decisions and avoid mistakes.
8	**Screen time** The navigator must be able to filter relevant information, use good old-fashioned common sense, and keep in mind the most important screen onboard – the window!
9	**Audits matter** Effective and routine navigation audits during passage are essential to ensure that what is learnt ashore is practised onboard.
10	**Never done** BRM is never 'over'. It must be part of a continuous improvement process underpinned by mentoring, open discussion and debriefing at the end of the voyage.

1. BRM	☐ can be discussed to refine BRM on board.
2. BRM	☐ is a tool that helps implement BRM on board.
3. The Master	☐ is a continuous process.
4. The Pilot	☐ plays a crucial role in the effectiveness of BRM.
5. A near-miss report	☐ offers protection against human error.
6. A navigation audit	☐ is part of the bridge team.

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

☐ discuss the principles of watchkeeping
☐ explain the safety precautions to be observed during watch
☐ understand SMCP for handing over the watch
☐ discuss the responsibilities of the bridge team during watch
☐ discuss the application of the International Collision Regulations

B. Class Project.

- Present to class ***Rule 19 – Conduct of vessels in restricted visibility*** of ColRegs. Make a scenario of a close-quarters situation in restricted visibility and explain which different sections of the rule apply and how.

C. Fill in the gaps with the words in the box.

competency	exhibit	surveillance	distractions	maintain
relieved	complacent	leadership	compliance	establishing

1. In order to maintain a safe watch, the following are among your primary duties: maintaining a proper lookout; general _____ of the ship; collision avoidance in _____ with ColRegs; recording bridge activities; making frequent periodic checks on the navigational aids and bridge equipment.
2. All officers should _____ a safe speed at all times. The OOW should be fully aware of the vessel's manoeuvring characteristics.
3. In Restricted Visibility, the OOW is responsible to keep a look-out, sound fog signals, proceed at a safe speed and have the engines ready for immediate manoeuvre. In addition, the OOW shall ensure that a dedicated look-out is posted at all times, _____ navigation lights, operate and use the radar, put the engines on standby.
4. The officer of the navigational watch shall in no circumstances leave the bridge until properly _____ by an appropriate officer.
5. The OOW must ensure there are no _____ caused by the use of domestic radios, cassettes, CD players, personal computers, television sets, mobile phones, etc.
6. For maintaining a safe watch, you must keep in mind the three letters ASK: A for attitude, S for skill, and K for knowledge. Accident statistics indicate that the majority of collisions and grounding incidents are attributed to carelessness or a _____ attitude and not due to lack of knowledge and skill.
7. The main focus of BRM is to change attitudes by _____ a safer and more efficient team work onboard ship. It aims to create good team leaders and team members by addressing issues related to _____, management styles, culture, communication, stress & fatigue, etc.
8. If a collision or grounding is attributed to lack of a proper lookout, there can be suspension of watchkeepers' Certificates of _____.

UNIT 14

Dangerous Goods

1. *The IMDG Code*
2. *Handling dangerous goods (SMCP B3/1.2) / Emergency response action*
3. *The IMSBC code*

Round-up

1. The IMDG Code

A. ***Look at the following key words related to handling dangerous goods. Tick (✓) the words that describe procedures followed in shipping to ensure the safe carriage of dangerous goods.***

labelling	placarding	packing	marking	inhalation hazard
combustible	storage	corrosive	flammable	spontaneous combustion
infectious	explosive	compatible	segregation	MSDS (Material Safety Data Sheet)

B. ***Listen to a short introduction to the International Maritime Dangerous Goods Code.***

i. Circle the words, from the keywords above, that you can hear.
ii. Answer the following questions:
- What is the aim of the code?
- Which people must know and use the code?

C. ***In the introduction above, the IMDG Code is called a "comprehensive regulatory framework". Look at what these words mean and then fill them in the example sentences below.***

comprehensive: complete, including everything that is necessary (items, details, facts, information)
regulatory: controlling an area of business or insdustry, and making sure that it is operating fairly
framework: a system of rules that is used to plan or decide something

1. A legal _____ for resolving territorial waters disputes is needed.
2. We offer you _____ training in all aspects of shipping management.
3. IMO is a _____ organization.

D. ***Read the following information on the IMDG Code[1]. Write the missing title for each part of the text in the space provided.***

Dangerous Goods List / PSN and UN Number / Different types of dangerous goods / What are dangerous goods and why are they useful? / IMDG Code provisions / Updating the IMDG Code / Identifying dangerous goods

The IMDG code contains detailed technical specifications to enable dangerous goods to be transported safely by sea. The IMDG Code became mandatory for adoption by SOLAS signatory states from 1st January 2004.

1. Sources: "An Introduction to the IMDG Code" Exis technologies, 2014, in www.imdgsupport.com, and "Handling Dangerous Goods in Ports" ASEAN-GIZ (German Technical Cooperation), 2011, in www.harbourmaster.org.

1. …….. The IMDG Code requires certain provisions to be followed whenever dangerous goods are shipped by sea. These provisions require that dangerous goods are correctly and safely:

- Classified and identified
- Packed
- Documented
- Marked, labelled and placarded
- Stowed on board the vessel
- Segregated from other goods with which they may react dangerously

The key objectives of the Code are to protect human life, prevent marine pollution and facilitate the free movement of dangerous goods.

2. …… Dangerous goods are substances or articles which can pose a threat to people, property and/or the environment. They can exist in three physical states – as a solid, liquid or gas – and can present a range of dangers in a transport environment – flammability, toxicity (poisonous) and corrosivity being the most common. The physical state and properties affect packing, handling and transport decisions. Many dangerous goods are essential in the manufacture of other products such as cars, plastics, electronics and pharmaceuticals on which progress and world trade depend.

3. …….. For transport purposes, dangerous goods are allocated to one of nine 'classes', according to the main danger they present. These 9 hazard classes have been established internationally by a United Nations (UN) committee to ensure that all modes of transport (road, rail, air and sea) classify dangerous goods in the same way. They are as follows:

- Class 1 – *Explosives,*
- Class 2 – *Gases,*
- Class 3 – *Flammable liquids,*
- Class 4 – *Flammable solids and other flammable substances,*
- Class 5 – *Oxidizing substances and organic peroxides,*
- Class 6 - *Toxic and infectious substances,*
- Class 7 – *Radioactive material,*
- Class 8 – *Corrosive substances*,
- Class 9 – *Miscellaneous dangerous substances and articles*

Many of these classes are sub-divided. For example, toxic substances are allocated to Class 6.1; infectious substances are allocated to class 6.2. The dangers presented by a particular article determine the way it needs to be packed, whether it can be loaded in the same container as other dangerous goods and where it needs to be stored within the port or stowed on board the ship.

4. …… Each class has a unique diamond label used to identify danger in transport.

Class 1		
	**1**	Explosive substances and articles (used to produce explosions or pyrotechnic effects)
Class 2		
	**2.1**	Flammable gas

Class 2		
	**2.2**	Non-flammable, compressed gas
	**2.3**	Toxic or poisonous gas

Class 3		
	**3**	Flammable liquids
Class 4		
	**4.1**	Flammable solids
	**4.2**	Spontaneous combustible solids
	**4.3**	Combustible solids when in contact with water (“dangerous when wet”)
Class 5		
	**5.1**	Oxidizer
	**5.2**	Organic peroxide

Class 6		
	**6.1**	Toxic substances
	**6.2**	Infectious substances
Class 7		
	**II**	Radioactive materials Category II (yellow)
Class 8		
	**–**	Corrosive materials
Class 9		
	**–**	Miscellaneous dangerous substances/ articles

5. …….. Within each of the 9 hazard classes dangerous goods are uniquely identified by two pieces of information:

- A four-digit number known as the UN Number which is preceded by the letters UN.
- The corresponding Proper Shipping Name (PSN).

For example, kerosene is identified in the IMDG Code by its UN Number UN 1223 and the PSN Kerosene. Together the UN Number and PSN uniquely identify dangerous goods to:

- enable rapid and precise identification during transport to ensure the correct handling, stowage, segregation etc, and
- in the event of an emergency, ensure that the correct procedures are followed.

6. …… The IMDG Code comprises 7 parts, presented in two volumes – Volume 1 and Volume 2. Most of the decisions on safe shipping and transport procedures stem from the use of the DGL located in Volume 2. The DGL is an index of substances

and articles, arranged in UN Number order. It comprises 18 columns of information for each listed substance/article, presented as a two-page spread in the printed books. Much of the information is in a coded form to make it easier to present in a table. The meaning and implications of these codes are explained in the relevant chapters and sections of Volumes 1 and 2, an initial point of reference being provided at the head of each column. Decisions on packing arrangements, marking and labelling requirements, documentation entries, stowage, segregation and other shipping and transport duties generally stem from the columns of the DGL.

7. ..... The IMDG Code is evolving and is updated every two years to reflect biennial revisions in the UN Model Regulations. These changes reflect the inclusion of newly classified dangerous goods, amendments to or deletions of existing entries, new technology and new methods of handling dangerous goods, safety concerns which arise as a result of human experience. Although the Code is updated every two years, in general, the basic principles remain constant and once you have understood them, you will be able to look up information in future versions of the IMDG Code.

E. ***What dangerous goods can you see in the pictures? Identify the following labelling.***

Proper Shipping Name, UN identification number, Hazard Class Placard

.....

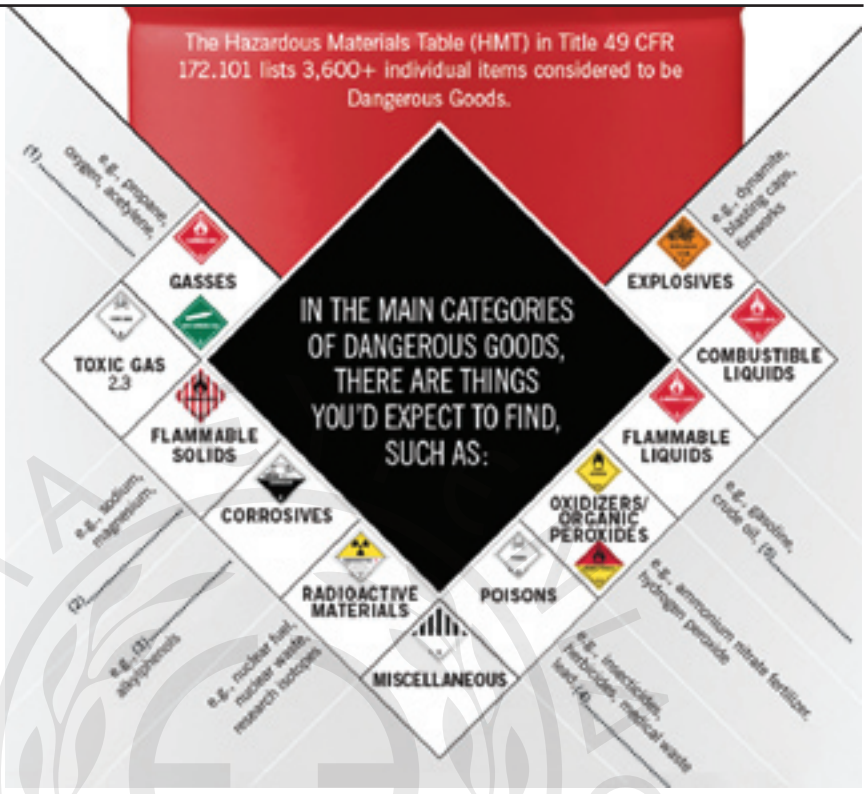
.....

.....

.....

F. *Which class do the following substances belong to? Five substances have been erased from the examples. Write the correct number (1-5) in the boxes.*

The generally accepted definition of Dangerous Goods (or hazardous materials) from the US DOT is: "Any substance which may pose an unreasonable risk to health and safety of operating or emergency personnel, the public, and/or the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal, or transportation."



- [5] solvents
- [ ] gunpowder
- [ ] nitrogen
- [ ] acids
- [ ] mercury

G. *Write the missing name of the dangerous goods shown below.*

paints & varnishes	aerosols	bleach	charcoal	perfume	hand sanitizer

H. ***What is the risk that dangerous goods present? Use the words in the box to fill in the gaps.***

asphyxiants	reaction	emit	contribute	surrounding	bacteria	friction

THE 9 CLASSES OF DANGEROUS GOODS: REASON FOR REGULATION

(dgiglobal.com/classes)

CLASS 1 Explosives are capable (by chemical _____) of producing gases at such temperatures, pressures and speeds as to cause catastrophic damage through force and/or of producing hazardous amounts of heat, light, sound, gas or smoke.
CLASS 2 Gases are capable of posing serious hazards due to their flammability, potential as _____, ability to oxidize and/or their toxicity or corrosiveness to humans.
CLASS 3 & CLASS 4 Flammable liquids and solids are capable of posing serious hazards due to their volatility (i.e. they evaporate and are unstable), combustibility and potential in causing severe extensive fire.
CLASS 5 Oxidizers, although not necessarily combustible in themselves, can yield oxygen and in so doing _____ to the combustion of other materials. Organic peroxides are thermally unstable and may burn rapidly, be sensitive to _____, react dangerously with other substances or cause damage to eyes.
CLASS 6 Toxic substances pose significant risks to human health upon contact. Infectious substances contain _____, viruses, parasites which cause disease in humans or animals.
CLASS 7 Radioactive material can _____ ionizing radiation, which presents potentially severe risks to human health.
CLASS 8 Corrosives cause severe damage when in contact with living tissue or, in the case of leakage, damage or destroy _____ materials.
CLASS 9 Miscellaneous dangerous goods present a wide array of potential hazards to human health, safety, infrastructure and means of transport.

2. Handling dangerous goods (SMCP B3/1.2) / Emergency response action

A. ***Briefing on nature of dangerous goods and instructions on compatibility and stowage. Match the two halves to make full sentences.***

1. Handle these goods ...	☐ 3, flammable liquids.
2. Stow IMO class 2 goods separated …	☐ with caution.
3. The IMO class of these goods is …	☐ flammable gases in contact with water.
4. Check the correct technical …	☐ combustion.
5. These goods are liable to spontaneous ...	☐ names in documents.
6. Stow flammable goods away…	☐ by one hold from IMO class 3 goods.
7. Ventilate the hold …	☐ from the engine room bulkhead.
8. Keep these goods dry, they emit …	☐ minimum of 12 metres.
9. Stow these drums away from Class 2 goods at ...	☐ before entering.

B. ***Put the words in the correct order to make full SMCPs.***

1. the IMO class / is / what / these goods / of?

.....

2. goods / the proper / check / of / segregation.
.....

3. wet packagings / refuse / of goods / when wet / that are dangerous.
.....

4. IMO class 1 goods / bosun's store / away / stow / from.
.....

5. separated by / stow / from foodstuffs / infectious substances / one compartment.
.....

C. *Listen to a news report and fill in the missing numbers.*

Hazmat situation at Ceres container terminal in Halifax Port, Canada[2]

(14 March 2014) A container carrying uranium hexafluoride fell ____ metres from a crane onto the deck of a container ship. Radiation levels are ____ times higher than normal.

D. *Now read an update of the news report to see how the situation evolved. Answer the questions.*

- What was the emergency response action taken?
- What happened to the ship's crew?

Halifax Fire Department confirmed that four cylinders containing uranium hexafluoride did fall from a container, but there was no leak of radioactive material. The fire department also said there were no injuries or contamination as a result of the incident. The vessel has been evacuated and the ship's crew is safely moved to a local hotel. Halifax firefighters established three quarantine zones — a cold zone, a warm zone where a command post had been established and a hot zone near the container where only the hazmat team was allowed.
The container was being moved onto the deck of the Swedish *Atlantic Companion* when it dropped. The packaging standards followed a successful protocol (the small canisters are put in a concrete case) and prevented a leak. Uranium hexafluoride provides fuel for nuclear power and is used in nuclear weapons. Thousands of tonnes of uranium hexafluoride are annually shipped across the world. If uranium hexafluoride, class 7 cargo, comes into contact with water or moisture in the air, it can form a lethal toxic cloud.

E. *Reporting incidents. Fill in the gaps with the words in the box.*

escaped	stowed	re-ignited	dropped	control	deformed

1. Drums of IMO class 7 goods were _____ on deck.
2. Several drums are _____ and leaking. Liquid is spilling.
3. Spilling substances of IMO class 7 _____ into the harbour water. Inform the pollution _____. Request hazmat team to come to the scene immediately.
4. Explosion in container _____ at the forward part of the vessel. Damage to surrounding containers.

2. From CBC News/Nova Scotia "Halifax Uranium Scare", Mar. 14, 2014, www.cbc.ca.

5. Fire not under control yet. IMO class 5 goods _____. Call the harbour fire brigade.

F. *Action in case of incidents. Write the appropriate verb in the orders.*

1. T _ _ n the vessel out of the wind – the spilling gas is toxic.
2. Let the spillage e _ _ _ _ _ _ _ e. Do not use absorbents for the spillage.
3. R _ _ _ _ e the spillage with synthetic scoops. Do not touch the spillage.
4. S _ _ _ _ _ _ e the contaminated goods from other goods. C _ _ _ r contaminated goods with tarpaulins.
5. C _ _ l down the container with water. Fight the fire from a great distance.
6. Close the hatch – F _ _ _ d number 2 hold with water.
7. Take injured persons to a safe area. P _ _ _ _ _ e first aid to injured persons.
8. Take off and d _ _ _ _ _ e of contaminated clothing.
9. A _ _ _ r course for the nearest port. Inform the port on radio. Call the ambulance.

G. *Read the following three texts[3] on dangerous goods fires that broke out on board container ships. Answer the questions.*

- What type of dangerous cargo is to blame for container ship fires in the past 10 years? What are the properties of such cargo that lead to fires?
- What was the role of response action in the case of *Charlotte Maersk*?

On 7 July 2010, *Charlotte Maersk* was en route from Port Klang, Malaysia, bound for Salalah, Oman. Approximately 3 hours after departure crew members on the bridge observed smoke rising from the forward part of the ship. It was soon apparent that there was a rapidly developing fire on deck. The fire alarm was activated and the crew mustered according to the muster plan and started the firefighting efforts. After approximately 24 hours of firefighting by the crew members, supporting ships and a firefighting aeroplane, the fire was considered to be under control. There were only minor damages to the hull and deck and some deformation due to heat on two hatches of cargo hold no. 6. 160 containers were damaged. One crew member subsequently suffered respiratory problems from inhaling smoke from the fire. A certificate of commendation from the IMO was awarded to the crew of *Charlotte Maersk* for their acts of bravery during the fire. The response time of the crew was decisive for the containment of the fire.

The fire originated from a 20-foot container in stowage position 230682 (UN no. 3105/ IMO class 5.2) which contained MEKP[4] (methyl ethyl ketone peroxide), type D, liquid, in 2688 cans and in 672 cartons. It was loaded on *Charlotte Maersk* in Shanghai, China, and was to be discharged in Port Said, Egypt. MEKP type D is an organic peroxide. It is a colourless oily liquid and this particular liquid was diluted by 55% dimethyl phthalate which supposedly makes it more stable. It is stated in the material data sheet from the manufacturer that organic peroxides are generally unstable and extremely flammable. Shock and friction should be avoided. There have been other accidents involving maritime transport of MEKP in containers: On 7 May 2007, in the port of Bandar Shahid Rajaee, Iran, a container containing MEKP, type D, caught fire after having been discharged and moved to the terminal area. When attempts were made to move the container, it exploded.

3. Marine Accident Report: *Charlotte Maersk fire, 7 July 2010,* Danish MAIB, www.dma.dk; "Safe Carriage of MEKP in Containers", 14/02/2012, North of England P&I Club, www.nepia.com; "MSC Flaminia in flames in the North Atlantic" 15/07/2012, by Rick Spilman, www.oldsaltblog.com.w
4. MEKP is used as a catalyst to harden resin in fiberglass.

The serious fire on *Charlotte Maersk* has drawn attention to the potential dangers of carrying MEKP; there have been several instances of fires involving MEKP carried in containers both in shore facilities and onboard vessels. MEKP is a strong oxidising agent and as such is designated IMDG Class 5.2. Like other such materials, e.g. Calcium Hypochlorite[5] (Class 5.1), it can be subject to a strong exothermic reaction which may lead to spontaneous combustion. The consequences of the *Charlotte Maersk* fire may have been much worse if it was not for the strong initial fire fighting response from the vessel crew and the support of shore fire fighters during the later stages of the incident. Maersk Line has implemented stringent procedures for the carriage of this product, including checks on shippers and carriage only within reefer containers set at 10°C.

Fires on container ships can be extremely difficult to fight. The fire on the *Charlotte Maersk* started following an explosion in a container. An explosion on *MSC Flaminia* in July 2012 was reported as a similar one. Likewise in 2006, an explosion in a container on the *Hyundai Fortune* caused a major fire which damaged the aft of the ship, requiring 5,000 tonnes of new steel and a new accommodation block.
The cause of the fire on the *Hyundai Fortune* is believed to be a mislabelled container containing petroleum-based cleaning fluids. One possible culprit could be the pool chemical calcium hypochlorite which reacts violently when exposed to moisture or heat, and has been involved or suspected in other explosions aboard container ships in recent years, including *Sea Elegance*, *M/V Hanjin Pennsylvania*, *CMA Djakarta*, *Aconcagua*, *Sea Land Mariner* and *M/V DG Harmony*.

H. *Match to make collocations found in the texts above.*

1. respiratory .....
2. stowage .....
3. response .....
4. oxidizing .....
5. spontaneous .....
6. stringent .....
7. mislabelled .....

time
container
position
combustion
agent
problems
procedures

I. *Emergency response and first aid. Match the nouns to their definitions. Draw arrows.*

Inhalation	taking food, drink or another substance into the body by swallowing it
Ingestion	taking air, smoke or gas into your lungs as you breathe
Contamination	being affected by something because of coming in contact with it
Exposure	being made dirty or impure by the presence of a dangerous substance

J. *Fill the nouns from the previous exercise in the sentences below.*

1. The water supply on the cruise ship is being tested for bacterial _____.
2. Even a brief _____ to radiation is very dangerous.
3. I was treated in hospital for smoke _____ after the fire on board.
4. This new therapy option does not require the _____ of drugs.

5. "Cal hypo" (chlorine or bleach powder) is used for water chlorination, disinfection and house cleaning.

K. *Fill in the gaps with the words in the box.*

evaporate	vapours	vomit	oxygen	evacuate	frostbite

What emergency response is appropriate in case of spilling or leaking of dangerous goods (such as chemicals)?

- rope off and (1) _____ the area as quickly as possible
- use protective clothing and a breathing apparatus to prevent exposure to skin and eyes
- use waterspray to reduce the (2) _____ coming from the dangerous substance
- eliminate any source of ignition that may cause an explosion
- let the leakage (3) _____ and shovel the remainder
- cover any items that have been contaminated by the chemical substance with tarpaulins and remove in good time

What first aid is appropriate in case of exposure to dangerous goods?

- carefully remove clothes that have been contaminated by the substance
- flush the eyes with luke-warm low-pressure running water for at least 15 minutes
- in case of inhalation, remove the person into fresh air and give (4) _____, if needed
- in case of skin exposure, treat for (5) _____ injuries; warm the area and dress it with bandage.
- in case of ingestion, do not allow the person to (6) _____.

3. The IMSBC Code

A. *Use the words in the box to fill in the gaps.*

order	hazardous	legislation	drainage	liable	permissible	mandatory

Carrying solid bulk cargoes safely[6]

Carrying solid bulk cargoes involves serious risks, which must be managed carefully to safeguard the crew and the ship. These risks include reduced ship stability, and even capsizing, due to cargo liquefaction; fire or explosion due to chemical hazards; and damage to ship structures due to poor loading procedures. The main (1) _____ governing safe carriage of solid bulk cargoes is the International Maritime Solid Bulk Cargoes (IMSBC) Code, which became (2) _____ on January 1, 2011, under the SOLAS Convention. Individual cargoes are listed in 'schedules' which are contained in Appendix 1 of the Code. These describe each cargo's properties and detail the requirements for handling, stowing and carrying it safely.

Before loading a cargo you must inspect and prepare the cargo spaces, checking that strainer plates are prepared to facilitate (3)_____ and prevent cargo from entering the bilge

6. *Carrying Solid Bulk Cargoes Safely: Guidance for Crews on the IMSBC Code*, Lloyd's Register/UK P&I Club/Intercargo, 2013.

system, bilge lines and sounding pipes are in good (4) _____, and measures are in place to minimise dust entering living quarters or coming into contact with moving parts of deck machinery and external navigational aids. You must also make sure that cargoes are properly distributed throughout the ship's holds to provide adequate stability. Also, the Master and the terminal representative must agree on a Loading Plan to ensure that the (5) _____ forces on the ship are not exceeded.

The Code's three cargo groups The IMSBC Code categorises cargoes into three groups:

Group A – cargoes which may liquefy if shipped at a moisture content exceeding their Transportable Moisture Limit (TML is the maximum moisture content considered safe for carriage).

Group B – cargoes which possess a chemical hazard which could give rise to a dangerous situation on a ship.

Group C – cargoes which are neither (6) _____ to liquefy (Group A) nor possess chemical hazards (Group B). Cargoes in this group can still be (7) _____.

You can find the Group for a particular cargo in its schedule.

B. *Read about the three cargo groups and fill in the table that follows with the words given in the box.*

Group A cargoes (cargoes which may liquefy)

What is liquefaction and how does it affect cargo?

Liquefaction means that a cargo becomes fluid (liquefies). On ships, this happens when the cargo is compacted by the ship's motion. Cargoes which are prone to liquefaction contain a certain quantity of moisture and small particles, although they may look relatively dry and granular when loaded. Liquefaction can lead to cargo shift and even to the capsizing and total loss of the ship, and can occur even when cargoes are cohesive and trimmed level. The bulk carrier *Hui Long* sank in 2005. The cause was believed to be liquefaction, possibly due to the TML being exceeded.

Examples of Group A cargoes

Mineral concentrates: Mineral concentrates are refined ores in which valuable components have been enriched by eliminating most waste materials. They include copper concentrate, iron concentrate, lead concentrate, nickel concentrate and zinc concentrate.

Nickel ore: There are several types of nickel ore which vary in colour, particle size and moisture content. Some may contain clay-like ores.

Coal: Coal (bituminous and anthracite) is a natural, solid, combustible material consisting of amorphous carbon and hydrocarbons. It is best known as a Group B cargo due to its flammable and self-heating properties, but it can also be classed as Group A because it can liquefy if predominantly fine (i.e. if 75% is made up of particles less than 5mm in size). In these cases, it is classed as both Group A and B.

Typical requirements for accepting and loading Group A cargoes

Follow these steps when carrying Group A cargoes to reduce the risk of liquefaction:

- Make sure the shipper has supplied the required information, including the TML and the actual moisture content (in a signed certificate and a declaration respectively).
- Only accept the cargo if the actual moisture content is less than its TML.
- Carry out visual monitoring during loading. If

Liquefied nickel ore


Nickel ore before and after liquefaction

there are any indications of high moisture content, stop loading and seek further advice.
- Consider trimming the cargo to reduce the likelihood of cargo shifting.
- Take measures to prevent water or other liquids entering the cargo space during loading and throughout the voyage.

Group B cargoes (cargoes with chemical hazards)

Group B cargoes are classified in two ways within the Code: 'Dangerous goods in solid form in bulk' (under the IMDG Code, Classes 4-9); and 'Materials hazardous only in bulk' (MHB). MHB cargoes are materials which possess chemical hazards when transported in bulk that do not meet the criteria for inclusion in the IMDG classes. They present significant risks when carried in bulk and require special precautions.

Examples of Group B cargoes and the risks they present

The major risks associated with this group are fire, explosion, release of toxic gas and corrosion.
Coal: Coal may create flammable atmospheres, heat spontaneously, deplete oxygen concentration and corrode metal structures. Some types of coal can produce carbon monoxide or methane.
Direct reduced iron: DRI may react with water and air to produce hydrogen and heat. The heat produced may cause ignition. Oxygen in enclosed spaces may also be depleted.
Metal sulphide concentrates: Some sulphide concentrates are prone to oxidation and have a tendency to self-heat, leading to oxygen depletion and emission of toxic fumes. Metal sulphide concentrates may present corrosion problems.
Ammonium nitrate-based fertilisers: If heated, contaminated or closely confined, these fertilisers can explode or decompose to release toxic fumes and gases.
Wood products transported in bulk: Wood products include logs, pulpwood, sawn logs and timber. They may cause oxygen depletion and increase carbon dioxide in the cargo space and adjacent spaces.

Typical requirements for accepting and loading Group B cargoes

To carry dangerous goods in solid form in bulk, your ship must have a Document of Compliance for the Carriage of Dangerous Goods, supplied by the ship's flag or classification society. The Master must have a special list, manifest or stowage plan identifying the cargo's location, and there must be instructions on board for emergency response.
Segregation: Because of their potential hazards,

Coal on fire in a cargo hold

many Group B cargoes are incompatible and must be segregated. When segregating cargoes, you should take into account any secondary risks they present.

Precautions: The following are some of the common risk mitigation measures you will employ.

Fire and explosion: Ventilate or inert the cargo holds and the enclosed spaces adjacent to the holds. The atmosphere in the cargo holds and the enclosed spaces adjacent to the holds may also need to be monitored with an appropriate gas detector.

Toxic gas: Toxic gas risks will be mitigated using natural or forced mechanical ventilation.

Corrosion: Corrosion can be caused by some Group B cargoes and their residues. A coating or barrier may need to be applied to the cargo space structures before loading. Before loading and unloading corrosive cargoes, make sure the cargo space is clean and dry.

Group C cargoes: Examples of Group C cargoes, their risks and mitigation measures

Iron ore and high density cargoes: These cargoes can be extremely dense and can overstress the tanktop. Make sure that their weight is evenly distributed during loading and during the voyage so that the tanktop is not overstressed, and also consider trimming the cargo. Loading rates of iron ore are normally very high and you should also consider the ship's ballasting operations and loading sequences.

Sand and fine particle materials: Fine particle materials can be abrasive. Silica dust is easily inhaled and can result in respiratory disease. You should take appropriate precautions to protect machinery and accommodation spaces from the dust of sand and fine particle cargoes. People who may be exposed to cargo dust should wear goggles or other equivalent dust eye-protection, dust filter masks and protective clothing.

Cement: Cement may shift when aerated during loading. Dust can also be produced from this cargo. Follow the precautions for sand and fine particle materials above.

fire & explosion	overstressing ship structures	liquefaction	corrosion	cement
direct reduced iron	iron concentrate	fertiliser	nickel ore	iron ore
zinc concentrate	cargo shifting & loss of stability	timber	toxic gas release	sand

	Group A	Group B	Group C
Dangers			
Examples of cargo			

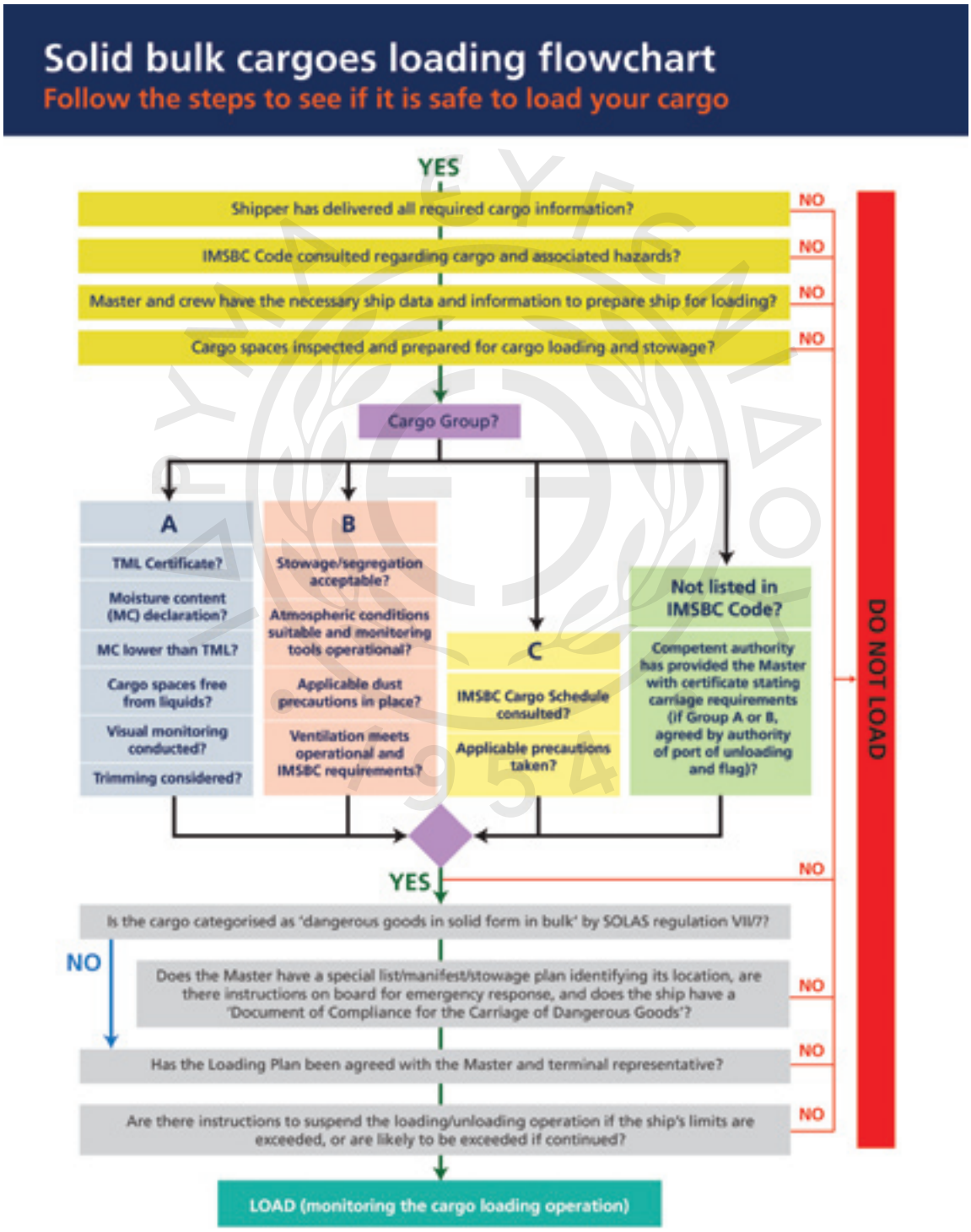
C. *Circle the correct one(s), A, B, or C.*

1. You need a gas meter for Group A - B - C cargoes.
2. You need an anti-corrosive coating for Group A - B - C cargoes.
3. You need a dust filter mask for Group A - B - C cargoes.
4. You need to know the exact moisture content for Group A - B - C cargoes.
5. Coal is Group A - B - C cargo.

D. ***Imagine you are talking to seafarers who are training on the IMSBC Code. Make a presentation using the flowchart below.***

Start like this:

Before accepting and loading a cargo, ask yourself the following questions:



E. *Study the IMSBC entry below and fill in the missing words in the summary sentences.*

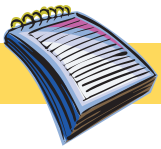
1. Trimming (even distribution of cargo) is important so that the _____ is not overstressed.
2. You need to stop loading operations of ferrosilicon when it _____.
3. In case of fire, you must use _____.
4. To clean the cargo spaces you must _____ them dry. If you use water, gas will be produced.
5. Check, in the relevant documentation, that the cargo has not been exposed to dry weather for less than _____ days prior to loading.
6. Make sure the cargo spaces are well _____ for a reasonable period before discharge.
7. You must use gas meters to measure _____ of flammable toxic gases in the cargo spaces.

In order to understand the provisions of carriage of dangerous goods in bulk, let's look at **ferrosilicon**. In the IMSBC Code Appendix 1 (Individual Schedules of Solid Bulk Cargoes) ferrosilicon is listed as:

BULK CARGO SHIPPING NAME: FERROSILICON UN 1408,
GROUP: B

The cargo schedule entry gives full details of Ferrosilicon UN 1408, its bulk density, its stowage factor, and then continues as follows:

Ferrosilicon UN 1408 *with 30% or more but less than 90% silicon (including briquettes)*
Description: Ferrosilicon is an extremely heavy cargo.
Hazard: In contact with moisture or water it may evolve hydrogen, a flammable gas which may form explosive mixtures with air and may, under similar circumstances, produce phosphine and arsine, which are highly toxic gases. This cargo is non-combustible or has a low fire-risk.
Stowage & Segregation: "Separated from" foodstuffs and all class 8 liquids.
Hold cleanliness: Clean and dry as relevant to the hazards of the cargo.
Weather precautions: This cargo shall be kept as dry as practicable before loading, during loading and during voyage. This cargo shall not be loaded during precipitation.
Loading: Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code. As the density of the cargo is extremely high, the tanktop may be overstressed unless the cargo is evenly spread across the tanktop to equalize the weight distribution.
Precautions: The manufacturer or the shipper shall provide the master with a certificate stating that, after manufacture, the cargo was stored under cover, but exposed to dry weather for not less than three days prior to shipment.
Ventilation: Continuous mechanical ventilation shall be conducted during the voyage for the cargo spaces carrying this cargo. If maintaining ventilation endangers the ship or the cargo, it may be interrupted unless there is a risk of explosion. In any case mechanical ventilation shall be maintained for a reasonable period prior to discharge.
Carriage: For quantitative measurements of hydrogen, phosphine and arsine, suitable detectors for each gas or combination of gases shall be on board while this cargo is carried. The detectors shall be of certified safe type for use in explosive atmosphere. The concentrations of these gases in the cargo spaces carrying this cargo shall be measured regularly, during voyage, and the results of the measurements shall be recorded and kept on board.
Clean-up: After discharge of this cargo, the cargo spaces shall be swept clean twice. Water shall not be used for cleaning cargo spaces which have contained this cargo, because of danger of gas.
Emergency procedures: wear self-contained breathing apparatus.
Emergency action in the event of fire: Batten down and use CO_2 if available. **Do not use water.**



Glossary

dilute	make a liquid thinner or weaker by adding water or another solvent in it; e.g. *Bleach can be diluted with cold water.*
compact	(verb) exert force on something to make it more dense, compress; e.g. *the soil may be compacted by iron oxide.*
concentrate	(noun) a substance that is made stronger because other substances (or water) have been removed; e.g. *Mineral concentrates are separated from waste rock by processing and filtering.*
deplete	reduce, lessen, or weaken, e.g. *oxygen is depleted in an enclosed space.*
decompose	(with reference to a chemical compound) break down or cause to break down into component elements or simpler constituents; e.g. *decompose water into hydrogen and oxygen*

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

- ☐ understand the requirements of ensuring safe carriage of dangerous goods
- ☐ demonstrate knowledge of the IMDG Code and IMSBC Code
- ☐ discuss regulations, standards and recommendations on the carriage of dangerous cargoes
- ☐ understand SMCP on handling dangerous goods

B. Class Project.

- A special booklet, issued by IMO, the so-called **International Bulk Chemical Code (IBC Code)** gives a listing of requirements for ships that carry noxious liquid substances. Present the code to class. What are the categories that it divides noxious liquid substances in, depending on their toxicity?

C. Fill in the gaps with the words in the box.

reaction	handled	inhaled	declaration
frameworks	substances	contaminated	comprehensive

1. The IMSBC Code requires a _____ from the shipper.
2. Regulatory _____, such as the IMDG Code and the UN Recommendations on the Transport of Dangerous Goods, incorporate _____ classification systems of hazards to provide a taxonomy of dangerous goods.
3. Explosives are materials or items which have the ability to rapidly ignite and explode as a consequence of chemical _____.
4. Toxic substances are those which are liable either to cause death or serious injury, or to harm human health if swallowed, _____ or by skin contact.
5. _____ or articles are classified as 'dangerous goods' for sea shipment if they meet the criteria prescribed in the IMDG Code 9 classes.

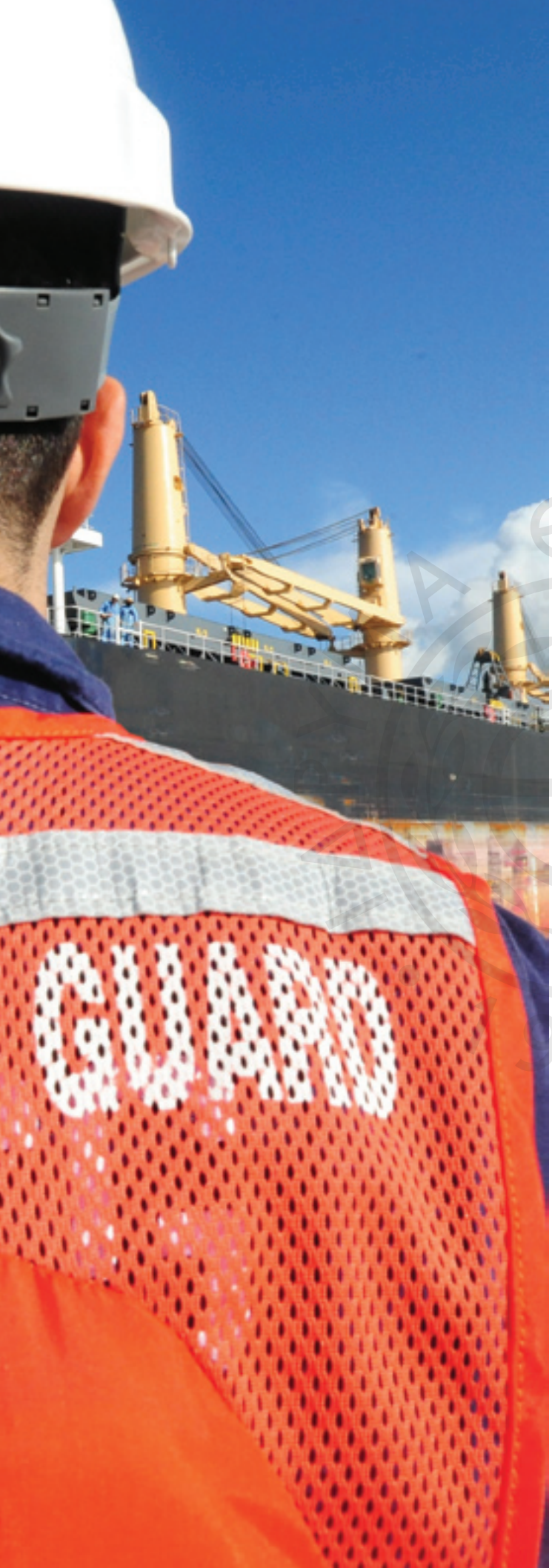
6. The way in which different classes of dangerous goods are _____ in transport depends upon their properties and hazards.
7. After a radiation quarantine at a Canadian port, hazmat teams verified that no leak was detected and no one was _____.

D. Do you remember the 9 classes of dangerous goods? Fill in the missing letters.

Class 1 E _ _ _ _ _ _ _ _ s
Class 2 G _ _ _ s
Class 3 Flammable l _ _ _ _ _ s
Class 4 Flammable s _ _ _ _ s
Class 5 O _ _ _ _ _ _ _ g substances and organic peroxides
Class 6 Toxic and I _ _ _ _ _ _ _ _ s substances
Class 7 Radioactive material
Class 8 C _ _ _ _ _ _ _ e substances
Class 9 M _ _ _ _ _ _ _ _ _ _ _ s dangerous substances and articles

E. Explain the following terms, based on what you have learned in this unit.

TML, Liquefaction, Cargo schedule, PSN, UN number



UNIT 15

Port State Control Inspections

1. *Paris MoU*
2. *Grounds for detention*
3. *Find the cause*
4. *ICT and shipping – What will the future bring?*

Round-up

1. Paris MoU

A. *Fill in the gaps with the words in the box.*

condition	applicable	operated	competency	requirements

Port State Control (PSC) is the inspection of foreign ships in other national ports by PSC officers (inspectors) for the purpose of verifying that the (1) _____ of the master and officers on board, and the (2) _____ of the ship and its equipment comply with the (3) _____ of international conventions (SOLAS, MARPOL, STCW, MLC) and that the vessel is manned and (4) _____ in compliance with (5) _____ international law.

B. *Read the information on Paris MoU and its work and answer the questions.*

1. Which countries are the members? Is USA a member of Paris MoU?
2. What is the difference between: Inspection, Inspection with deficiency, Detention, Banning?
3. What is the WGB list? What is it based on?
4. Have ship detentions increased or decreased in the past 3 years?

Paris MoU (Paris Memorandum of Understanding)

(information from www.parismou.org)

The ***organization*** consists of 27 participating maritime Administrations and covers the waters of the European coastal States and the North Atlantic basin from North America to Europe.

Its mission is to eliminate the operation of sub-standard ships through a harmonized system of port State control.

Annually more than 18,000 inspections take place on board foreign ships in the Paris MoU ports, ensuring that these ships meet international safety, security and environmental standards, and that crew members have adequate living and working conditions.

The ***basic principle*** is that the prime responsibility for compliance with the requirements laid down in the international maritime conventions lies with the shipowner/operator. Responsibility for ensuring such compliance remains with the flag State.

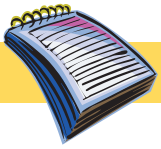
Who boards a ship to carry out port State control? A Port State Control Officer (PSCO) carries out port State control. The PSCO is a properly qualified person, authorized to carry out port State control inspections in accordance with the Paris MoU, by the Maritime Authority of the port State and acts under its responsibility.

Banning In accordance with section 4 of the Paris MoU, ships are banned after multiple detentions: these ships will be refused access to any port in the region of the Memorandum for a minimum period. Also, ships which jump detention or fail to call at an indicated repair yard are banned. Notwithstanding the provisions of section 4, access to a specific port may be permitted by the relevant authority of that port State in the event of force majeure or overriding safety considerations, or to reduce or minimize the risk of pollution.

White, Grey and Black List Each year a new White, Grey and Black list will be published in the Paris MoU Annual Report. The "White, Grey and Black (WGB) list" presents the full spectrum, from quality flags to flags with a poor performance that are considered high or very high risk. It is based on the total number of inspections and detentions over a 3-year rolling period for flags with at least 30 inspections in the period.

Paris MoU
on Port State Control

InfoGraphic Paris MoU region 2014



Glossary

force majeure	unexpected circumstances, such as war, that can be used as an excuse when they prevent somebody from fulfilling a contract, e.g. *The oil company declared force majeure and they are free from liability by delay in shipments*.
notwithstanding	in spite of, despite something, e.g. *Notwithstanding some major financial problems, the insurance company has had a successful year*.
overriding	more important than any other consideration, e.g. *The overriding concern was to keep costs low*.

C. *Listen to a PSCO for Paris MoU describing what inspectors check when boarding a vessel and fill in the missing words. The first letter is given.*

A PSCO is looking for proof that...

1. the vessel is maintained in a satisfactory condition at all times
2. there are no o_____ r_____ from port or flag state inspections
3. planned maintenance is being carried out and r_____ kept
4. applicable codes and g_____ are taken into consideration when operating the vessel
5. the crew is able to carry out operations in a c_____ manner, to utilize information contained in international codes, and to conduct drills
6. the vessel and company are ready to r_____ to emergency situations

D. *Listen to an introduction to PSC in Australia[1] and fill in the missing words in the table which shows what inspectors examine during an inspection and why.*

In order to ensure that...	*the inspectors check...*
the crew is not fatigued	rest hours, logbooks and operational records, and speak with watchkeepers
the vessel has proper life-saving appliances	lifeboats, liferafts, _____, launching arrangements, hook release systems
the vessel has operational fire-fighting systems	fire _____, fire pumps, fire _____, isolating valves
the vessel has appropriate environmental systems	engine room equipment, garbage _____ arrangements
the vessel can receive navigational, safety messages and calls of distress	onboard _____ equipment
the crew live in a healthy environment, that meets international standards	accommodation, catering, hospital, _____ spaces
the galley is in a good condition	food _____ areas and equipment, for the absence of vermin

1. Introduction to Port State Control in Australia, AMSA 2014, Ship Safety Division.

Relative clauses

In order to make clear who/what we are talking about or give additional information, we use relative clauses:

This is the inspector who inspected the vessel in Houston.
The inspector, who was Australian, was difficult to understand.
This is the deficiency which led to detention.
The deficiency, which was rectified on time, was a minor one.

Note: *For information on relative clauses go to page 398.*

E. ***Correct the mistakes in the following sentences, related to the use of pronouns and commas, adding or deleting as appropriately.***

1. This is the inspector who he wrote three observations.
2. The inspector who was Chinese, spoke English fluently.
3. The crew manager, whose his son is an intern in the International Law Institute, is writing me a letter of recommendation.
4. The fuel oil, which it was spilled overboard has evaporated.

2. Grounds for detention

A. ***Fill in the table with information about the cases. Decide which case goes in each column.***

Britain's Maritime and Coastguard Agency has announced that nine foreign flagged ships were under detention in UK ports during December 2012 after failing PSC inspection.

SOME OF THE SHIPS DETAINED IN DECEMBER 2012

Date and Place of detention: – 11 December 2012, Tyne
Vessel name: – OCEAN MORNING (Bulk Carrier)
Flag: – Panama, Classification Society: – Nippon Kaiji Kyokai (NKK)
Summary: – Eighteen deficiencies including one with grounds for detention.
The vessel was detained in Tyne as some deficiencies were marked as ISM, which demonstrates there was objective evidence of a serious failure, or lack of effectiveness of the implementation of the ISM Code. There were several fire related deficiencies identified, including there being a lack of control at the fire drill; the oil mist detector and two breathing apparatus sets were inoperative; the vessel was not complying with hot work permit as there was no extinguisher available; a fire main on board had a leak from a joint.
Other deficiencies identified included: there was a lack of control at the abandon ship drill; several pipes were corroded through and also had rubber patch repair on them. In the engine room, not all lights were working on escape. Number one hold tanktop was holed during cargo loading. The hours of rest for the Master and Chief Engineer were not as required.
The vessel was released on 18 December 2012.

Date and Place of detention: – 9 September 2011, Liverpool
Vessel Name: – DYCKBURG (Oil Tanker), Flag: – Antigua & Barbuda
Classification Society: – Lloyd's Register of Shipping (LR)
Summary: – Seventeen deficiencies including one with grounds for detention.
The vessel was detained in Liverpool because there were a large number of SOLAS related deficiencies which were objective evidence of a serious failure or lack of effectiveness of implementation of the ISM code on board the vessel. There was no evidence that the freefall lifeboat had been manoeuvred in the water within the last 3 months; also there was no evidence that the freefall lifeboat had been freefall launched within the last 6 months; in addition, the deck officer was not familiar with launching the starboard liferaft by davit.
Other deficiencies identified included: the main engine was defective; also the engine room was very oily in some areas; the five-year service on the immersion suit in the engine room had expired.
The vessel was still detained at 31 December 2012.

Date and Place of detention: – 8 November 2010, Birkenhead
Vessel Name: – MOST SKY (General Cargo), Flag: – Panama
Classification Society: – Russian Maritime Register of Shipping (RMRS)
Summary: – Twelve deficiencies including four with grounds for detention.
The vessel was detained in Birkenhead because the engine room was very dirty, there were fuel oil leaks and a major non-conformity was identified with respect to the lack of maintenance of the ship.
Other deficiencies include: the crew/officers' records of rest were not signed; the crew accommodation was no longer provided with steam heating; the galley needed cleaning; there was insufficient fruit and vegetables on board; the crew showers and toilets were dirty and the laundry washing facilities were inadequate. In addition, the lifejacket lights were out of date; the aft deck was slippery underneath the deck generator and several fire doors were tied open.
The vessel was still detained at 31 December 2012.

Vessel:			
Flag:			
Classification:			
Date of detention:			
Major non-conformity:	Related to lifeboat drills (SOLAS)	Related to lack of ship maintenance	Related to fire-fighting
Deficiencies:			

Expressing likelihood

When you are talking about possible situations, you can express how likely you think they are by using the following words:

unlikely, (very) likely

For example:

How likely is it for the ship to be detained?
It's unlikely, but not totally impossible, I suppose.

Here are some more ways to express likelihood:

- *The inspector wrote down three observations marked as ISM. It is* ***possible/certain*** *that the vessel will be detained.*
- ***It's pretty much inevitable*** *that freight rates will go up this year.*
- *I'm* ***probably*** *going to be away when you come back from your voyage.*
- *I'm* ***definitely*** *going to apply for the position of Safety and Quality Manager.*
- ***I guess there's a fifty per cent chance that*** *they'll say no to my suggestions on SMS updates.*

Expressing certainty/uncertainty

When you are stating what has happened or is going to happen, you can say how certain or uncertain you are about what you are saying:

- ***I'm sure/100% certain/absolutely positive*** *the company will continue to have a high safety record.*
- ***There's no doubt in my mind that*** *this was the best option. It's a pity they didn't accept it.*
- ***Without a doubt/No question,*** *we must organize additional training sessions on ISPS.*
- ***I'm not (at all) sure*** *my crew is adequately prepared for the inspection,* ***to be honest.***
- ***I rather doubt they'll*** *send a replacement in the next port of call.*

B. Choose the correct alternative.

1. We have a problem with the communication systems on board. The internet connection is down. I called the provider and they said it is ***might*** / ***most likely*** a problem with the antenna.
2. The electronic chart features are not displayed properly. This is ***probably*** / ***unlikely*** because the software we are using for ECDIS is outdated.
3. Look at this printout! The laser printer has smudged the documents, it ***likely*** / ***definitely*** needs a new toner.

C. You are informed that MV Mars, a container vessel, was detained. What was the deficiency that most probably led to detention? Use words that describe likelihood to say your opinion. Also, note that these are the most common cargo related deficiencies in container vessels.

1. Stowage/securing
2. Placarding and marking
3. Documentation
4. Segregation of cargo

e.g. What was the deficiency that most probably led to detention?
It was probably... I'm 100% certain it was due to...

D. ***Look at the following PSC findings and comment on each case separately. How likely is it for each vessel to be detained? Some answers are given as examples. Also, the Paris MoU statistics on the top 10 deficiencies given below will help you.***

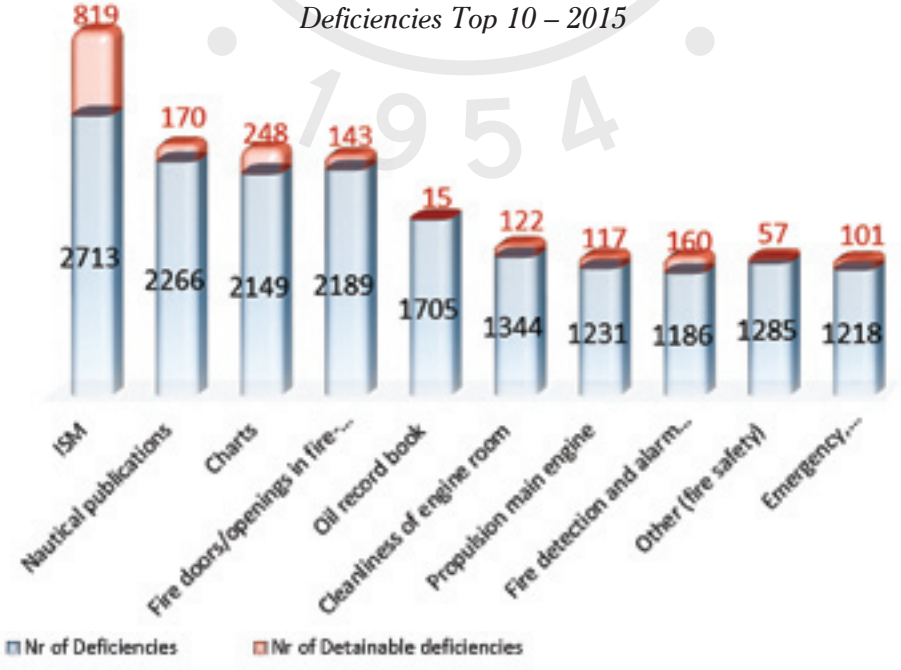
(MV LOBSTER) PSC finding:
Excessive oil leaking from the ship's service diesel generators and the main engine. The oil has coated the machinery and the condition of the Engine Room presents a significant fire hazard.
(MV SALT) PSC finding:
After 45 min of trying, the Chief Engineer was not able to prove proper operation of the OWS. He also could not provide manufacturer's manual. PSC verified 3 separate ways of by-passing the OWS and discharging water directly to sea.
(MV SAILOR) PSC finding:
Defects in MF/HF radio installation. MF/HF DSC was not connected to reserve source of energy; power from emergency batteries was not supplied due to a defective cable.

How likely is it for MV .... to be detained?

This ship will definitely be detained. Cleanliness in the engine room is one of the most common deficiencies and the fire hazard gives grounds for detention.

Oil filtering equipment is a very common deficiency, but I don't think it gives grounds for detention. The vessel is unlikely to be detained

Deficiencies Top 10 – 2015



1. ISM
2. Nautical Publications
3. Charts
4. Fire doors/openings
5. Oil Record Book
6. Cleanliness of engine room
7. Propulsion main engine
8. Fire detection & alarm systems
9. Fire safety
10. Emergency lighting, batteries & switches

3. Find the cause

A. ***Write a report where you deduce (draw conclusions on) the causes of a minor occupational accident on board.***

i. First read the 1st case in the table below.
ii. Then, read the 2nd case and keep notes regarding the cause of the incident, similar to those in the 1st case.
iii. Finally, expand your notes to write a report on the second case.

Case description	*Corrective actions taken / suggested*	*Root cause*
1. During repair works, the Apprentice Engineer injured his right hand while handling the grinding wheel. Also, his eyes were irritated from some steel particles / flakes. He was not wearing proper PPE, i.e. working gloves and safety goggles.	The EOW immediately interrupted the works and first aid was provided to the injured person. The incident was communicated to the entire engine crew for experience feedback purposes. Additional training to be provided in terms of proper PPE use according to company's safety procedures and Code of Safe Working Practices as well as regarding the correct use of machinery tools. The incident to be included in the next safety committee meeting for further analysis. Said App. Engineer, once he recovers from his injury, to perform safety rounds in the engine room area in order to identify similar omissions, if any.	– Failure to use PPE properly – Lack of experience – Lack of skill – Lack of training – Inadequate supervision – Lack of compliance with company safety procedures
2. While the fitter was working in E/R workshop repairing the air condition shaft, a small foreign metallic body entered his right eye. He was not wearing proper safety goggles.	First aid was provided to the injured fitter. Agent was notified to arrange transportation to a doctor for medical examination / treatment. The incident was communicated to shipboard personnel and the importance of using proper PPE at all times while on duty was stressed once more. Even when working in very confined and narrow space / area or perspiration impedes clear vision, safety goggles should not be removed but only for a few seconds when job is interrupted.	– .... – .... – .... – ....

Regarding the causes of the injury in the E/R workshop, one can note the following: The fitter failed to .....
.....
.....
.....
.....

B. ***What is the cause of passenger accidents on board? What are the most dangerous areas on board a cruise ship or ferry where a passenger may be injured?***

C. ***Find the words in the text that complete the glossary.***

Safe passenger environment

Guidance to Master, by Gard

Passenger vessels carry the most precious of cargoes, namely people. Passengers enjoying a holiday on board a vessel, whether a cruise vessel, ferry or cargo vessel, are exposed to an increased risk of personal injury due to

- less attention being paid to possible dangers due to the relaxed atmosphere
- increased alcohol consumption
- the movement of the vessel and an unfamiliar environment
- adverse weather conditions.

Not surprisingly, slips and falls as well as trapped fingers are the most common causes of claims on board passenger vessels. The sudden interruption of a holiday due to a personal injury is often accompanied by disappointment and discontent resulting in large claims, not only for the costs of medical care and treatment but also for pain and suffering. Claims for loss of enjoyment may also be brought in some jurisdictions, and national consumer legislation provides an ideal climate for such claims.

Accident prone areas and circumstances

Some specific areas where injuries to passengers are likely to occur include

- stairways
- lifts
- sliding or closing doors
- raised coamings
- areas with dimmed lighting such as bars and cinemas
- swimming pools
- areas adjacent to swimming pools and areas with slippery surfaces, such as open decks, particularly in adverse weather
- gangways and accommodation ladders
- cabin doors and bunk ladders.

Passengers are more likely to suffer injury in circumstances such as

- embarkation and disembarkation
- excursions
- sports activities on the vessel
- vessel movement in heavy weather causing loss of balance.

Glossary

_____ of great value, not to be treated carelessly
_____ unfavourable, negative, harmful
_____ dissatisfaction with one's circumstances; lack of contentment

_____ an area or country in which a particular system of laws has authority/a system of law courts

_____ tending to be involved in a greater than average number of accidents

D. ***Imagine you have been asked to give a short presentation on the possible causes of passenger accidents. Based on the information in the Guidance above, note down and present to class the possible causes.***

4. ICT and shipping - What will the future bring?

A. ***A group in the EU, including engineers from Rolls Royce, are working on a special project for merchant ships called "Maritime Unmanned Navigation through Intelligence Networks". What are they trying to develop? What are "autonomous ships"? Listen to find out.***

B. ***In your opinion, can there be "unmanned navigation" and "autonomous ships"? What are the benefits? What are the negative points? Is such a thing currently legally acceptable? What would the consequences be for seafarers? Discuss in class.***

C. ***Read an extract from a flyer that describes how advanced information technology finds application in remote ship management. Fill in the missing words.***

install	clicks	gain	repairs	troubleshoot	configurations

Remote/web-based access to shipboard systems[2]

Remote ship management enables users to connect to the ship's network and see a list of available IP-enabled devices. The IT engineer simply (1) _____ on the device to (2) _____ access to it and can change (3) _____, update operating systems, (4) _____ applications or make (5) _____ – all the sorts of IT maintenance that an engineer would previously do in person. Any IP-enabled device can be accessed, so the engineer can (6) _____ not just the ship's PCs, but also printers, scanners, or other IP devices.

2. se@REMOTE: "Breaking the barrier between ships and IT staff", in http://www.globecommsystems.com/pdf/crowley-maritime-case-study.pdf.

D. ***Read the following text and supply the correct title in the appropriate space. Do you agree with the writer about the role of ICT in the future of shipping? In what ways can ICT help make shipping more sustainable?***

A. Reduce fleet CO_2 emissions 60% below present levels	E. Lessons from history
B. Advanced modelling and simulation tools for ship design	F. Automation and remote control
C. Reduce fatality rates by 90% below present levels	G. Unmanned vessels – the trump card
D. Maintain or reduce the present freight cost levels	H. A positive effect on crew retention

ICT will make shipping safer, smarter and greener[3]

The pace of change in information and communication technology (ICT) will continue to accelerate. Advances in storage technology, computer processing, social media platforms and the ever-increasing number of products containing sensors and embedded software are some of the factors driving the change. A revolution in ICT will be an evolution in shipping industry. Over the next few decades, developments in ICT will heavily impact shipping by creating a more connected, integrated and efficient shipping industry. The shipping industry must set some long term aspirations for change to meet global safety and sustainability expectations:

- (1) _____ The current crew fatality rate in shipping is 10 times higher than industry workers in OECD countries. Seafarers have the right to a safe workplace and passengers have a right to safe transportation.
- (2) _____ If global targets are to limit temperature increase to 2 degrees Celsius, then the shipping industry should aspire to reduce their share of emissions at the same rate as other industry segments.
- (3) _____ Over the past decades shipping freight costs have steadily declined relative to the value of goods shipped. It is important that improving on safety and emissions does not increase freight costs and adversely impact the competitive position of the industry vis-à-vis other modes of transportation.

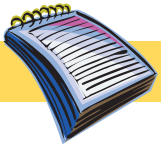
So, with these ambitions as a backdrop, how will ICT developments contribute to make shipping safer and more sustainable?

- (4) _____ Within this area, ICT developments allow for an increased use of automated systems to improve operational performance and reduce costs and risks associated with human error. Today sensors installed on ships have allowed for monitoring of certain operating parameters – a trend likely to apply to many more aspects, going forward. Shipping may also adopt technologies from oil and gas industry such as a system for remote operation and diagnostics. In subsea oil recovery there already are solutions installed for fully automated and remote controlled operations.
- (5) _____ This will help owners manage challenges related to technical issues, future energy prices, climate change, and existing and upcoming regulations. New computational capabilities will enable the development of advanced modelling and simulation tools for design and optimization of new hull designs, propulsion and complex machinery systems.
- (6) _____ Making broadband available on vessels significantly improves the lives of seafarers who can easily communicate with family and stay connected to world events.

3. Bjørn K. Haugland, DNV GL Sustainability, 24 Mar 2014, adapted and abridged.

(7) _____ With advanced ICT, vessels can be designed to be remotely operated from shore. The industry would benefit from lower operational costs, elimination of on-board crew cost and risk associated with human error and threats to crew safety. Unmanned ships are a potential game changer, they will revolutionize supply chain logistics and there will be no restriction on how much time a vessel can spend at sea, as there are no humans affected.

(8) _____ We are on the threshold of a fascinating future for the shipping industry – an industry that has shown the world how to adapt and change for centuries. The first transatlantic cable was laid in 1865. By 1897, there were 162,000 nautical miles of operational cable, with London at the center of the network. This network fundamentally transformed the shipping industry. While previously vessels would lie idle in port for weeks waiting for orders, the use of telegraph messaging now allowed voyages to be planned and optimized. Similarly, more innovative use of ICT will have a transformative effect on the economic aspects of the industry, along with driving safety and sustainability in the coming decades.



Glossary

aspiration	an ambition, or hope, of achieving something
vis-à-vis	as compared with
backdrop	a background or setting for
retention	the action of keeping something rather than losing it or stopping it
idle	not in use
trump card	a valuable resource that may be used, especially as a surprise, in order to gain an advantage

Round-up

A. Tick ☑ the goals you think you have achieved. The goals of this unit are for you to be able to do the following in English.

- ☐ present/deduce causes of events, such as onboard accidents for crew or passengers
- ☐ discuss the likelihood of events happening, such as the likelihood of ship detention after a PSC inspection based on particular deficiencies
- ☐ talk about potential problems with communication systems on board and their causehipping
- ☐ discuss the role of information and communication technology in shipping

B. Class Project.

- Access the ***annual reports*** on the Paris MoU site (www.parismou.org/publications-category/annual-reports) and find the most recent report. Present to class the *white, grey and black lists* of flag states and the *high/medium performance of registers*. Also, what are the *top five deficiencies* given? What is the rating for the *Greek flag*?
- Paris MoU undertakes the following ***types of inspection:*** *Initial Inspection, More Detailed inspection, Expanded inspection, Concentrated inspection campaign*. Find the relevant information on the Paris MoU site (www.parismou.org/inspections-risk/inspection-types) and explain in class what the different types of inspection entail.

C. Complete the missing words.

lookout	objective	grounds	implementation	inoperative	precious
adverse	seaworthiness	released	non-conformities	jurisdictions	discontent

1. After an inspection by PSC in the Port of Amsterdam, M/V Rio was detained due to major (1) _____ to SOLAS 74/78 that were noted. There were several deficiencies including some with (2) _____ for detention.
2. The deficiencies identified included: the main propulsion engine was (3) _____; the main sea water inlet pipework was cracked before an isolation valve; the crew did not report the engine and pipework failures to the relevant authorities; manning was not in accordance with Minimum Manning Safety Document, as the master was in custody ashore; there was no (4) _____ during the hours of darkness; the hull was damaged and impairing (5) _____; the ship sanitation certificate was not as required.
3. Due to deficiencies being marked as ISM, there was (6) _____ evidence of a serious failure, or lack of effectiveness of the (7) _____ of the ISM Code. The vessel will not be (8) _____ until the deficiencies are rectified.
4. There is widespread (9) _____ among the crew at the proposed changes to pay and conditions.
5. You are wasting (10) _____ time!
6. In some (11) _____ there is mandatory death sentence for murder.
7. The ship was refused traffic clearance and had to remain in port due to (12) _____ weather conditions.

D. Match to make collocations.

1. garbage _____
2. substandard _____
3. launching _____
4. overdue _____

ships
arrangements
recommendations
disposal

E. Choose which verb(s) can be used with each noun.

carry out	meet	rectify	detain	maintain	conduct

1. _____ an inspection
2. _____ safety standards
3. _____ a deficiency
4. _____ a drill
5. _____ a vessel

REVIEW 3

Units 11-15

1. SOPEP/Safety & security equipment
2. Ship motions and shifting cargo
3. The Prestige oil spill
4. The dangers of trasporting dangerous cargoes
5. Shipping and new technologies – Inspections

1. SOPEP / Safety & security equipment

A. Fill in the blanks with the words in the box.

importance	designated	plan	booms	emergency
accordance	contacted	response	incident	equirements

Shipboard Oil Pollution **(1) _____ (2) _____**

- When an oil pollution (3) _____ occurs or is likely to occur the ship follows the SOPEP, in (4) _____ with the requirements of MARPOL.
- The SOPEP lists the authorities or persons to be (5) _____ in the event of an oil pollution incident. The (6) _____ Person Ashore handles the matter on the part of the company.
- A Vessel (7) _____ Plan is available.
- In the US, the ship owner is required to have a contract with an approved Qualified Individual to assist in the co-ordination of shore response at the time of an oil spill.
- The contingency plan is discussed in a safety meeting.
- The Coastal State Authorities are notified and oil (8)_____ are rigged around the vessel by port authorities to restrict the extent of the pollution.
- For on-deck spills or minor over-side spills there are SOPEP oil spill response kits available on board. They contain the equipment you need to immediately fight the spill and gather the oil in buckets. It is of paramount (9)_____ that the bunkering operations are planned and executed as per Company's SMS and SOPEP (10)_____.

B. We will discuss three types of safety equipment onboard.

1. LIFEBOAT EQUIPMENT
2. OIL SPILL EQUIPMENT
3. ISPS EQUIPMENT

Divide yourselves in three groups. Each group picks one topic.
i. Give some examples of equipment regarding your topic.
ii. Which of the following words are related to the type of equipment you picked?

sawdust / security area / oil dispersant / close circuit surveillance cameras / fishing tackle / seasickness bag

iii. Find the equipment which belongs to your topic.

Name badge	Oil absorbent pad
Oil absorbent boom	Visitor logbook
Jack-knife	Bucket (plus disposable bags, gloves, absorbent booms, pads)
Storm lantern	Food ration
Waterproof matches	Handcuffs
Metal detector	Shovel, broom, squeegee

iv. Look at the pictures in the following diagrams. Write the name of the type of equipment (Lifeboat / Oil spill / ISPS Equipment) in the middle of the diagram. Then, give names for each picture by matching them with the words from exercise (iii) above.

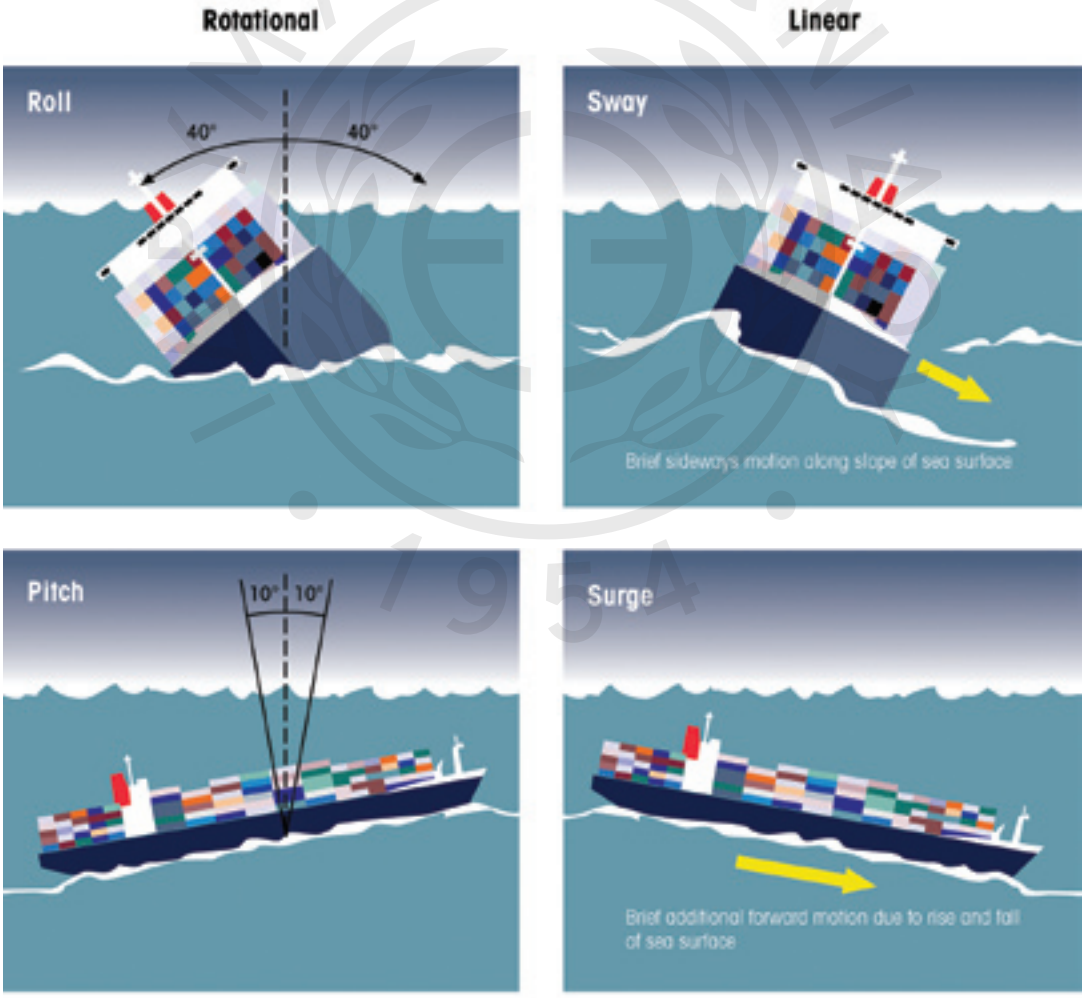
2. Ship motions and shifting cargo

A. Read the text, study the pictures and then give a definition of the ship motions, in your own words.

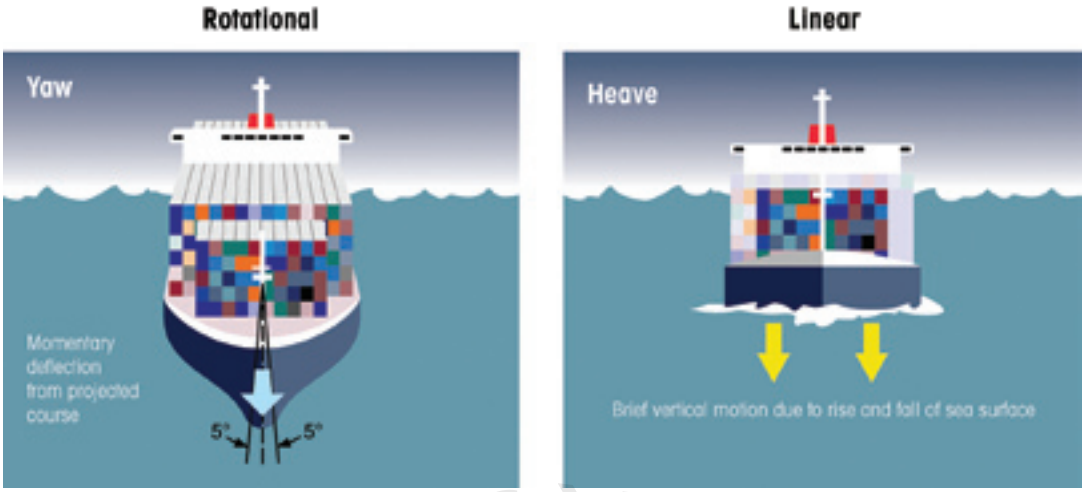
Ship motions and shifting cargo[1]

The incidence of cargo moving inside a container during transit is considerable and it creates serious risks to ships and the stability of container stacks. Although containerised cargo is well protected, it is still subject to the constant movement and stress of maritime transport. In heavy seas, the cargo is exposed to compressive forces due to pitching and rolling. These forces may increase the normal strain on lashings and other securing devices by as much as 100%. The forces acting in a seaway are rotational (**rolling, pitching, yawing**) and linear (**swaying, surging, heaving**). Calculations for securing against these forces follow a prescribed discipline and it is important to refer to this procedure when performing calculations. The recognised calculations are contained in the IMO Code of Safe Practice for Cargo Stowage and Securing (CSS Code).

Ship motions in a heavy seaway

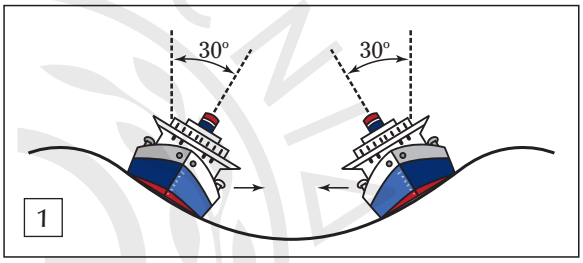


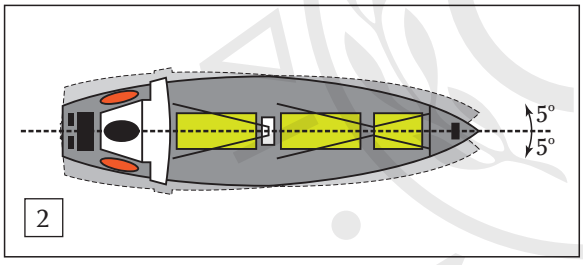
1. Safe Transport of Containers by Sea: Industry Guidance for Shippers, Nov. 2009, by ICS (International Chamber of Shipping) and WSC (World Shipping Council).

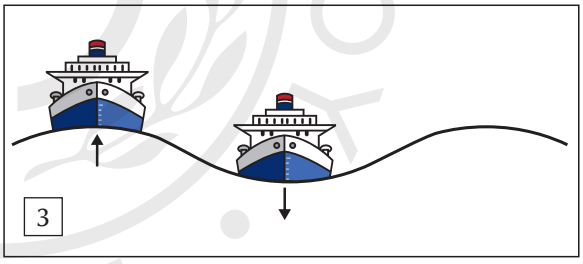


B. What are the ship motions shown in the pictures below? The sentences describe the ship motions in the pictures. Fill in the missing words.

1. _____ to 30° port and to 30° starboard, and _____ to port and to starboard, as each wave passes.
2. _____ 5° port and 5° starboard, as each wave passes.
3. _____ up and down as each wave passes.







3. The Prestige oil spill

*The following sentences summarize some facts in **the Prestige oil spill**. They are split in two parts. Match the two halves to recreate the summary sentences.*

1. The crew	☐ denied to the vessel in distress.
2. The pollution	☐ abandoned vessel by helicopter.
3. Port of refuge was	☐ broke in two.
4. The vessel	☐ recovered.
5. The pollution fund was	☐ blacklisted and not accepted in EU ports.
6. Substandard vessels are	☐ exceeded in this case.
7. The fuel trapped in the wreck was	☐ spread over a wide area in the Western Mediterranean.

Prestige, 13 November 2002

The incident

On 13 November 2002, the Bahamian oil tanker the Prestige sent out a distress call off the coast of Galicia (Spain). She was transporting 77,000 tonnes of heavy fuel oil from the terminals at Ventspills (Latvia) and Saint Petersburg (Russia) to Singapore. The crew was airlifted to safety and the vessel was taken in tow. After 6 days spent at sea in search of a port of refuge, the Prestige broke in two and sank in waters 3,500 m deep, 130 nautical miles off the coast of a region which had already experienced 2 major oil spills. The quantity of fuel oil spilled was estimated at less than 25,000 tonnes by Spanish specialists. This estimation was later increased to 64,000 tonnes.

Response

Unparalleled response operations at sea were able to take place thanks to the fact that the vessel was moved away. Despite the very high viscosity of the pollutant and the difficult sea conditions, 7 oil spill response vessels from 5 countries were able to carry out recovery operations off the coast of Galicia. From the end of December, the specialised vessels were supported at sea by an unprecedented mobilisation of fleets of fishing boats. In the estuaries, thousands of coastal fishermen and shellfish collectors helped with response to the spill, with their boats and makeshift recovery means.The joint action of specialised vessels and fishing boats resulted in the recovery of over 53,000 tonnes of emulsion containing nearly a third of the fuel oil spilled.

Impact

The fuel oil which was not recovered at sea began, over a period of weeks, to pollute several thousand kilometres of coastline, first in Spain, then in France, Portugal and as far as the Netherlands. Shortly after the incident, exclusion areas were set up in Galicia where fishing, shellfish collection and the sale of sea produce were banned along the shoreline. Later, these bans were gradually lifted, the last ones in October 2003. The summer tourist season was affected in all the areas hit by the pollution. Over 23,000 oiled birds were treated in rescue centres. Specialists estimated the total number of birds killed by the pollution at between 150,000 and 230,000.

The Wreck

The risk presented by the fuel trapped in the wreck of the Prestige could not be ignored. The volume of pollutant, the depth and the distance exceeded the realms of all previously experienced oil spills. An unrivalled recovery operation was studied, tested and carried out for the first time ever. Upon completion, on 30 September 2004, 13,600 tonnes of fuel had been recovered.

Compensation

In June 2006, the IOPC Funds annual report positioned the claims connected to the Prestige spill at 868 million Euros, of which 755 million were for Spain, 109 million for France and 4 million for Portugal. This amount far exceeded the available limit of 171 million Euros and payments were initially restricted to 15% of the amounts accepted, then later increased to 30%.

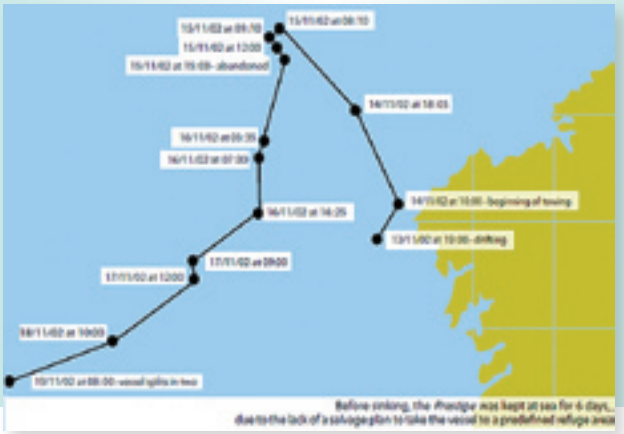
Cause of accident	Quantity transported	Pollutant	Quantity spilled	Waste collected	Length of coast polluted	Compensation claimed	Compensation awarded
Structural damage	77,000 t	Heavy fuel oil	64,000 t	170,000 t	2,000 km	868 million €*	57 million €*

Not on our shores!

The master of a vessel in difficulty will naturally request refuge from the coastal State. After the Prestige was denied refuge, Europe requested that all member States designate refuge areas where vessels in difficulty can be received. But who would possibly accept putting their local environment and their economy at risk by offering shelter to a disabled vessel vomiting pollutant?

In the event of a disaster, insurance only covers a small part of the damages and it often takes several years of out-of-court negotiations, or in some cases over a decade of legal proceedings, to eventually obtain only partial compensation.

As long as accepting a vessel in a refuge area does not lead to an automatic guarantee of rapid and complete compensation in the event of a disaster, the “Not on our shores!” attitude is highly likely to continue to prevail.



Before sinking, the *Prestige* was kept at sea for 6 days, due to the lack of a salvage plan to take the vessel to a predefined refuge area

Flags of convenience = rust buckets!

International maritime law is based on the principle of freedom. The open registration policy in force gives shipowners the right to register a vessel navigating in international woters under the flag of any country which complies with the rules established by the International Maritime Organization (IMO), without having to live or have possessions in the country. Eliminating open registration is not part of IMO’s agenda: statistics show that fleets flying flags often labelled ‘flags of convenience” do not all have particularly high accident rates. Furthermore, not all rust buckets fly flags of convenience.

To protect themselves from substandard vessels, the European countries have implemen-ted a coordinated defence policy through the exchange of black lists of vessels reported as substandard during port State control. The vessels in question are banned from European ports until the deficiencies are reported.

The different stakeholders and countries involved in the last voyage of the *Prestige*

4. The dangers of transporting dangerous cargoes

A. What happens to goods lost at sea[2]? Put the missing phrases in the numbered gaps.

On a stormy January night in 1992, out in the Pacific Ocean, 29,000 plastic yellow ducks, blue turtles and green frogs fell from a cargo ship and were lost at sea.

Since then, these durable plastic bath toys have been floating around the world, passing the site where the Titanic sank, landing in Japan, Alaska and Hawaii and even spending years frozen in an Arctic ice pack. Originally sealed in a 40-foot steel container, rough seas and huge waves knocked the bath toys overboard, along with several other containers that sank straight to the ocean floor.

Some estimates suggest that up to 10,000 containers fall into the ocean every year. The World Shipping Council, whose members represent 90% of the world's container ship capacity, say that figure is grossly exaggerated and estimate that on average no more than 350 containers are lost annually.

Approximately 90% of worldwide cargo travels by sea – **[1]**. Shipping containers have transformed global trade, easily moving between truck, train and ship. 183 million TEUs are moved globally by sea every year and at any one time, approximately 6.7 million containers are in transit.

Due to severe weather and high seas, accidents or incorrect stowage, there are now shipping containers littering the seabed all around the world. Many float on the surface for months, some rupture and release their goods, but most eventually sink to the bottom, creating deep-sea stepping stones between ports across the globe. Oceanographer Curt Ebbesmeyer says, "Usually container ships lose containers when the ship starts **[2]**. You have to imagine a couple of dozen containers falling overboard together, it's a violent episode". According to Peter Glover, Master Mariner, "There is no international convention which places an obligation on shipping companies to report losses of containers at sea." However, a report is required if the loss of the container presents a danger to navigation, or if discharge of the contents of the container is such that it **[3]**.

In June 2013, a five-year-old container ship, the *MOL Comfort* split apart off the coast of Yemen in heavy weather. There were no casualties but all 7,000 containers, reportedly carrying consumer electronics and clothes, were lost after the ship caught fire and subsequently sank - a catastrophic event that cost insurers **[4]**.

Over the years, a great wealth of unusual items has washed up on beaches around the world. In 2006, beachcombers scavenging the Outer Banks of North Carolina were greeted by thousands of sealed bags of Doritos tortilla chips that floated onto the beach, dry and still in an edible condition.

During a storm in 1990, a large wave washed 21 shipping containers into the North Pacific Ocean. 60,000 Nike shoes - en route from Korea to the US - splashed into the waves. Over the next year, hundreds of shoes - from hiking boots to children's shoes - were discovered on the beaches of western Vancouver Island, Washington and Oregon. Also, 34,000 hockey gloves and 5 million Lego pieces were dropped in the ocean some 16 years ago. But it is the plastic animals that have proved most valuable for scientific research of great ocean currents – **[5]**.

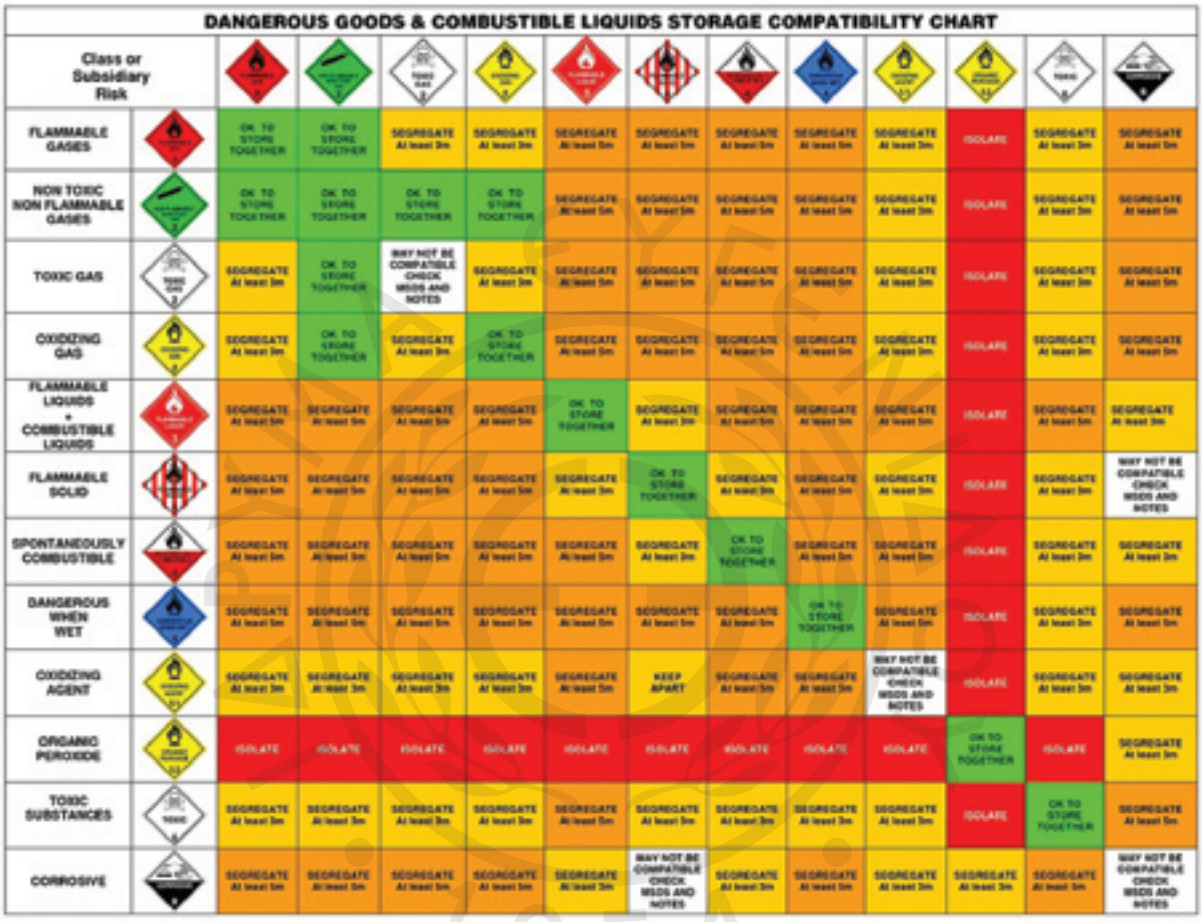
[ ] rolling side-to-side at more than a 55-degree angle	**[ ]** an overwhelming percentage	**[ ]** the so-called engine of the planet's climate	**[ ]** between $300-400 million in claims	**[ ]** breaches the MARPOL convention

29,000 rubber bath toys were lost at sea in 1992, and are still being found, revolutionizing our knowledge of Ocean Science

2. "Ducks overboard! What happens to goods lost at sea" by Olivia Yasukawa, CNN, 9 Oct 2013.

B. Dangerous Cargo compatibility table. Consult the table and answer the following questions.

1. You have two different types of goods in two containers, one is labelled as Class 2, oxidizing gas, and the other one is labelled as Class 6, toxic cargo. Can you store them together?
2. What is the space you must leave between Class 5.1 cargo and Class 3 cargo?
3. You have two containers labelled with Class 2, toxic gas. Can you store them together?
4. You have two containers labelled with Class 4, flammable solids. Can you store them together?



DANGEROUS GOODS & COMBUSTIBLE LIQUIDS STORAGE COMPATIBILITY CHART

Class or Subsidiary Risk													
FLAMMABLE GASES		OK TO STORE TOGETHER	OK TO STORE TOGETHER	SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	SEGREGATE At least 3m	ISOLATE	SEGREGATE At least 3m	SEGREGATE At least 5m
NON TOXIC NON FLAMMABLE GASES		OK TO STORE TOGETHER	OK TO STORE TOGETHER	OK TO STORE TOGETHER	OK TO STORE TOGETHER	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	ISOLATE	SEGREGATE At least 3m	SEGREGATE At least 5m
TOXIC GAS		SEGREGATE At least 3m	OK TO STORE TOGETHER	MAY NOT BE COMPATIBLE CHECK MSDS AND NOTES	SEGREGATE At least 3m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	SEGREGATE At least 3m	ISOLATE	SEGREGATE At least 3m	SEGREGATE At least 5m
OXIDIZING GAS		SEGREGATE At least 3m	OK TO STORE TOGETHER	SEGREGATE At least 3m	OK TO STORE TOGETHER	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	SEGREGATE At least 3m	ISOLATE	SEGREGATE At least 3m	SEGREGATE At least 5m
FLAMMABLE LIQUIDS + COMBUSTIBLE LIQUIDS		SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	OK TO STORE TOGETHER	SEGREGATE At least 3m	SEGREGATE At least 5m	SEGREGATE At least 3m	SEGREGATE At least 5m	ISOLATE	SEGREGATE At least 5m	SEGREGATE At least 3m
FLAMMABLE SOLID		SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	OK TO STORE TOGETHER	SEGREGATE At least 3m	SEGREGATE At least 5m	SEGREGATE At least 5m	ISOLATE	SEGREGATE At least 5m	MAY NOT BE COMPATIBLE CHECK MSDS AND NOTES
SPONTANEOUSLY COMBUSTIBLE		SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	OK TO STORE TOGETHER	SEGREGATE At least 5m	SEGREGATE At least 5m	ISOLATE	SEGREGATE At least 3m	SEGREGATE At least 5m
DANGEROUS WHEN WET		SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	SEGREGATE At least 5m	OK TO STORE TOGETHER	SEGREGATE At least 5m	ISOLATE	SEGREGATE At least 3m	SEGREGATE At least 5m
OXIDIZING AGENT		SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 5m	KEEP APART	SEGREGATE At least 5m	SEGREGATE At least 5m	MAY NOT BE COMPATIBLE CHECK MSDS AND NOTES	ISOLATE	SEGREGATE At least 3m	SEGREGATE At least 3m
ORGANIC PEROXIDE		ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	ISOLATE	OK TO STORE TOGETHER	ISOLATE	SEGREGATE At least 5m
TOXIC SUBSTANCES		SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 5m	ISOLATE	OK TO STORE TOGETHER	SEGREGATE At least 5m
CORROSIVE		SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 5m	SEGREGATE At least 3m	MAY NOT BE COMPATIBLE CHECK MSDS AND NOTES	SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 3m	SEGREGATE At least 3m	MAY NOT BE COMPATIBLE CHECK MSDS AND NOTES

C. Write the correct derivative of the words in capital letters.

What should you do if your vessel causes an oil spill?

1. If the authorities decide to conduct a criminal _____ [INVESTIGATE], seek advice from lawyers before responding to any questions. Make it clear to the authorities that you require a lawyer to be in _____ [ATTEND] during any interviews.
2. When pollution occurs, there should be full _____ [CO-OPERATE] with all contractors combating the spill.
3. Chemical _____ [DISPERSE] must not be used following an oil spill, unless and until there is _____ [APPROVE] by the local authorities.
4. If the spill was caused by damage to the vessel's structure, all relevant blueprints from the vessel plans should be readily available. An officer from the vessel should be assigned to the task of providing _____ [ASSIST] when necessary in interpreting them.
5. Keep a record of the approximate amount spilled, the _____ [PREVAIL] weather conditions and the operation during which pollution occurred, e.g. bunkering or cargo transfer.

D. Read the article[3] and fill in the missing words given in the box.

falsified	advent	bypass	outbound	accumulates	sewer
contaminated	sentenced	alerted	tampering	incinerated	impact

The "Magic pipe".

The M/V Snow Flower, a refrigerated container ship, was (1) _____ from Los Angeles when it began experiencing serious problems in the engine room.

A faulty valve had caused waste oil and water levels in the bilge holding tank to begin rising, while one of the ship's deep water ballast tanks had become badly (2) _____ with heavy fuel oil.

With no place to put the bilge water, crew members would later tell the Coast Guard, the chief engineer decided to partially pump out of the port and starboard holding tanks while bypassing a key pollution-control device.

"I need a magic pipe," he told a junior engineer. The crew, sweating in the hot engine room, rigged a pipe to a discharge valve. Then they began illegally pumping the oil and water directly overboard, mostly at night, as the Snow Flower continued on its voyage to Chile, and then to Gloucester Marine Terminal in New Jersey. By the time the ship reached New Jersey, the CG - (3)_____ by someone on board - was waiting. The Swedish shipping company that operates the Snow Flower, a ship registered in the Cook Islands, was hit with $1.4 million in fines after pleading guilty to the dumping cover-up by Snow Flower's engineers.

Many vessels use the ocean as an open (4) _____ to dump millions of gallons of waste oil when no one is looking. "There's no shortage of cases," said an official of the environmental crimes section for the U.S. Department of Justice. "From large cruise lines to the smallest operator, there's not a segment of the industry we have not come across." The prime incentive is money. Illegal dumping can save tens of thousands of dollars. One of the earliest cases brought by the government involved Royal Caribbean Cruises, whose ship Sovereign of the Seas was caught in 1994 pumping oily bilge waste off the coast of San Juan, Puerto Rico. Ship engineers (5) _____ records kept in the ship's Oil Record Book, which became known on board as the Eventyrbok -- Norwegian for "fairy tale book."

In another case, a Danish shipping company pleaded guilty to conspiracy to defraud the government by maintaining false records aboard its ship, the M/T Clipper Trojan. The company paid $3.25 million and agreed to retrofit some of its ships with new anti-pollution equipment. Meanwhile, the chief engineer was (6) _____ to five months in prison. He had rehearsed junior crew members so that they would tell investigators they had not done any illegal dumping.

Long-term damage.

The amount of oil illegally dumped by oceangoing ships has a far greater (7) _____ on the environment than accidental spills. Some estimates put shipboard waste-dumping at more than 88 million gallons a year - some eight times the amount of crude oil spilled when the Exxon Valdez hit a reef in Alaska 20 years ago. Sludge filtered out from the low-grade fuel burned by many ships is particularly bad for the environment. It is supposed to be (8) _____ or off-loaded in port. "It's almost like tar; that's what they are putting in the ocean," the federal prosecutor said.

The (9) _____ of separators.

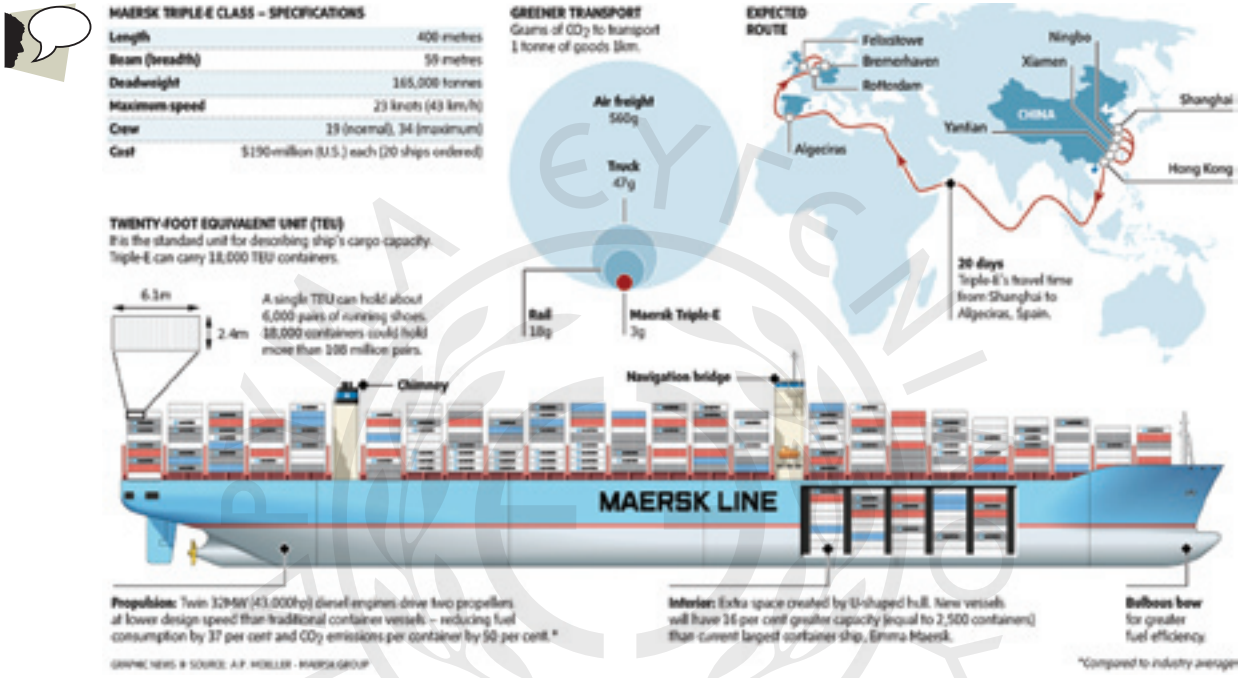
All ships leak oil. Lubricants ooze from gaskets and pumps, fuel may spill from lines, ongoing maintenance requires oil changes on machinery, and fuel oil burned in propulsion systems generates waste sludge when it is purified. Washed down with water - even rain from open hatches - it all finds its way down into the bilges, the lowest part of a ship.

Bilge water constantly (10) _____ in any vessel, depending on its age and upkeep, and eventually must be pumped out for the maintenance and ultimate safety of the ship. At one time, the practice was to simply dump the bilge waste overboard. But MARPOL, adopted in the 1970s, set standards for the amount of waste oil that could be routinely discharged. Ships were required to install a pollution-control device known as an oily water separator to treat the bilge water.

3. Abridged from "Sea-borne oil polluters", by Ted Sherman, New Jersey News, 17 May 2009.

The device does what its name implies: separates and filters the oil from the water so that the water can be pumped out of the ship. The oil goes into a holding tank for later disposal. However, the machinery is costly to monitor. Also, it is expensive to dispose of the waste oil on shore. For some ship engineers, it's just easier, or cheaper, to simply (11) _____ the oily water separator with a temporary pipe - a magic pipe, as it is known throughout the shipping industry, that is removed and hidden before the next U.S. port of call. USCG officials have seen all kinds of ways that ship engineers may try to conceal evidence of (12) _____ - despite the risk of losing their licence, paying millions of dollars in fines, even going to jail. "We look at bulkheads to see if there are marks. We look at the separator. We look for spare pipes with oil," they explain.

E. Green ships. Look at this ship. What makes it "green"?



F. Can the whistleblower practice, described below, be a successful way in reducing oily water dumping? What do whistleblowers risk, by becoming involved?

Illegal dumping and whistleblowers[4]

In the United States, according to a special provision in the Act to Prevent Pollution from Ships (33 U.S.C, Section 1908 a), individuals involved in reporting a violation that leads to a conviction are eligible to receive up to half of the fine paid by the company. It is estimated that ten to fifteen percent of commercial ships over 100 gross tons regularly break the law and intentionally dump oil into the seas. Whistleblowers are key to prosecution efforts. More than half of all MARPOL cases occur as a result of crewmembers alerting US authorities about illegal discharges or false records.

	Example No. 1	***Example No. 2***
Date	Aug 3, 2006	Dec 13, 2011
Award	Four whistleblowers shared an award of $2.5 million.	One whistleblower received $350,000.

4. Information on illegal dumping and whistleblower rewards from www.marinedefenders.com, The Marine Defenders Project by SUNY Maritime College.

The Crime	The company pled guilty to counts of obstruction of justice, false statements and violating the Act through the use of a so-called "magic pipe" to discharge sludge and oil-contaminated waste overboard from the M/V Atlantic Breeze.	Violation of the Act to Prevent Pollution from Ships; Failure to maintain an accurate oil record book.
The Penalty	The shipping company paid a $5 million criminal fine.	The shipping company paid a $2 million penalty.
The Report	Crewmembers on the M/V Atlantic Breeze, a car carrier vessel, sent a fax to an international seafarers' union that they were being ordered to engage in deliberate acts of pollution, including the discharge of oil-contaminated bilge waste and sludge as well as garbage and plastics.	A crewmember emailed a letter, photographs, and a video to the CG that showed the illegal discharge setup. Two pumps and two hoses appeared to be used to pump sludge, oily waste, and oily bilge water directly into the sea, bypassing the vessel's required pollution-prevention equipment. When the vessel arrived in New Orleans on April 18, 2011, CG personnel boarded the vessel and found the hoses depicted in the photographs and videos.

5. Shipping and new technologies – Inspections

A. Listen to an AMSA inspector talking about the typical stages of an inspection. What is the order in which the particular inspector checks the following things during an inspection? Write the correct number (1-5) in each box.

☐ Bridge (chart work/radio equipment)
☐ Certificates
☐ Deck (Battery room/dampers/ventilators/LSA)
☐ Accommodation (provisions)
☐ Engine room (OWS, Sewage treatment plant)

B. Imagine you kept the following summary notes after reading the text on shipping and technological change. Fill in the missing words. Then, read the text to find out if your choices were correct.

port	process	competition	conservative
transformation	double hulls	incentive	insurance

1. Shipowners have a low _____ to invest in energy efficiency technology.
2. Innovative ship design vessels cannot easily get _____.
3. Who/what pushes for change in the shipping industry?
   i. _____ (to reduce cost & increase performance)
   ii. regulation after major accidents, e.g. _____ – EXXON VALDEZ
   iii. regulation after public health and environmental problems, e.g. scrubbers – air pollution and cold-ironing – _____ pollution
4. Other industries, such as the car industry or the electric power industry, are on the front of pushing forward technological _____; the shipping industry, on the other hand, is more _____ and changes tend to be part of a slow _____.

Shipping and new technologies[5]

Vessel emissions of nitrous oxides (NOx) and sulphur (SOx), causing air pollution, estimated to be responsible for tens of thousands of deaths each year, could be virtually eliminated by technologies such as scrubbers and catalytic converters that have been mandatory in land-based industries for years, but are only now beginning to be advocated for shipping. Alternative fuels, including natural gas and biofuels, could provide further emissions savings, but these have also been slow to gain traction.

What delays the introduction of new technologies in the shipping sector?

Split incentives

If so many energy efficiency measures that can provide cost savings already exist, why haven't they already been implemented? One answer lies in the problem of split incentives. The shipping sector is a complex sector made up of many actors with different priorities: ships' owners, the yards where vessels are built, the manufacturers who supply components, the suppliers of fuel and cargo owners who charter the ships, each have different incentives and investment horizons. The issue can be illustrated by the area of house renting. In cases where landlords are responsible for a property's upkeep but tenants pay its energy bills, landlords have little financial incentive to invest in improvements that only benefit their tenants. Conversely, in situations where the landlord covers energy costs, tenants have little financial incentive to adopt energy-saving behaviours. Shipowners and charterers are analogous to the landlords and tenants in the example above. In cases where shipowners pay for fuel, such as voyage charters, liner operations and contracts of affreightment, owners have a strong incentive to invest in fuel efficiency measures for their vessels. Much more often, the benefit of the fuel savings goes to the charterer and shipowners' incentive to invest in energy efficiency technology is low.

Burden of proof on new technology.

Unlike many other sectors, new technologies in the shipping industry are guilty until proven innocent. Ships that do not comply with the International Maritime Organisation's (IMO) technology-specific regulations are ineligible for insurance, a significant financial deterrent for would-be front-runners who might otherwise consider trying out innovative ship designs.

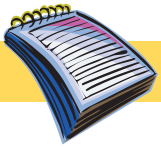
What drives transformation?

Over the past century, competition has been a primary driver of technological change in the shipping industry. The need to reduce costs and increase performance has driven the sector's major fuel and engine shifts to date. Regulation has also driven important technological change. Major accidents, such as the Exxon Valdez tanker spill in 1989, as well as persistent public health and environmental problems, such as air pollution in ports, have created pressure for the shift to technologies such as double hulls, scrubbers and all-electric (cold-ironing) ports.

Nevertheless, even in the presence of these drivers, transformation is a slow process in the shipping industry. Technological shifts such as containerisation or the introduction of double hulls on tankers took around 30 years from introduction to achieving a 90 to 100 per cent market share.

Why does transformation take so long?

The shipping industry has a reputation for being conservative when it comes to adopting new technology. Much of the innovation underlying transformative technology occurs outside the sector. For example, steam engines, hybrid propulsion and fuel cells all originated in the automotive and electric power industries and only later spread to ships.



Glossary

advocated	publicly supported
gain traction	gain popularity or acceptance

5. DNV GL: From technology to transformation, Høvik, 2014.

incentive	a thing that motivates or encourages someone to do something
conversely	in a way that is opposite or reverse of something
deterrent	a thing that discourages someone from doing something
front-runner	leading in a race or competition
drive	cause something to make progress or develop
persistent	continuing to exist over a prolonged period of time, (of an unpleasant situation) not stopping
cold-ironing	(or *shore connection* or *alternative maritime power)* the process of providing shoreside electrical power to a ship at berth while its main and auxiliary engines are turned off. Cold ironing permits emergency equipment, refrigeration, cooling, heating and lighting to receive continuous electrical power while the ship loads or unloads its cargo.

C. A USCG Commander gives an interview on what to expect from a USCG inspection. Fill in the missing numbers/words in the following advice on how to have a smooth inspection.

1. First of all, give _____ hours advanced notice to the National Vessel Movement Centre.
2. Don't forget that the inspection is a _____ process, not an adversarial one. Also, regardless of the port you are in, East or West Coast, it's a standard process.
3. Consult the _____ book, you can find it online, it lists the inspection criteria and the documents the USCG will need to check.
4. Also, it saves time if the vessel's _____ and Chief Officer are readily available.
5. Finally, be _____, don't try to hide any problems; rather, work with the USCG to fix them.

D. Idioms and everyday English terms coming from the sea.

There are many idioms that originated from the sea but eventually came to be used in everyday life. Listen to a radio interview about maritime metaphors and nautical terms that are used in general English. Circle the ones that are mentioned in the interview.

nautical term/ phrase	***idiom/meaning in general use***
1. make headway	make progress
2. watertight	(of an excuse, a plan, an argument) carefully prepared so that it contains no mistakes, faults or weaknesses
3. full steam ahead	with as much speed or energy as possible
4. smooth sailing	simple and free from trouble, easy and problem free (also *"plain sailing"* in British English)
5. weather a storm	wait until the situation improves again; come safely through a difficult period or experience
6. reach the end of your rope	having no patience or energy left to cope with something; to feel that you cannot deal with a difficult situation anymore (also, "*at the end of your tether"* in British English)
7. go overboard	(informal) to be too excited or enthusiastic about something or about doing something; to react in an immoderate way

8. safe harbour	a place of shelter and safety (figuratively); (in law, a rule that protects a company from being legally responsible for actions taken believing them to be right)
9. scuttle	deliberately cause (a plan) to fail ("*to scuttle a ship*"; sink your ship intentionally by making holes in it to prevent it from being taken by an enemy)
10. on the rocks	likely to fail soon due to difficulties
11. run afoul	to do something you are not allowed to do, especially breaking a rule or law; come into conflict with, go against
12. wake	*(in the wake of)* coming after or following somebody; in the aftermath of
13. high and dry	in a difficult situation, without help or money (literally) out of the water, stranded by the sea as it retreats; *"When the tide goes out, a lot of boats are left high and dry."*
14. even keel	*(on an even keel)*; living, working or happening in a calm way, with no sudden changes, especially after a difficult time
15. clean bill of health	a report which says that something is in a good condition or that somebody is healthy
16. leeway	the amount of freedom that you have to do something in the way you want to; flexibility
17. to be taken aback	to be shocked or surprised (by somebody/something)

E. The following sentences contain idioms with nautical terms and maritime metaphors. Fill in the correct words in the gaps. The list of nautical phrases above will help you.

1. How much _____ should parents give their children?
2. Business is now back on an even _____ after the union strike.
3. There have been demonstrations on the streets in the _____ of the recent bomb attack.
4. She has a(n) _____ alibi. Everybody is now convinced of her innocence.
5. The crew manager refuses to resign, intending to _____ the storm.
6. The cranes were given a _____ bill of health by the surveyor.
7. They pulled out of the deal at the last minute leaving us high and _____.
8. Companies which run _____ of the law face huge fines.
9. He was taken _____ by her directness.
10. I'm at the end of my _____ and I feel I can no longer cope with the offensive and aggressive behaviour of the Bosun.
11. Don't go _____ on fitness. Four times a week in the gym is enough.
12. Shareholders are threatening to _____ the deal.
13. I think their marriage is on the _____.
14. Try not to worry about your interview. I'm sure it will be smooth _____.

APPENDIX I
English for Marine Engineers

Part One

1. IMO SMCP: Briefing on special machinery events, main engine and auxiliary equipment operation

A. Lead-in: You are going to read about an incident. What type of incident is it? Choose the correct title. Then, think of the important points stressed in the text and discuss what lessons can be learned.

a) Blackout due to flooding in electrical equipment.
b) Engine room flooding during ballast operation.
c) Flooding due to ballast pump breakdown during maintenance.

During a ballast operation at night, while at a shipyard in order to trim the vessel for drydocking, it was discovered that the engine room was flooded. Damage to submerged electrical equipment occurred. Furthermore, the engine room had to be cleaned after the flooding. The vessel was alongside a shipyard for renewal hull survey. Some pipes and a main ballast pump had been dismantled for maintenance. The vessel needed to be ballasted, after midnight, in order to be trimmed for entering into the drydock. The most probable cause of the flooding was lack of communication between the deck side and the engine room and lack of adherence to proper procedures regarding the sounding of alarms. Investigations afterwards revealed that during the ballasting, bilge alarms in the engine room sounded three times as follows:

- the engine room aft bilge alarm, then after some time
- the engine room forward bilge alarm, and sometimes later
- the sludge tank level alarm (this tank had been opened for cleaning and survey)

The watch keeper cancelled the alarms every time without physically going down into the engine room bottom floor to check. After some three hours the deck officer discovered that water level in the ballast tanks did not increase. It was finally discovered that the engine room was flooded by 2.5 m forward and 3 m aft[1].

The red arrow shows the water level during flooding

B. Match the two halves to make full IMO Standard Marine Communication Phrases. Draw arrows.

1. There was a breakdown	to the alarm point.
2. Fill up the tank	the problems continue.
3. Call the watch engineer if	to operate an additional pump.
4. We require a further generator	of the main engine at 1200.

1. From officerofthewatch.com, 18 Jan 2013.

C. Fill in the missing words.

pitch	output	pressure	sounding	discharging	revolutions	temperature

1. Present _____ of the main engine are 100 per minute.
2. Present _____ of the main engine is 1.000 kilowatts
3. Present _____ of propeller is 90 degrees.
4. Do not exceed a minimum _____ of 20 degrees centrigrade.
5. Do not exceed a _____ of 4 bars.
6. Slop _____ is 2 metres.
7. We are _____ double bottom tank.

D. Fill in the missing prepositions.

at	above	with	due to	per	below	to	from

1. There are problems _____ the main engine.
2. There is no pumping _____ present.
3. Call the Chief Engineer if the revolutions of the main engine are _____ 90 _____ minute.
4. We transferred ballast water _____ number 2 tank _____ number 4 tank.
5. The temperature is too high, it is 20 degrees _____ normal.
6. There was a blackout at 1300 _____ the fact that the auxiliary generators stopped.

2. Bilge – Ballast system

A. Lead in: Check what you know. Circle the correct alternative.

1. What is a bilge?
   a) It is a space in the lowest part of the ship where unwanted water is gathered.
   b) It is a space on the main deck where rain water is collected.
   c) It is a space in the accommodation where dirty water is gathered.

2. What is the function of the bilge system?
   a) To run interchangeably with the ballast system.
   b) To pump all unwanted water (from any compartment of the ship) out of the ship.
   c) To help with fire fighting.

3. Which statement is correct?
   a) The bilge system is a safety compulsory system.
   b) The bilge system is a safety optional system.
   c) The bilge system is a non-safety system.

B. Read and check your answers above.

Bilge-line arrangement[2]

The bilge-line arrangement is an important safety system that is required by law. The purpose of the bilge line arrangement is to pump excess water out of the ship. Rules made up by governments and Classification Societies have to comply with international

2. from Ship Knowledge, 5th ed. 2008, pp 254-256.

SOLAS rules. SOLAS states that the bilge-line arrangement, the ballast-line arrangement and the fire-fighting arrangement must be three independent systems, each being capable of taking over the work of the other if necessary.

Small amounts of water can accumulate in the ship as a result of condensation, leakages of pipes, washing or rain. Condensation can occur when warm air hits a cold surface. In the most favourable circumstances the water flows down the sides into the bilge well and can be pumped overboard.

Bilge pumps keep the engine room dry. There are normally three systems. *First*, a small pump capable of dealing with the normal, small, daily quantities. This small pump pumps the dirty water (water and oil) into a bilge holding tank. From the tank, the water is pumped by another small pump through an oil-water separator overboard, only when it is sufficiently clean. If not, it goes to another storage tank, the sludge tank. *A second*, bigger pump, can pump the bilge water from the engine room straight overboard, but this is only allowed in emergencies. *A third* possibility is to use the direct suction of the main cooling water pumps, which has huge capacity for big leaks in emergencies.

C. Which words in the passage mean the following?

1. more than is acceptable or necessary: _____
2. obey a rule, an order: _____
3. gradually increase in quantity over a period of time: _____
4. the process of steam or warm air changing to liquid: _____

D. What does a bilge system consist of? Underline only the parts included in the system.

bilge pumps, non-return valves, mud box, condensers, bilge wells, two-way valves, main bilge line, ejector (eductor), deaerating tank, bilge water separator, suction lines, distribution valve chest (manifold), bilge holding tank (bilge water tank), drain cock

E. Read the following descriptions of the function of various parts of the bilge arrangement. Write the name of each part, using the words given in exercise D.

1. _____ A pumping device without moving parts (e.g. piston etc.) which is actuated by the high pressure of water flowing through it by the general service pump or the fire fighting pump. The high pressure of water creates a vacuum around the nozzle of the device, which causes the suction of bilge water. It discharges right overboard and it is generally used in emergencies. It is commonly called “gifari” after the French engineer Giffard who invented it.
2. _____ Pipe lines which run from the manifold to the compartments they are connected with, and from the manifold through the double bottom to the bilge well. Bilge water is suctioned through them, if we open the appropriate valve.
3. _____ A huge tank of about 50m^3 capacity where bilge water is pumped into, from the bilge well. It is divided into smaller compartments by vertical divisions which have holes. Dirt and waste partly settle down in the 1st compartment, while cleaner water passes through the holes into the next compartment and from there, through the separator, overboard.
4. _____ An appropriate box which contains valves, each of which controls the flow of bilge water from a bilge compartment or a bilge well.
5. _____ A valve which is controlled by a handwheel and a screwed spindle. When it is screwed down completely it stops the flow of water but when open, the water flows only one way, thus not allowing it to flow back to the bilge well.
6. _____ A cleaning apparatus which separates oil from bilge water before it is

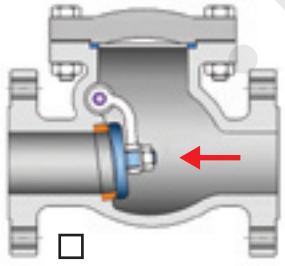
pumped overboard to prevent pollution. The residue of oil in the water that is pumped overboard must not exceed 15ppm, according to the MARPOL convention.

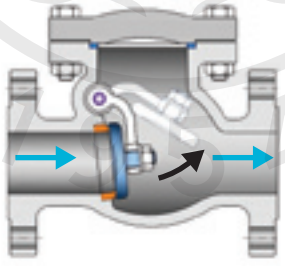
7. _____ A kind of filter on the suction line head which is a perforated basket, easily accessible and detachable, necessary to prevent ashes and other particles from entering the pumps and choking them.
8. _____ A pump which suctions bilge water from the bilge well and discharges into the bilge tank or overboard. It is a self-priming pump which means it doesn't need another pump to supply it with water for starting.
9. _____ A pipe line situated in the engine room. It runs from the manifold to the suction side of the pumps.

F. Can you identify what is shown in the following pictures? Use the titles given below.







1. BILGE PUMP
2. CENTRIFUGAL SEPARATOR
3. SMALL EJECTOR (or EDUCTOR)
4. VALVE CHEST
5. NON-RETURN (CHECK) VALVE
6. BILGE WELL
7. STRUM BOX

G. Match the two halves to make full sentences that give you some more facts about the bilge system.

1. Several suction lines are mounted ☐ so a non-return valve is placed in the suction line.
2. Suction lines are fitted with valves ☐ by the speed of the water flowing through it.

3. The liquid removed from a bilge well must not be allowed to flow back to it	☐ one in each corner of the hold and each provided with its own suction line to the main line.
4. The cargo holds are provided with four bilge wells,	☐ we choose which bilge well the water is collected in.
5. Depending on list and trim,	☐ to open or close them.
6. An ejector creates a vacuum	☐ on a manifold.

H. Read the text and answer the following questions.

1. Where is the bilge main situated?
2. What is the main bilge line connected with?
3. What do the suction lines suction from?
4. How do we control the suction from the bilge well?
5. What must there be on the suction heads to prevent choking of the bilge pumps?

The main bilge line is situated in the *engine room*. It runs from the *distribution chest (or manifold)* to the suction side of the *bilge pumps* or the *ejector*. The distribution chest contains the valves which control the flow of bilge water from a compartment. These valves are *screwed down non-return valves*. The suction lines run from the distribution chest to the compartments that they are connected with, and from the distribution chest down through the double bottom to the *bilge well*. Every well is connected to the distribution chest by a separate bilge line, so that we can operate the bilge lines from the manifold in the engine room. Both the main bilge line and the suction lines are made of galvanized steel.

All bilge suctions must be fitted with suitable *strainers* which in the machinery space are *mud boxes* (attached to the distribution chests) through which the water must pass on its way to the pump. These mud boxes contain perforated *strum plates* which can be removed for cleaning by taking out a detachable cover from the box. It is important for them to be easily accessible, that's why they are positioned at floor plate level. The bilge wells are usually situated at the fore and aft ends of the holds both on starboard and port sides because water flows to the lowest point in the hold. The bilge arrangement in the engine room also has an emergency system (to prevent flooding) which is compulsory and has its suction point at the lowest point in the engine room. This system must be connected to the suction line of the sea water cooling water pump or the general service pump.

I. Fill in the missing phrases that complete the text.

What is bilge?[3]

A bilge is the lowest space of the ship. It is the area where two sides of the ship meet. The corners of the lowest compartment of the ship constitute a bilge. You can see a bilge compartment if you go to any corner of the lowest platform of the engine room and peep beneath the floor plates. It's a space which is often filled up with an opaque black liquid.
These bilge compartments are also known as bilge wells, **…[1] ...** The depth and the number of bilge wells depend on the ship's size, its capacity and the amount of bilge it generates. A bilge well is the most important residual collection tank of the entire engine room.

3. "Bilge water storage, treatment and discharge" from www.brighthubengineering.com.

What is bilge water?

Bilge water is not exactly water but a mixture or variety of substances. It's a mixture of fresh water, sea water, oil, sludge, chemicals and various other fluids. So, where do all these substances come from? Sea water and fresh water can find their way to the bilge wells due to leakage in the pipe lines, leaky pump and valve glands, from the propulsion system, overflowing of tanks **…[2]…** All these substances get accumulated in the bilge wells and the mixture formed is known as bilge water.

A significant amount of sea water can seep into the bilge well if there is a leakage in the shaft gland or stuffing box. Sea water can also enter from leaky main sea chest valves. Fresh water from heat exchangers, fresh water generators and boilers often contribute to the filling of bilge wells. Oil finds its way to the bilge well mainly from the fuel oil purifiers, leakage in fuel line and oil spills.

It is a governmental law that any liquid which has oil particles suspended in it should not be discharged in the open sea. Bilge wells are helpful to store this contaminated water **…[3]…** If the bilge wells overflow it could cause a rise in the level of water up to or above the floor plates. This could lead to accidents, emergency situations **…[4]…** For this reason, bilge wells are periodically emptied by pumping out the bilge with the help of bilge pumps.

MARPOL states that bilge water cannot be directly pumped out into the sea. For this reason, bilge water is first passed through an Oily Water Separator where the level of suspended oil particles in the mixture is significantly brought down. When the PPM of oil particles in the mixture comes down to the permissible limit, it is allowed to be thrown overboard but only when the ship is en route.

Bilge wells are always provided with strainers **…[5]…** This is done to prevent choking in the oily water separator or bilge pump. Absence of strainers might lead to drop in bilge pump outlet pressure and also reduction in outlet flow of oily water separators.

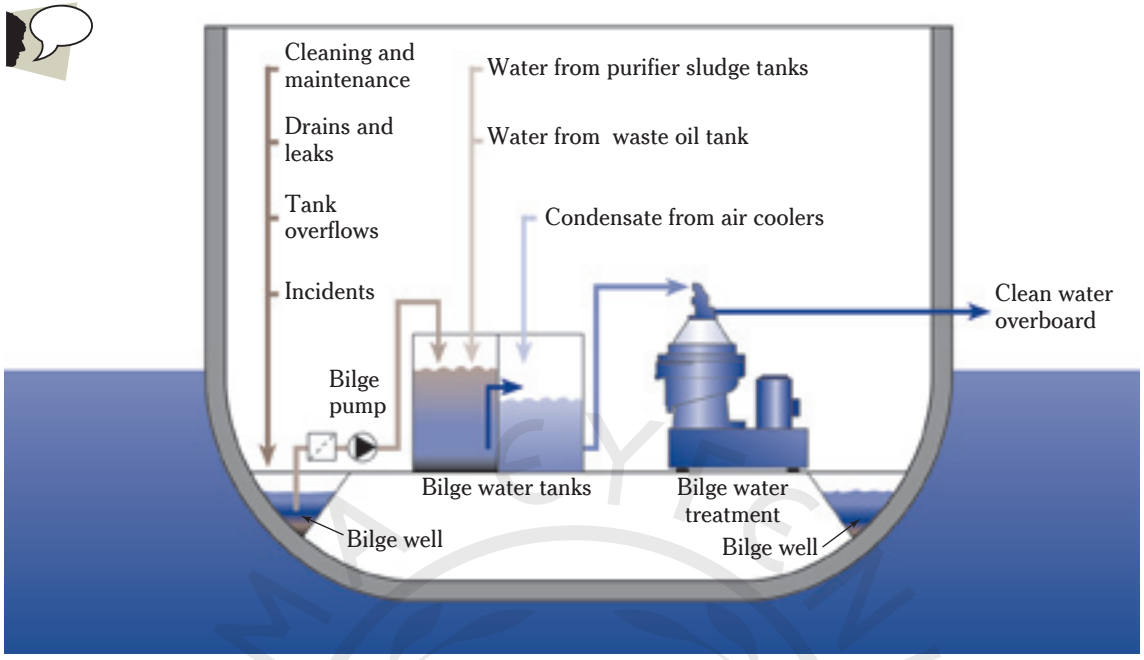
A bilge well has two compartments, separated by a bulkhead that extends half or three quarters of the height of the well. A lid with small holes covers the well. As soon as the water reaches a certain height, it flows to the well next to it. The suction part of the bilge line is situated in that part of the well. This suction side of the main cooling water pump has a free suction. In case of a major leak, this enables the large capacity of the cooling water pump to be used as an emergency bilge pump. This is called emergency suction. The valve is manually operated, **…[6]…**

- ☐ and even due to accidental spills
- ☐ but can sometimes be a threat to the engine room
- ☐ where all the bilge water gets accumulated
- ☐ or even disturbance in the stability of the ship
- ☐ to prevent solid particles from entering
- ☐ with a large-diameter red handwheel above the floor plates

Glossary

peep	look quickly at something, especially through a small opening
opaque	(of liquid) not clear enough to see through, not transparent
seep	flow or leak slowly through small holes, e.g. *Oil seeped from a crack in the pipe.*
be suspended	(of solid particles) be dispersed through the bulk of a liquid

J. Look at the following figure. What does it show? Explain the process it shows orally.



K. What is the difference in valve mountings between the bilge and ballast systems? Read the text to find out.

The ballast arrangement

The ballast system is used to pump seawater in or out of the ballast tanks. The rules for the ballast system are less stringent than the rules for bilge systems. Some reasons for taking ballast on board or shifting ballast once it is on board include:

- to improve stability of the ship, especially when the ship does not carry cargo
- to alter the trim
- to control the list during loading and discharge. Many ships use an anti-heeling system for this purpose
- to improve manoeuvrability

An anti-heeling system is used to minimize the list (in port). Pumps with large capacity (1000 m³/hour) are installed between two tanks (one port side and one starboard). These pumps can transfer water from one tank to the other at great speed. The system is fully automatic and much used on ships with cranes, container vessels and Ro-Ro vessels to reduce the list that can occur during cargo handling.

Fore and aft peak tanks, deep tanks, double bottom tanks, and wing tanks are usually used for ballast water, depending on the ship's type. Bulk carriers often use one of the holds for ballast, during a ballast voyage.

Contrary to the valves in the bilge arrangement, the valves in the ballast arrangement have to be two-way valves as the tanks must be able to be filled and emptied. Nowadays the ballast system is often designed as a ring line. Remote controlled valves are used to empty or fill the ballast tanks.

Combined or separate mains for suction and discharge may be provided. Where a tank or cargo space can be used for ballast or dry cargo, then either a ballast or bilge connection will be required. The system must therefore be arranged so that only the appropriate pipeline is in service; the other must be securely blanked or closed off. Where tanks are arranged for either oil or ballast, a change-over chest must be fitted in the pipeline so that only the ballast main or the oil transfer main is connected to the tank.

L. Fill in the gaps with the words in the box.

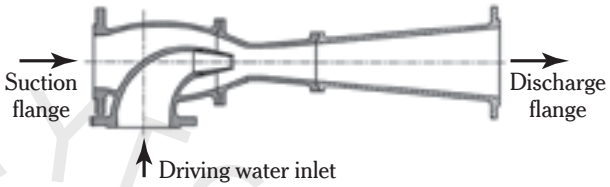
lubrication	flow	stabilize	self-priming	reliability	utilized	miscellaneous	design

Marine water ejectors

Ejectors are simple in (1) _____ and reliable in operation as they don't have movable parts like standard pumps. Since there are no moving parts, no (2) _____ is necessary and maintenance is minimal. Ejectors are (3) _____ and easily activated by simply turning on the (4) _____ of the driving water.

Due to their excellent suction capability and (5) _____, water ejectors are frequently used for marine applications such as:

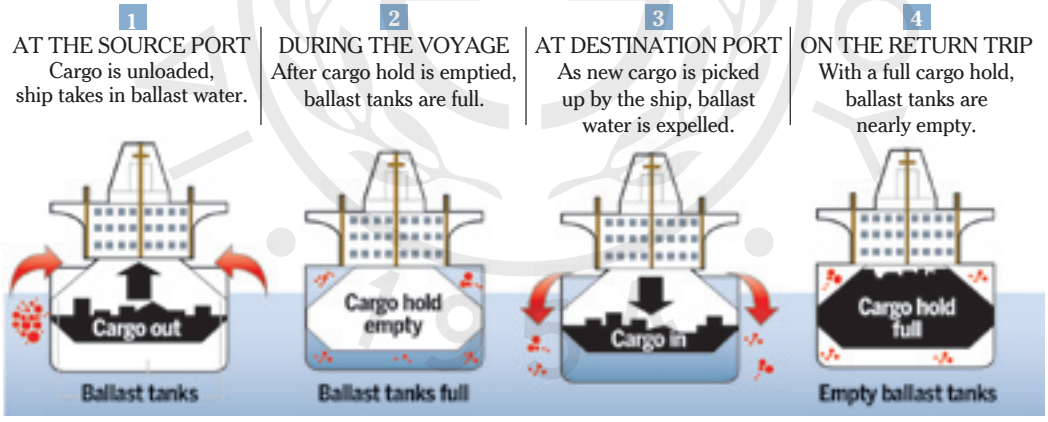
- Ballast stripping ejector.
- Bilge stripping ejector.
- Chain locker ejector.
- Sewage (black) water vacuum suction.
- (6) _____ other applications.



Their size can vary from 50 cm to more than a few metres, and their versatile application makes them a significant part of ship's engine room equipment.

The ballast pump out/pump in cycle

Ballast water is required to (7) _____ an empty ship in the open seas. The ballast tanks need to be filled or emptied quickly during the cargo unloading and cargo loading cycle of a ship. Ballast eductors can be efficiently (8) _____ to fill/empty ballast tanks quickly. Ballast eductors can save valuable energy and power, depending on the application.



3. Preparations of a DE for running / prior to arrival in port / after arrival in port

A. Lead in: Discuss the preparation of a Diesel Engine for running after a complete overhaul or an extended period out of running. What do you think is of greater importance during preparations of a Diesel Engine for running? Justify your answer.

Proper warming up? Engagement of turning gear?
Checking for leakages?

B. You will read instructions from a manual on preliminaries before starting up the engine. Decide whether the sentences below are True or False, according to the text.

1. Warm up the engine gradually using the circulating pumps to circulate the system.
2. Check all the levels of liquids in all tanks belonging to the engine. Check the cleanliness of cooling water and replenish all cooling systems. Check the suitability of lube oil in the sump tank and fill up with clean lubricating oil. Fill up the fuel oil service tank with purified fuel oil.
3. Check all shut off valves of all systems for correct position.
4. Check the ventings of the cooling water outlets for free passage, so as to allow the air to escape from the cooling spaces of the cylinder. The cooling spaces of the turbocharger and charge air coolers are to be vented too.
5. Make an examination inside the crankcase to make sure that no tools, cleaning rags, devices or guide bars have been left inside. These might later impede the motion of the running gear or obstruct any ducts or pipes.
6. Put in the turning gear. Start up all cooling water and lubricating oil pumps. Put the system under service pressure and check for leakages making tight any found. Check all components connected to the lubricating oil system for correct oil flow. Bar the engine over by means of the turning gear with the indicator cocks (valves) open and the control gear in the top position (=stop), to ascertain that nothing obstructs the movement of the running gear. At the same time operate the hand cranks of the cylinder lubricators to ensure satisfactory lubrication of the cylinders from the very beginning. If there are no leakages and you find everything correct, disengage the turning gear and secure it.
7. Pump up the starting air reservoirs to their maximum pressure and drain them of water. Also, drain the air-coolers, the scavenge (charge)-air receiver and the spaces underneath the piston undersides.
8. Prime the fuel oil system (fuel pumps, pipes and fuel injectors) using a priming (booster) pump. For this purpose open the vent cock on the fuel filter to allow the air escape through the fuel supply pipe. Then open the priming plugs on the fuel valves and raise the pressure. Check if the fuel emerges from the drain openings of the priming plugs without any accompanying air.
9. Finally, before putting on the staring air, check the reversing and control gear. Set the automatic starting air stop valve to "auto" position and close the vent cock on the starting air distribution pipe. Check water and oil pressures and report readiness of the engine to the bridge.

TRUE / FALSE	1. When you turn the engine with the turning gear the indicator cocks must be closed.
TRUE / FALSE	2. Turning the engine with the turning gear gives you the opportunity to make sure of the unobstructed movement of the crankshaft.
TRUE / FALSE	3. The movement of crankshaft is not influenced by the accidental presence of tools or bars in the crankcase.
TRUE / FALSE	4. When you put on the staring air, you must close the vent cocks of the system.

C. What do the following words of the text mean? Match to their synonyms.

1. replenish	☐ make sure
2. rags	☐ block
3. impede	☐ refill
4. obstruct	☐ come out
5. ascertain	☐ standing by
6. emerge	☐ cloths
7. readiness	☐ stop

D. Use the text in exercise B as a guide and work in pairs to write the appropriate preparatory work(s) that must be done for each engine component/system below. Use the actions given in the box (some actions are used twice). Examples are given, for help.

check for leaks	refill	check for correct functioning
drain of water	fill up	check for left over tools
check cleanliness	prime	check pressure
check for fitness	vent all outlets	open to make sure no water/oil/fuel has collected in the cylinder

1. cooling water ➡ check cleanliness – refill
2. cooling water system ➡ _____
3. lube-oil ➡ _____
4. lube-oil system ➡ _____
5. fuel oil system ➡ _____
6. starting air ➡ drain of water, refill, check pressure
7 air coolers & air receivers ➡ _____
8. crankcase ➡ _____
9. indicator cocks on the cylinder cover ➡ _____
10. reversing gear ➡ _____

N.B. Each time the engine is started up, unless it had been stopped only for a short interval during a manoeuvring period, the engine should be turned over by means of the turning gear and with the indicator cocks open for one full revolution, in order to make sure that nothing impedes the motion of the running gear.

E. You will read a starting-up checklist of a MAN B&W 2-stroke diesel engine. Fll in a suitable heading for each check point. Choose from the following headings. One is given as an example.

cylinders	direction of rotation	~~pressures and temperatures~~
exhaust valves	turbochargers	starting valves on cylinder covers
circulating oil	cylinder lubricators	

Check 1: .....

➥ Ensure that the direction of propeller rotation corresponds to the telegraph order.

Check 2: .....

➥ See that all exhaust valves are operating correctly. Disengage the lifting/rotation indicators after checking the functioning. Check that the slide valve spindles of the sealing air control units protrude through the covers to ensure sealing air supply.

Check 3: .....

➥ Ensure that all turbochargers are running.

Check 4: .....

➥ Check that the pressure and discharge are in order (main engine and turbochargers).

Check 5: .....

➥ Check that all cylinders are firing.

Check 6: .....

➥ Feel over the pipes. A hot pipe indicates leaking starting vlave.

Check 7: pressures and temperatures

➥ See that everything is normal for the engine speed. In particular: the circulating oil (bearing lubrication and piston cooling), camshaft lubricating oil (engines without Unilub), fuel oil, cooling water, scavenge air, and control and safety air.

Check 8: .....

➥ Make sure that the lubricators are working, and with an even "drop height" level in all the sight glasses.

F. Read the following document. It is a pre-departure checklist that the EOW has to fill in prior to the ship's sailing. Five preparations have been extracted from the list. Fill in an appropriate word in the blanks of the sentences below and then place them in an appropriate position in the list.

disengaged	astern	ready	permission	sufficiently	leakage

- Have indicator cocks been checked for water or oil _____?
- Is main engine warmed up through _____?
- Has bridge been notified that engine room is _____ for sea?
- Has turning gear been _____?
- Obtain _____ from the bridge to test main engine ahead and _____ on air.

	ENGINE ROOM PREPARATION FOR DEPARTURE CHECKLIST	*Checklist VOP-E-2*		
No.	**Preparation**	Yes	No	N/A
1				
2	Are minimum of two alternators running and in parallel?			
3	Are all main engine coolant and lube-oil sump levels correct?			
4	Are main engine lube-oil pumps and cooling water pumps running with stand-by pumps on auto start?			
5	Have steering gear tests been carried out in all modes and two motors left in use?			
6	Has main engine been turned on gear with indicator cocks open?			
7				
8	Has engine room clock been synchronized with bridge?			
9	Have engine room to bridge communications been tested?			
10	Has engine room telegraph been tested with bridge?			
11				
12				
13	Are air start compressors running and set on auto start (where applicable)?			
14	Are indicator cocks closed?			
15	Are air start bottles full and drained of water?			
16	Is power source available for mooring winches (steam, hydraulic or electrical)?			
17	Is air on deck air whistle?			
18				
19	Are both Bell and Log books available?			

- This checklist must be filled in prior to commencement of stand-by.
- The Engine Room Pre-Departure Checklist shall be completed by the Engineer of the Watch (EOW) prior to the vessel's sailing. On completion, an entry into the Engine Room Log Book shall be made stating: ALL CHECKS AS PER VOP-E-2 (Vessel Operating Procedures) CARRIED OUT
- In addition, all steering gear tests and checks carried out must be recorded in the Engine Room Log Book.

G. Fill in the missing prepositions [out, on, over, to, off, in].

1. Preparations prior _____ arrival in port.
2. Decide whether the harbour manoeuvres should be carried _____ on diesel oil or _____ heavy fuel oil. Change-_____ should be executed **one** hour before the first manoeuvres are expected.

3. Start an additional auxiliary engine _____ order to ensure a power reserve for the manoeuvres.
4. Make a reversing test (Fixed Pitch Propeller plants). This ensures that the starting valves blow _____ any condensed water from the starting air and control air systems just before the manoeuvres.

H. Complete the verbs.

What to do when a ship is about to arrive in port:

Some things to be done by the Duty Engineer on Receiving One-hour notice from the Bridge

1. I _ _ _ _ m Chief Engineer regarding arrival.
2. S _ _ _ t additional generator.
3. S _ _ p the steam turbine and shaft generator if fitted.
4. E _ _ _ _ e that power is available for deck machinery and bow thruster.
5. M _ _ e a visual inspection of the steering gear room.
6. C _ _ _ e the dampers for exhaust gas boiler and open bypass.
7. S _ _ t and l _ _ k sewage direct overboard discharge and start sewage plant or o _ _ n valve for sewage holding tank.
8. C _ _ _ _ e over to high sea suction from low sea suction.
9. D _ _ _ n the air receivers.

I. Fill in with the words in the box.

load	main	finished	activate	vent	manually	engage

Things to do after the ship has arrived in port:

1. When the "_____ with engine" order is given from the bridge, change over from bridge control to engine room control.
2. Stop additional running generator. However, make sure that the generator that is running is able to take all the _____.
3. Close _____ air starting valve.
4. Open indicator cock and turbocharger drain valve.
5. _____ turning gear and turn engine for 10 minutes.
6. Open _____ for exhaust gas boiler.
7. _____ the arrival program if UMS to stop the lube oil pump, cross head pump, shaft bearing and stern tube bearing pumps etc. or stop _____ in manned engine room.

4. Marine fuel oil/lube oil properties and standards

Lead-in: Look at the following concepts and terms related to fuel/lube oil specifications. Tick ☑ the ones you know and can explain what they mean.

☐ fuel properties	☐ impurities in fuel	☐ off-spec fuels
☐ catalytic fines	☐ fouling of gasways	☐ diesel-knock
☐ residual fuels	☐ BoB	☐ ISO 8217
☐ abrasive wear	☐ BN	☐ CCAI

You will read the fuel oil specification given by a marine diesel engine manufacturer as a guideline on purchasing fuels and lubes for an engine operating on Heavy Residual Fuels.

Residual marine fuel standards

			Category ISO-8217 (Class F)										
Characteristic	**Unit**	**Limit**	**RMA 30**	**RMB 30**	**RMD 80**	**RME 180**	**RMF 180**	**RMG 380**	**RMH 380**	**RMK 380**	**RMH 700**	**RMK 700**	**Test method reference**
Density at 15 °C	kg/m³	max.	960,0	975,0	980	991.0		991.0		1010.0	991.0	1010.0	ISO 3675 or ISO 12185 (see also 7.1)
Kinematic viscosity at 50 °C	mm²/s	max.	30,0		80.0	180.0		380.0			700.0		ISO 3104
Flash point	°C	min.	60		60	60		60			60		ISO 2719 (see also 7.2)
Pour point (upper)	°C	max.	0	24	30	30		30			30		ISO 3016
- winter quality		max.	6	24	30	30		30			30		ISO 3016
- summer quality													
Carbon residue	%(m/m)	max.	10		14	15	20	18	22		22		ISO 10370
Ash	%(m/m)	max.	0.10		0.10	0.10	0.15	0.15			0.15		ISO 6245
Water	%(v/v)	max.	0.5		0.5	0.5		0.5			0.5		ISO 3733
Sulphur	%(m/m)	max.	3.50		4.00	4.50		4.50			4.50		ISO 8754 or ISO 14596 (see also 7.3)
Vanadium	mg/kg	max.	150		350	200	500	300	600		600		ISO 14597 or IP 501 or IP 470 (see also 7.8
Total sediment potential	%(m/m)	max.	0.10		0.10	0.10		0.10			0.10		ISO 10307-2 (see also 7.6)
Aluminium + Silicon	mg/kg	max.	80		80	80		80			80		ISO 10478 or IP 501 or IP 470 (see also 7.9)
Used lubricating oil (ULO)		max.	The fuel shall be free of ULO										IP 501 or IP 470 (see 7.7)
- Zinc		max.	15										IP 501 or IP 500 (see 7.7)
- Phosphorus		max.	15										IP 501 or IP 470 (see 7.7)
- Calcium	mg/kg		30										

Parameters and Data[4]

Viscosity: Viscosity cannot be considered a quality criterion in its own right for fuel oils, and is stated only for handling reasons (pumps, preheaters and centrifuges).

Density: Density is related to the fuel quality because fuels derived from extensive refinery processing are left with a higher carbon content, are more aromatic and thus heavier. Therefore, fuels with a high density are also high in carbon residue. The water separation ability of the fuel oil is ensured by limiting the density for reasons of centrifuging, as stated in the specification.

Flash point: The flash point limit is set as a safeguard against fire only.

Pour point: The pour point indicates the minimum temperature at which the fuel should be stored and pumped. Temperatures below the pour point result in wax formation.

Sulphur: The corrosive effect of sulphuric acid during combustion is counteracted by adequate lube oils and temperature control of the combustion chamber walls.

4. Guidelines for Fuels and Lubes Purchasing Operation on Heavy Residual Fuels, MAN Diesel & Turbo, August 2014.

Carbon residue: Fuels with a high carbon residue content could cause fouling of the gasways, necessitating more frequent cleaning, especially of the turbocharger and exhaust gas boiler.

Water: Water in the fuel should be removed by centrifuging the fuel before use. This applies especially to salt water, the sodium content of which can result in deposits on valves and turbochargers. If the water cannot be removed online, homogenising after centrifuging is recommended.

Ash: Ash represents solid contaminants as well as metals bound in the fuel (e.g. vanadium and nickel). Part of the ash could be catalyst particles from the refining process. Catalyst particles are highly abrasive. Solid ash should be removed to the widest possible extent by centrifuging, and cleaning can be improved by installing a fine filter after the centrifuge (e.g. 50 µm).

Vanadium and sodium: Vanadium is bound in chemical complexes in the fuel and, consequently, cannot be removed. Vanadium deposits can be very hard, and may cause extensive damage to the turbocharger nozzle ring and turbine wheel. The only way to remove vanadium deposits is to disassemble the components and erase the deposits mechanically. Sodium is normally present in the fuel as a salt water contamination and may, as such, be removed by centrifuging. Sodium can also reach the engine in the form of airborne sea water mist. Vanadium, in combination with sodium, may lead to exhaust valve corrosion and turbocharger deposits.

Aluminium and silicon: The limit to aluminium and silicon has been introduced in order to restrict the content of catalytic fines, mainly Al2O3 and SiO2, in the oil. Catalytic fines give rise to abrasive wear, and their content should, therefore, be reduced as much as possible by centrifuging the fuel oil before it reaches the engine. It is recommended that the level of catalytic fines should not exceed 15 ppm after the centrifuge.

Ignition quality: Normally applied analytical data for fuel oil contain no direct indication of ignition quality, neither do current specifications and standards. Tests performed together with fuel analysing institutes can give indications of the ignition and combustion qualities of the different fuels. The tests present the Rate of Heat Release, and the test results reflect the differences in ignition and combustion properties of diesel engine fuels resulting from variations in the chemical composition of the fuels being tested. However, these test results do not reflect the functions of the actual combustion in the diesel engine, because the tests are conducted at different conditions/mechanisms than exist in the engine.

Centrifuging: Fuel oils should always be considered as contaminated upon delivery and should therefore be thoroughly cleaned to remove solid/liquid contaminants before use. Impurities in the fuel can cause damage to fuel pumps and fuel valves and deterioration of the exhaust valve seats. Also increased fouling of gasways and turbocharger blades could result from the use of inadequately cleaned fuel oil. To obtain optimum cleaning, it is of utmost importance that the centrifuge is operated with as low a fuel oil viscosity as possible and that the fuel oil is allowed to remain in the centrifuge bowl for as long as possible.

Homogenisers: Homogenisers are used to disperse any water and sludge remaining in the fuel after centrifuging. A homogenizer placed after the centrifuge will render fresh water harmless to the engine. It also is a means to deal with incompatibility problems. Both ultrasonic and mechanical homogenisers are available. Homogenisers installed before the fuel centrifuge can, when considering the full range of the ISO 8217 fuel specification, reduce the efficiency of the centrifuge and, thus, the cleanliness of the fuel delivered to the engine. The sodium will not be removed from the fuel in the form of salt water. The cat fines and other abrasive material might be split up into very small particles, which are difficult for the centrifuge to separate and which will still have a harmful wear effect on the engine components. Installation of homogenisers before the centrifuge is therefore not advisable.

Lube Oil Blending on Board: A new blending-on-board (BoB) concept makes it possible to add additives to the engine system oil and then utilise it as cylinder lube oil. By topping up the thereby used system oil, a steady renewal of the oil is ensured as well as improved viscosity control and

cleanliness. The oil suppliers get the advantage of supplying only one oil and a limited amount of additives. The traditionally consumed cylinder oil is replaced with the blended lube oil. Furthermore, the idea with the BoB concept is that the operator will ultimately be able to adjust the cylinder oil BN to the current fuel sulphur level by changing the blending ratio.

Contamination of system lube oil: Increase of BN (Base Number) and viscosity of the system lube oil during operation is unavoidable. The piston rod stuffing box separates the combustion and scavenge air spaces from the crankcase. Therefore, lube oil will not be severely contaminated with combustion products and used cylinder lube oil. However, some cylinder lube oil leaks through the stuffing box, down into the system lube oil sump. This is revealed by increasing BN and viscosity levels of the system lube oil. Normally, the increase will stop after some time and remains at a stable level when topping up with new system lube oil. Water may also contaminate system oil. Excess water levels may harm tin-aluminium bearings, for which reason it is recommended that the water level does not exceed 0,2%. In some cases, fuel has been seen leaking through the fuel pump umbrella sealings into the system oil. Fuel is known to form deposits on hot spots, i.e. in the piston undercrown space. It is therefore important to keep the recommended overhaul intervals on fuel pumps to secure that the pump packings/sealings are replaced.

A. Match the questions to the answers, according to the specifications and data above.

1. What problems can arise from unclean, uncentrifuged oil?
2. Are there standards for the ignition quality of fuel?
3. Why must you not place homogenizers before the centrifuge?
4. Which property must you know to protect the vessel from fire?
5. Which property indicates the temperature at which the fuel should be stored?
6. What causes fouling of the gasways?
7. Which solid particles are particularly responsible for abrasive wear?
8. How can you remove vanadium deposits from turbocharger nozzle ring?
9. How can you remove cat fines?
10. Which parameter is not actually a measurement of HFO quality?
11. Which fuel can cause combustion deposits, especially when the engines are running at low load?
12. What do engines designed for operation on high sulphur fuels use to minimize the effects of sulphur?
13. Which areas will suffer high wear if cat fines rates are not reduced?
14. What is the minimum temperature prescribed for use in marine power plants?
15. What is the lowest fuel temperature before wax is formed?
16. What can replace the traditional cylinder oil?

☐ Carbon residue.
☐ The flash point.
☐ Special lubricants.
☐ No, you just have some indications that you can take into account, depending on the particular engine and operation demands.
☐ By using a grinding tool (mechanically).
☐ Blended lube oil (engine system oil with additives).
☐ By centrifuging and a fine filter.
☐ Damage to fuel pumps and fuel valves, deterioration of exhaust valve seats, fouling of gasways and turbocharger blades.
☐ Because they reduce the efficiency of the centrifuge.
☐ The pour point. It is also important for pumping.
☐ Cat fines.
☐ Viscosity. But you need to be aware of it in order to set heaters correctly, prior to pumping, cleaning or treating the fuel oil, and before injection to the main engine.
☐ Fuel pumps and injectors, the liners and piston rings.
☐ Fuel oil with high carbon residue.
☐ 60°C
☐ 30°C

B. These are the parameters tested in fuel[5]. Match to the information regarding their function. Some are given as examples. Also, consult the table of fuel standards (p. 316) for help.

Viscosity	Sulphur	Density	~~Sediment~~	Elements	Carbon residue	Cat fines
Water	~~Ash~~	Flash point	Pour point	Acid number	~~Ignition properties~~	

1.	It is expressed in kilograms per cubic metre; it mainly affects the fuel separation.
2.	It is expressed in square millimetres per second (or Centistokes) at a stated temperature; it is a measure of a fuel's resistance to flow.
3.	It is expressed as per cent by volume; it may cause corrosion in the fuel system.
4.	It is expressed as per cent by weight; it indicates the coke-forming tendencies of a fuel.
5.	It contributes to air pollution; its compounds may corrode cylinder liners and piston rings.
6. Ash	It represents the incombustible components of fuel oil.
7. Sediment	It consists of hydrocarbon sludge and is contained in all fuels; it is a parameter (Total sediment potential) that is used to indicate and assess the stability and cleanliness of a fuel.
8.	Small particles of the catalyst (aluminium and silica oxides) used in the refining process and carried over into the residual fuel; they are porous, extremely hard, of irregular shape and abrasive in nature.
9.	Expressed in milligrams per kilogram or parts per million; metals, like ***vanadium, nickel, iron, sodium***; also, ***calcium, zinc*** and ***phosphorous***, which are indicators of used lube oil in the fuel, which may increase the particulate emission and the risk of exhaust gasway fouling.
10.	It is expressed in degrees centigrade; it must be known for safe transport and storage.
11. Ignition properties	A rough indicator of ignition quality; the Calculated Carbon Aromaticity Index is used as an indication, calculated on the basis of an empirical formula that includes density and viscosity, but might sometimes not be efficient for predicting the ignition quality.
12.	It is expressed in degrees centigrade; is max 30°C; the lowest temperature at which the fuel will flow; wax will form at lower temperatures; wax may block filters or deposit on heat exchangers.
13.	It detects all acids present; if it is elevated it may be an indicator of other harmful components.

5. Veritas Petroleum Services, Fuel Quality Testing, Power Plant Instruction Manual, 05 2015, www.v-p-s.com.

C. Look at the table on biofuel specifications[6] for two-stroke low speed diesel engines. Complete the missing words (the first letter is given).

Off-spec. Fuels

Several selected off-spec. fuels (i.e. beyond ISO 8217) have been tested on MAN B&W's two-stroke research engine (Natural gas / Bitumen / Orimulsion / Tallow). These are the specifications:

Two-stroke Low Speed Diesel Engines[1)]

Designation		
1. D ..... at 15°C	kg/m^3	1010
Kinematic **2.** ..... v at 10°C [2)]	cSt	55
3. F ..... point	°C	≥ 60
4. C	% (m/m)	22
Ash	% (m/m)	0.15
5. W	% (m/m)	1.0
6. S ..... [3)]	% (m/m)	5.0
7. V	ppm (m/m)	600
8. A ..... + Silicon	mg/kg	80
Sodium plus potassium	ppm (m/m)	200
Calcium	ppm (m/m)	200
Lead	ppm (m/m)	10
TAN (Total **9.** A ..... Number)	mg KOH/g [4)]	<25
SAN (Strong Acid Number)	mg KOH/g	0

1) Valid at inlet to centrifuge plant.
2) Pre-heating down to 15 cSt at engine inlet flange is to be ensured.
3) Lodene, phosphorus and sulphur content according to agreement with emission controls maker.
4) Experience shows that a high Total Acid Number has influence on the time between overhaul of the engine fuel system and, therefore, need to be adjusted accordingly.

D. Write the correct derivative of the word in capital letters.

1. You need to remove any _____ of deposits by vanadium as soon as possible. — FORM
2. You must make a _____ test to see if you can mix these lube oils. — COMPATIBLE
3. Sulphuric acid has a _____ effect. — CORROSION
4. There is a high _____ of ash and other solid contaminants which can only be removed through a fine filter. — ACCUMULATE
5. High _____ fuels have a high carbon residue content. — DENSE
6. They use _____ to improve lube oil quality and reduce the possibility of salt water contamination. — ADD

6. Guiding biofuel specification for MAN B&W.

E. You will read about an incident. Answer the following questions.

1. Was the HFO used suitable for the particular engine type?
2. Did the laboratory warn the Chief Engineer about any possible problems?
3. Why was there a failure of lubrication of pistons and liners?
4. What preventive actions could have been taken to adjust the engines? Make suggestions and discuss.

Main Engine Damage Due to Ignition Delay[7].

Course of Events.

In a Gulf of Mexico port, the vessel (a Panamax bulk carrier, built 1980) received heavy fuel oil IFO 180 according to ISO category RME 25 with a density of 989,6 kg/m^3 and a viscosity of 172 Cst. The bunker receipt information and the following DNVPS analysis coincide with respect to these parameters. Based on the density and viscosity information, the ignition qualities of this fuel (CCAI) were calculated to 860 which is acceptable for slow speed engines. The vessel is equipped with a 16-cylinder medium speed main engine of European design, and this fuel is on the limit of where operational problems could be expected for medium speed engines. As a result, the chief engineer on board and the ship management office were informed by DNVPS that precautions should be taken to ensure satisfactory combustion.

The chief engineer on board and the ship manager ashore did not pay any attention to the fuel analysis. They did not consider the specific recommendations issued by the engine maker or DNVPS's precautions for operating the main engine with fuel with inferior ignition characteristics.

To compound the problem, the vessel was sent to areas for trading, including days with river passage with variable loads on the main engine. This made it difficult to maintain maximum combustion temperature and thus made it virtually impossible to follow the operational recommendations. The delayed combustion resulted in increased combustion pressure, combustion close to the cylinder walls and the consequential failure of the lubrication of the pistons and liners.

Extent of the Damage.

The result was a complete breakdown of all pistons, cylinder liners and cylinder heads with related parts. Due to lack of availability of spare parts onboard ship, only preliminary repairs were made. Thus, the voyage to the discharge port was made at reduced speed. Meanwhile, the company had to make arrangements at the discharge port to acquire spare parts and make preparation for final repairs. The vessel was taken off-hire upon arrival at the discharge port. As a result the total cost to repair is approximately $530,000 USD and the total time off-hire is approximately 45 days.

Probable Cause.

The ship manager of the vessel made the error in believing that a lower viscosity fuel (180 Cst) was of better quality than a high viscosity fuel (380 Cst). This is commonly seen when a fuel supplier lowers the viscosity by adding lighter components that may seriously alter the ignition characteristics.

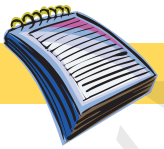
The ship manager had arranged for sampling and analysis of fuel. However, the ship manager had not ensured that their chief engineers were provided with proper procedures and instructions to take the necessary precautions against damage that could be incurred by inferior quality fuel. The result was that the vessel left the bunkering port with no preventive actions and precautions on how to deal with a situation with a fuel on board having inferior combustion characteristics.

7. In *Bunkers and bunkering*, a selection of articles published by Gard AS, Norwegian P&I Club, January 2014.

Lessons to be Learned.

The importance of fuel sampling and analysis is essential for verification of the quality of the fuel received on board. There is, however, little value in companies spending money on sampling and testing if shipboard engineers are not properly trained to understand the fuel quality analysis and provided with procedures and instructions on how to adjust the fuel equipment and engines accordingly. Procedures and instructions should be established in the technical or operational departments on how to:

- establish requirements for fuel quality depending on the fuel treatment equipment and engines on board
- follow-up the vessels' bunkering schedules, ensure correct sampling and where to send samples for analysis
- ensure the engineers on board and technical staff ashore will understand the analysis and the limitations for their equipment, and
- in the event of having taken on fuel of inadequate quality, establish communication with the engine makers and fuel analysing company in order for them to provide proper instructions to the vessel.



Glossary

coincide	to be the same or very similar, to be in agreement
compound	to make something bad become even worse by causing further damage or problems
off-hire	period of time during which a vessel under time charter is unable to meet the requirements agreed between the charterer and shipowner due to some reasons within the control of the latter; in this case, e.g. machinery breakdown, the charterer is not required to pay hire money

F. Read the following text and then answer the questions.

- What do you know about the fuel oil properties/contents highlighted in bold?
- How do they affect combustion/operation/wear?

Liquid gold – Fuel oil and lubricating oil[8]

Short story

One of the world's largest marine diesel engines burnt untested fuel containing ***"cat fines"*** (catalytic aluminium/silicon fines). In a few hours of operation, several years' wear and tear occurred in the new engine. An independent few hundred dollar test would have avoided this expensive claim.

Summary

Based on experience it can be said that excessive wear and tear, damage and salvage of vessels with broken down engines often relate back to basic problems with fuel oil and lube oil quality.

Bunkering: Golden Rules

Rule No. 1 Always order fuel according to the engine maker's recommendation, using the industry fuel oil standard ISO 8217. This requirement should be included in the charter party. For each fuel

8. By Lindsay Gordon, in Gard *Bunkers and bunkering*, 2014.

category within ISO 8217 the characteristics are given as maximum values with the exception of ***flash point*** and for this reason it is not sufficient to only refer to ISO 8217.

Rule No. 2 Check the supplier's paperwork to ensure that the delivery conforms in terms of quantity and specification with what has actually been ordered.

Rule No. 3 Whenever possible, place new bunkers into empty tanks. New fuel oil should not be used until analysis results have been received. Even when it is possible to do this, it is essential that the Chief Engineer carries out a compatibility test. Simple, cheap test kits are available.

Rule No. 4 Employ the services of an independent fuel analysis contractor, e.g., Lloyd's Register, FOBAS (Fuel Oil Bunker Analysis & Advisory Service), Det Norske Veritas – Veritas Petroleum Services. The cost is a few hundred dollars and test results are usually available within 36 hours. Regardless of whether the service of an independent fuel analysis contractor is utilised or not, the Chief Engineer should take a continuous drip sample at the manifold throughout the entire bunkering procedure. The equipment necessary to do this is relatively small cost compared with the cost of the bunkers.

Rule No. 5 The Chief Engineer should check that the bunkers to be loaded do not contain an unacceptable amount of ***water***. In the case of distillates, a simple test involving a dip tape and water finding paste can be used. For fuel oil this may not always be accurate and a water test kit can be used. The kit is cheap and simple to use. If the bunker supply is from barge, a Chief Engineer should be wary if the supply is continually being circulated in the barge tanks. The circulating process may be disguising a nasty cocktail!

Handling fuel oil

Heavy fuel (residuals and mixtures of residuals and distillate) must be purified in an efficient centrifuge before entering the service tank. There are several key points.

1. Ensure that the correct gravity disc is used.
2. Never exceed the flow rate recommended for the centrifuge for the grade of fuel in use. The lower the flow rate the better the efficiency. Consider using two or three centrifuges in series/parallel as purifier/clarifier.
3. Centrifuging is still recommended for the distillate fuels, MDO/MGO, as the fuel may be contaminated in the storage tanks.
4. Keep the fuel temperature about 10°C above the minimum storage temperature, to minimise the risk of wax formation and the temperature after the final heater 5°C to 10°C above the recommended fuel injection temperature to compensate for heat losses between heater and fuel injector.
5. The temperature at the purifier should be steady – a typical optimum temperature is 98°C. Temperatures at storage, settling and service tanks should be monitored at least twice daily. Overheating can degrade the fuel and result in cargo damage in holds.
6. The importance of operating the settling and service drain test cocks is often overlooked, particularly in unattended engine rooms. Twice a day is the minimum for this simple operation, which will reduce the risk of water or sludge entering the fuel system.
7. Fuel oil filters should be examined, say, every few days in service – even if the differential pressure gauges are normal. The reason for this is twofold. First, a filter will often allow fuel to pass even when partially choked. It can then suddenly choke completely. Second, although Class Rules require a standby filter to be available, difficulties have been encountered in changing over to the standby filter in an emergency situation, resulting in engine stoppage.
8. An automatic ***viscosity*** controller (viscometer) should be in proper working order to maintain correct viscosity of the fuel at the engine. Failure to do this can result in poor combustion and even damage.

NB: Viscosity in itself is not a measure of the quality of a fuel. Fuel oils having a high ***density*** in combination with low viscosity have low ignition quality. This can mean poor combustion and "diesel knock". Ignition quality can be calculated in terms of ***CCAI***. Typically, while not an exact tool for judging ignition quality, engines running at constant speed and load (over 50 per cent) can without difficulty use fuels with CCAI 870 (max). Engines running at variable speed and load can without difficulty use fuels with CCAI 860 (max).

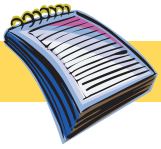
What can be done

1. If an independent analysis recommends that a fuel should not be burnt, do not do it! Place the supplier on notice, seek advice from your P&I Club and consider a port of refuge.
2. Excess water can be settled out with time and heat. Purify slowly. Check to see if contamination is saline – do not use the fuel if it is.
3. If a fuel has a poor compatibility rating, do not mix with any other fuel.
4. If "diesel knock" (high CCAI) occurs, ensure that engine and fuel temperatures are maintained. Do not advance ignition timing.
5. If problems occur, samples should be taken at various points in the fuel system, e.g. transfer pump, settling and service tanks, before/after purifier. It is also useful to take sludge or deposit samples at the purifier, filter, scavenge spaces and piston rings/crowns.

Lubricating oil

Many of the points discussed above regarding purifiers, filters, test cocks on storage tanks apply to lubricating oil. In addition, there are several key points to consider.

1. Ensure that the correct grade of oil is being used. Taking a lube oil sample at the purifier.
2. Lube oil is not technically clean when supplied and, inevitably, becomes dirty and contaminated in service. It should be purified constantly at sea. Water must not be added when centrifuging.
3. The oil should be heated to about 90°C at the centrifuge. Check with supplier.
4. Try and use only about 20 per cent of the rated flow capacity of the separator.
5. Check that the correct gravity disc is in use at the purifier.
6. Take samples for analysis about every 1,000 operating hours, to ensure safe engine operation. The sample (minimum 1 litre) should be taken with the engine in operation, after the oil filter on the engine. Provide the following details with the sample – name of vessel, date, installation, engine number, oil brand, engine operating hours, hours oil has been in use, where taken, type of fuel oil, other remarks.
7. If the water content of an oil charge exceeds 0.5 per cent to 1 per cent, and can not be removed by purification in service, change the complete charge and renovate. If problems are experienced, tell the analyst as various types of analysis are available.
8. In general, changes in the analyses provide a better idea of the condition and trends in the oil than the absolute values.
9. If the lube oil in an engine is suspect, pump contents up to an empty storage tank. Allow to settle, drain, take sample for analysis. Meanwhile, clean out sump tank, filters, etc., renew charge.



Glossary

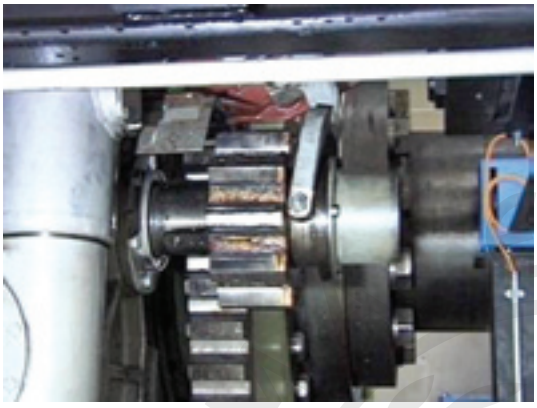
wary	careful when dealing with something/somebody because you think that there may be danger or problem; cautious
diesel knock	sharp metallic noise in diesel engine caused by high frequency pressure oscillations inside the cylinder due to abnormal (wrongly timed) combustion processes

G. Round up. Discuss the following questions.

- Which parameters are important lately because of environmental concerns?
- Which ones do not affect quality per se but need to be known for other reasons?
- Which fuel oil parameters are important because they affect engine wear?

5. Maintenance of Diesel engine (II)

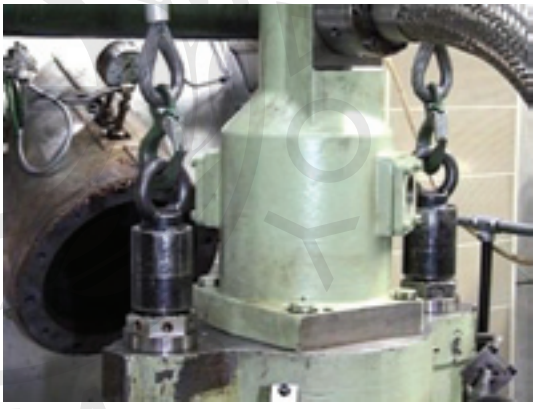
A. The following pictures show steps from* the piston removal *of a Sulzer RTA diesel engine for checking and maintenance. Read the explanatory notes for the actions that must be taken and use the phrases in bold to write the correct sentence as a title for each picture.



[1] .....

[2] .....

[3] .....



[4] .....

[5] .....

[6] .....

[7] .....

[8] .....

First, make the necessary preparations[9]:

- ***shut down engine*** and ***shut off start air***
- ***engage turning gear***
- ***remove cooling water and isolate fuel oil***
- ***disconnect air start branch pipe***

Then, ***remove cylinder cover studs***, after you slacken them using a tensioning jack and a hydraulic pump snap connector for the jack.

Next, ***attach a lifting tool to the cylinder head*** and ***lift the cylinder head***, using the engine crane. ***Place it in a safe position on blocks of wood*** to protect the seating faces.

At this stage, ***use a grinding tool to remove the wear ridge at the top of the liner,*** otherwise the piston rings will jam against the wear ridge as the piston is lifted. After you disconnect the piston rod from the crosshead, remove piston rod nuts and push stuffing box out of its housing.

Clean out the threaded holes in the piston crown with a tap using water to soften the carbon. Bolt on the lifting tool to the piston and attach the engine room crane.

Now, ***lift the piston*** from the engine and ***place the piston in the cradle*** ready for cleaning and examination.

B. Tick (☑) the two synonyms. Cross (☒) the odd one out.

1.	☐ disengage	☐ detach	☐ block
2.	☐ remove	☐ fix	☐ attach
3.	☐ settle	☐ slacken	☐ loosen
4.	☐ dismantle	☐ disassemble	☐ reconstruct
5.	☐ screw on	☐ untie	☐ bolt on
6.	☐ recondition	☐ recharge	☐ restore
7.	☐ reserve	☐ remove	☐ discard
8.	☐ raise	☐ lift	☐ submerge

9. Selection of pictures and information abridged from www.marinediesels.com.

C. Fill in the correct word(s) for each category. Three are given as an example.

~~Cooling system~~	Lubrication	Fuel system	Air intake system	Valves and heads
Operating systems	Emission systems	~~Exhaust system~~	~~Mechanical systems~~	

Maintenance categories

Marine diesel maintenance procedures can be grouped into nine broad categories:

1. _____ – checking levels; changing oil, oil filters; performing oil sampling to optimize oil change intervals and to detect engine wear.
2. _____ – changing fuel filters, fuel injectors; checking water separators; and doing fuel quality analysis to make sure fuel contains proper lubricants and additives.
3. Cooling system – fluid level checks; draining, flushing and refilling the system when required.
4. _____ – inspecting and changing air filters; inspecting the turbocharger to make sure there is no fouling of the compressor blades from crankcase gases.
5. Exhaust system – inspecting for leaks, corrosion, wet stacking.
6. _____ – inspecting, adjusting and recording of valve train wear and cylinder head wear.
7. _____ – inspecting crankcase ventilation systems, selective catalytic reduction (SCR) systems and diesel particulate filters (if so equipped).
8. Mechanical systems – inspecting resilient engine mounts and torsional couplings; general inspecting for leaks, wear or deterioration.
9. _____ – downloading data from digital engine management system (EMS) to note and review alarm conditions.

Wet stacking ("over-fueling"): a condition in diesel engines in which not all the fuel is burned and it passes on into the exhaust side of the turbocharger and on into the exhaust system. The word "stacking" comes from the term "stack" for exhaust pipe. The oily exhaust pipe is therefore a "wet stack". In diesel generators, it is usually because the diesel engine is running at only a small percentage of its capacity.

D. You will read a text on two vessels drydocked in KEPPEL shipyard, Singapore. Read about the drydocking works done to the particular vessels. Write an appropriate verb in the list below beside each part which was examined. One is given as an example.

SHIPS IN KEPPEL SHIPYARD

Ship name: **Bow Lion**
Ship type: Tanker
Deadweight tonnage: 40,272 dwt — Length × Beam: 170 × 32 metres
Manager: Mare Maritime Company S.A. — Country: Greece
Major Works
"Bow Lion" came to Keppel for major drydocking works. Its cargo tanks' internal surface was gritblasted and painted. The vessel's boiler was opened and cleaned while mounting valves and electrical motors were overhauled. For the main and auxiliary engines, its cylinders and pistons were dismantled and also overhauled. The switchboard controller was calibrated and an emergency towing arrangement was installed at the aft poop deck. Various pipes were also cropped and renewed.

Ship name: **Sea Trident**
Ship type: Bulk Carrier
Deadweight tonnage: 43,575 dwt Length × Beam: 189 × 31 metres
Manager: Argonaut Agencies Ltd Country: United Kingdom
Major Works
"Sea Trident" was in the yard for drydocking and general repair works. Ballast lines of double bottom tanks were cropped out and renewed. The cargo holds' internal surface was high pressure washed, gritblasted and painted. Its main engine piston rings and grooves were re-built while the air cooler was chemically cleaned and pressure tested. Five of "Sea Trident's" Macgregor hatch cover trackways and wheel assemblies were also repaired. The main engine's turbo charger, governor and fuel injector valve pump were overhauled. Its deck crane number one was also removed and repaired.

Bow Lion

1. The tanker's tanks gritblasted/painted
2. The boiler.....
3. The valves .....
4. The electrical motors .....
5. The pistons .....
6. The switch board controller .....
7. The damaged pipes.....

Sea Trident

1. The bulk carrier's holds.....
2. The ballast line.....
3. The piston rings grooves.....
4. The air cooler.....
5. The hatch covers' trackways..... .
6. No 1 crane.....
7. The turbocharger, governor and fuel injector .....

E. Match the following words, that are found in the text, to their explanations. Draw arrows.

calibrate	clean a surface using a jet of sand
gritblast	test instruments for accuracy and adjust them
trackway	cut off worn pieces, e.g. of pipes
crop	hatch cover's railings

F. You will read a text about the works carried out during the annual survey of the port boiler. Decide if the statements below are True or False.

Port Boiler Annual Survey: Works carried out

Removing 4 internal feed pipes, supplying 3 new feed pipes complete with **flanges**, perforating pipes as original pipes and fitting and jointing in position. Re-drilling perforation holes in 1 (one) existing feed pipe and refitting in place as originally.

Removing blowdown valve **chests**, opening up valve chests, machining valve **lids** and seats, reassembling valve, rejointing cover and packing glands and refitting valve chests to boiler shell. Checking safety valve **spindles** on lathe for truth, adjusting and refitting spindles.

Dismantling stop valve seat, supplying, **machining** and fitting new valve seat, machining valve lid and grinding-in valve lid to seat.

Removing gauge glass fittings, supplying new Klinger type fittings, and renewing glasses.

Machining auxiliary stop valve seat, machining valve and grinding-in valve lid to seat.

Fitting 8 new zinc plates.

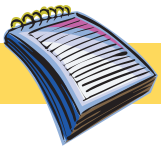
Removing, calibrating and refitting 2 (two) boiler pressure gauges.

Supplying 3 (three) new check valve lids, as spare.

15 (fifteen) common tubes expanded; 8 (eight) combustion stays **caulked**.

TRUE / FALSE	The feed pipes which were removed were all replaced with new ones which were drilled properly and fitted in position.
TRUE / FALSE	The safety valve spindle was checked, adjusted and refitted.
TRUE / FALSE	The blowdown valve chests were opened, the valves were properly overhauled and refitted in the valve chests and on the boiler casing.
TRUE / FALSE	The gauge glasses were renewed.
TRUE / FALSE	The auxiliary stop valve and its seat were both machined.
TRUE / FALSE	No spare parts were ordered.
TRUE / FALSE	Two removed boiler pressure gauges were measured for truth before being refitted in position again.
TRUE / FALSE	The boiler tubes and the combustion chamber stays were in good condition.

G. What do the words in bold in the text mean? Fill in the glossary.



Glossary

_____ to seal openings with a waterproof filler; also, to make a boat watertight by stopping up any gaps in its hull

_____ thin sheet of metal, rubber or leather used for sealing purposes between engine parts being in contact

_____ to take (a machine) apart so that it is in separate pieces

_____ valve stem

_____ valve cage

_____ valve head (mushroom)

_____ to lathe, recondition, repair

H. Fill in the sentences with an appropriate verb.

1. We **r _ _ _ _ _ _ d** two worn pipes with new ones.
2. We **r _ _ _ _ _ _ _ d** the holes of an old pipe.
3. We **d _ _ _ _ _ _ _ _ d** the stop valve, **g _ _ _ _ d** its seat with carborandium and **r _ _ _ _ _ _ d** in position again.
4. We **c _ _ _ _ _ _ _ _ d** two pressure gauges.
5. We **c _ _ _ _ _ d** some combustion stays of the boiler.

I.* SEALING ELEMENTS *There is a variety of sealing elements used in different parts of the engine to make them tight and prevent leakage of gases, steam, air and various liquids and fluids. The following is a list of the most common sealing elements. Match them to their usage below.

packing	joint	washer	gasket	O-rings	rubber rings	glands

	1. Flat round sealing element made of metal, wood, rubber, leather or fiber, used with bolts and screws in screwed connections.
	2. A seal which fills the space between two or more mating surfaces, generally to prevent leakage from or into the joined objects while under compression.
	3. Sealing element which joins two parts tightly, e.g. two pipes.
	4. Sealing material made of rubber or permanite or other material used to prevent leakages in stuffing boxes, pumps and other parts.
	5. Flexible rings used in rounded parts of the main engine or auxiliary machinery (such as circumferentially in the external grooves of the cylinder liner) to seal them against leakages.
	6. Sealing elements used for tightening packings in the various parts of the engine, e.g. stuffing box as well as in pumps.
	7. Sealing rings usually made of reinforced caoutchouc.

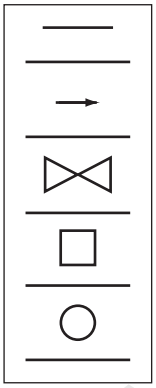
pipe expansion joint

O-rings

braided packing

6. Review to Part One *(Consolidation and expansion)*

A. Symbols for piping on technical diagrams[10]. Draw arrows to match.



Valves, cocks and flaps

Pipe

Appliances

Pipe with indication of direction of flow

Indicating and measuring instruments

B. Write the missing words in order to find the names for each of the symbols below.

ejector	expansion	filter or strainer	air pipe	membrane	flexible	level
flange	non-return	centrifugal pump	ball-valve	valve chest	safety	spring

	Pipes and pipe joints				
1		Crossing pipes, connected	4		_____ pipe
2		_____ pipe	5		Blank _____
3		Joint, screwed	6		Pipe going downwards
	Valves, cocks and flaps				
7		_____ valve (flap), angle, screw down	10		_____ (cock)
8		_____ valve	11		Suction _____ with non-return valves
9		Butterfly valve	12		Double-seated, changeover valve, straight
	Control and regulation parts				
13		Hand operated	16		_____
14		_____	17		Electric motor
15		Piston			

10. As per ISO/R 538-1967, MAN Diesel Electronically Controlled Two-stroke Engines (B60ME-C9.6) Project Guide, 2014.

	Appliances				
18		Mudbox	21		_____
19		_____	22		Gear or screw pump
20		Separator	23		_____
	Fittings				
24		_____ with net	25		Deck fittings for sounding pipe
	Indicating instrumets				
26		Observation glass	27		_____ indicator

C. You will read about emergency procedures in case of flooding in the engine room.

Fill in the missing verbs, in the correct form (e.g. ending in -ed, -ing).

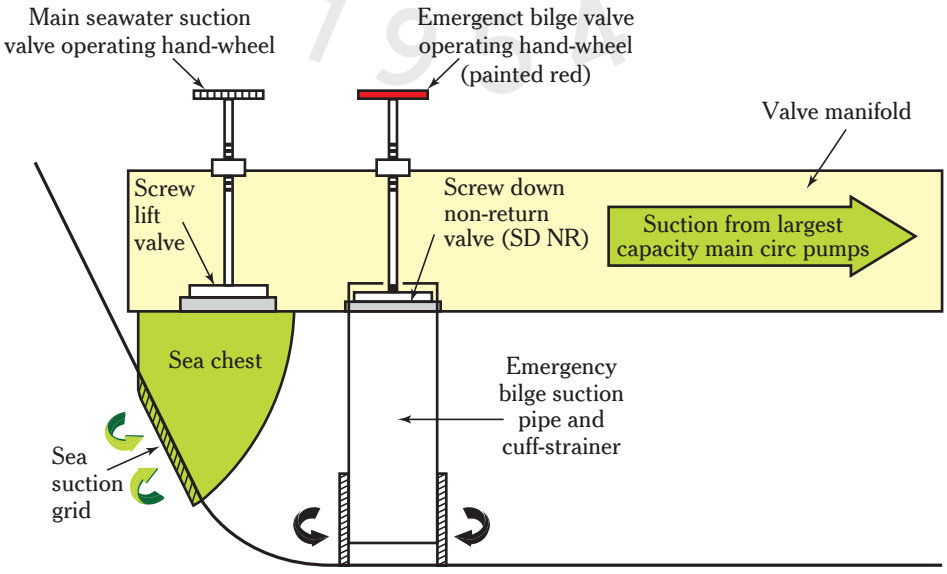
activate	open	connect	contain	notify	ensure	choke

Engine Room Flooding Procedures

(*from www.brighhubengineering.com*)

In case of engine room flooding, the level of the incoming seawater in the bilges must be controlled in order to prevent it reaching the main power generators. This would be catastrophic, leading to the loss of main power to pumps and the main engine. To prevent this, bilge suctions should be (1) _____ and bilge pump (2) _____. If this does not (3) _____ the rising water level, then the Emergency Bilge Injection Valve must be operated. The Emergency Bilge Injection Valve must only be used at the time of engine room flooding. It

EMERGENCY BILGE INJECTION VALVE ARRANGEMENT



is (4) _____ to the pumps having maximum lift capacity, such as the main sea water circulation or ballast pump.

- The suction pipe below the valve is fitted above the tank top, not above the bilge well. This is because during operation, there is a higher risk of (5) _____ when the suction is above the bilge well due to cotton waste etc.
- The valve operating hand wheel is painted red; the spindle extends below the engine room plates to the valve manifold. This contains the main seawater suction valve from the sea chest and the emergency bilge injection valve; the emergency bilge injection valve is a Screw Down Non-Return Valve (SDNR). The operation of the valve should be checked frequently to (6) _____ that its hand wheel can be turned freely by hand, without having to resort to the use of a wheel spanner.
- Under normal circumstances bilge water is passed through the oily water separator, before discharging overboard. However, the discharge of water from the engine room at the time of flooding is pumped directly overboard, by-passing the oily water separator. In this situation the Port Authorities should be (7) _____.

A diagram of a typical arrangement of an emergency bilge injection valve is shown on the previous page:

You will read a Marine Safety Alert Notice regarding engine room operations.

USCG MARINE SAFETY ALERT, MARCH 11, 2015

Engine Room Operations:
Maintaining Machinery, Knowing Escape Routes &
Conducting Thorough Engineer Watches

Recently an engine room fire occurred onboard an older cruise ship while it was at berth. A fuel oil spray under pressure developed from an operating engine's fuel supply line when a bolted flange parted. The fuel spray ignited when it contacted the engine's exhaust piping or turbocharger components. The vessel's fine mist extinguishing system automatically activated and performed as designed extinguishing the primary fire. Fuel pumps and shutoff valves were also secured. However, the short-duration fire also ignited cable bundles, quickly filling the machinery space with smoke. As a result, one crewmember and two technicians were unable to egress and ***perished*** in the engine room. The Coast Guard is issuing this safety alert to (1) ***reiterate*** the importance of vessel engineers being ***cognizant*** of and taking action on engine manufacturer technical bulletins and service letters, (2) remind personnel working in machinery spaces to have a personal exit plan no matter where they are working, and (3) stress the value of having engineers frequently perform detailed engineering space inspection rounds on engines, systems, and other equipment.

The ongoing investigation into the fire has revealed that a fuel line supply flange integral to the engine parted after three bolts completely loosened and the remaining bolt fractured. Other bolts within the engine's hot box were also found broken. The involved engine was a Wärtsilä model VASA12V32LNE also referenced as a VASA 32. It is a very common engine with thousands operating in ship and shore side service. Over its service life the manufacturer has produced a number of technical bulletins and service letters related to the fuel system piping, shielding of hot surfaces, other fire protection devices, and availability of components to meet SOLAS requirements. In its service letters Wärtsilä notes that fuel pipes leading to and from the injection pumps are subject to pressure pulses derived from the injection pumps, vibrations caused by normal engine vibrations, and static stresses caused by heat expansion. Any repairs or modifications to the fuel system must

follow manufacturer guidance provided in associated manuals, bulletins, and service letters. In this case, the loosening of these bolts may have been caused by vibrational loosening. It is unknown when the involved piping was last removed and reinstalled and whether or not proper ***torque*** was applied to the bolts.

Emergency ***egress*** was also identified as an issue during the fire investigation. Machinery spaces onboard cruise ships and other large vessels are complex spaces where an unfamiliar person can become quite ***disoriented***, particularly during emergencies. Additional factors like the loss of all power and lighting or excessive smoke can make rapid evacuation extremely difficult. There are simple steps to improve ***the odds*** of a successful escape. Before any work begins, learn the locations of available exits and escape routes in all directions (i.e. up and down levels and platforms, port and starboard). If there are watertight doors present review the procedures to manually open them if they should be closed. Also learn the location of Emergency Escape Breathing Devices (EEBDs) and review their proper usage and activation. Lastly and very importantly, always carry a good flashlight in your pocket. The light it provides may save your life.

An Oil Companies International Marine Forum (OCIMF) information document related to machinery space inspections and rounds states, "The widespread introduction of machinery automation and associated alarm and control systems has significantly changed the nature of operational practices on board vessels. The extensive use of computers, monitoring tools, and equipment has increased the volume and accuracy of data to the extent that there is a risk that the responsible officer may become insulated from the actual machinery status and performance." The purpose of engineering personnel conducting rounds in machinery spaces is to identify and initiate intervention, preventative maintenance, and repair actions when unsafe conditions exist. When rounds are carefully carried out, engineers will discover abnormalities as they occur. Identifying discrepancies such as loosening bolts, leaking piping and flanges, excessive oil loss through poor seals and gaskets, failing pump seals, loosening of pipe brackets, inadequate lubricant levels, etc., are typical issues found when thorough inspection rounds are conducted. Each operating engine should be thoroughly examined several times a watch on all sides available noting potential leakages, loosening of components, proper drainage of air coolers, etc. All persons making rounds should be using very bright flashlights in the performance of their inspection duties.

As a result of this casualty, the Coast Guard strongly recommends that owner and operators of all types of vessels develop policy and procedures to ensure:

- They have up-to-date service bulletins and service letters for critical equipment, implementing the requirements specifically when such items relate to fire prevention and safety;
- That service vendors, technicians, crewmembers, or any persons working within machinery spaces understand their escape routes and available emergency equipment before they start work;
- That all engineering personnel know how to perform effective and comprehensive inspections to detect abnormalities and problematic systems, equipment and components as early as possible.

D. Match the words, found in the text above in bold italics, to their synonyms. Then use the words to complete the sentences below.

a) egress
b) perished
c) reiterate
d) cognizant
e) torque
f) the odds
g) disoriented (*disorientated*)

_____ confused, unable to recognize where you should go
_____ the degree to which something is likely to happen
_____ died, esp. in a sudden violent way
_____ the act of leaving a place (*opposite: ingress, access*)
_____ repeat something in order to emphasize it
_____ a twisting force that causes machinery, etc. to rotate
_____ having knowledge or awareness

1. A _____ wrench is a tool used to precisely apply a specific moment of force to a fastener such as a nut or bolt.
2. This doorway is intended for _____ only.
3. She had to _____ the points made in her earlier speech.
4. What are _____ of me getting a job in this company?
5. It is very easy to get _____ in a smoky atmosphere.
6. Three passengers _____ in the ferry fire.
7. They are _____ of the importance of the case.

E. You will read about cargo residues in bilge systems. Choose the correct word in blue.

Cargo residues in hold bilge systems[11]

Before loading the cargo hold of a bulk carrier, appropriate inspections should be ***carried/conducted*** in order to ensure that all the systems related to the cargo hold are in good working order. One of the key common issues is the cleaning of the hold from cargo residues. Debris finds its way into the systems of hold bilges making manual removal of such debris imperative. Debris (especially foodstuff) which has been left in the bilges will decay over time giving some of the most unpleasant smells. Hold bilges are usually cleaned using a shovel. Once the bilge area has been cleaned the next thing to do is to ensure that the rest of the hold bilge systems are in good working order. Therefore, the following should be checked and tested if possible: *bilge sounding pipes, bilge suctions, bilge non-return valves*. Moreover, bulk carriers are fitted with ***eductor/adductor*** systems which are being used for the cleaning of cargo holds as well as for the removal of ***accustomed/accumulated*** cargo debris.

Sounding pipes Cargo residues from bilges can enter the bottom of sounding pipes and block them making them unusable, since they cannot give us appropriate soundings. One way of preventing this is to hose the sounding pipes out with water coming from the deck. Another way is to use airlines in order to remove by air pressure any leftover cargo residues.

Bilge suctions The ***plated/perforated*** strum box fitting of a bilge suction line prevents cargo residues from entering the bilge line. Therefore, after a cargo discharge operation, the strum box should be checked and cleaned in order to ensure that the bilge suction line will not block. If possible, the strum box should also be checked for ***corruption/corrosion***. Since hold bilge systems are used in order to remove water from the hold, a good way to check that the bilge suction and bilge suction line are not blocked is to pour amounts of water into the bilge well and pump them out watching that the whole operation pumps out expected amounts of water. Of course, if water builds up during washing, then most probably a blockage to the bilge system must have occurred and it must be investigated.

Non return valves In order to prevent water pumped from hold bilges from ***flowing/floating*** back through the bilge line and into the hold bilge wells again, non-return valves are fitted to the hold bilge pumping systems. Cargo debris or residues which are trapped in non-return valves reduce the pumping ***intensity/efficiency*** of hold bilges. The most common way of testing that non-return valves are working properly is by stopping the pumping procedure and allowing water to turn back to the bilge line. If the non-return valve is working properly then no water should enter the hold bilge, but if water flows into the hold bilge, the non-return valve, normally situated in the ***duct keel/duct reel***, is not working correctly.

F. You will read an article on a way of optimizing maintenance, proposed by manufacturers. Summarize the article orally. Answer the question and provide some examples.

- What is trending analysis and how can it help in diesel engine maintenance?

11. By Stavros Kairis, www.officerofthewatch.com, 2012, abridged.

Optimizing maintenance with trending analysis[12]

What is required today is a change from the "fix-as-fail" philosophy of the past to the "maintain-to-avoid-failure" mentality. Engine manufacturers tend to recommend maintenance schedules based on typical or average duty cycles or patterns of use. However, duty cycles may vary widely from "average" depending on the type of ship and the application, and this can affect maintenance. For example, ferries tend to operate at high power for extended periods, followed by periods of idling during loading and unloading. Tugs pushing barges upriver operate for extended periods at high power, while harbor tugs tend to have more intermittent duty cycles. Each pattern of use can increase or decrease the amount of maintenance needed compared with the recommended amount. The ideal way to gauge how to adjust maintenance schedules to match usage is through trending analysis.

Trending analysis involves sampling, testing and record-keeping in order to forecast when certain maintenance activities should be performed. It's a way of optimizing costly maintenance procedures to save money, save time and accurately predict when more expensive repairs may be conveniently scheduled. By undertaking activities such as analyzing oil and coolant samples, inspecting a few engine components early and recording the wear in the valve train during valve lash adjustments, problems can be identified early. Or, if there is less wear than expected, maintenance intervals may be extended to save time and money without compromising reliability. We will look at one area where trending analysis is applied:

Lubrication maintenance

Regular lubricating oil changes are perhaps the most important factor in engine durability, and the cost of doing them can add up. A typical large ferry with twin 65-liter engines will require 100 gallons of lubricating oil at about $15 a gallon every 250 hours of operation. If the ferry operates 10 hours per day using standard, Type-1, oil, it will require an oil change every 25 days at a cost of $1,500 just for oil. Filters and labor would be extra. Some manufacturers are able to increase oil change intervals to 500 hours with Type-1 oil by installing a larger oil sump, but that tends to increase oil disposal costs. The same thing can be accomplished by switching to higher-quality Type 2 oil, cutting materials, labor and disposal costs almost in half. Some marine diesel engines come equipped with centrifugal oil filters, which can extend oil change intervals to 1,500 hours when using Type-3 oil, cutting the cost of materials and labor by approximately 70 to 80 percent. By extending oil change intervals, operators also greatly reduce the hassle and disposal costs associated with waste oil and used filters.

Oil change intervals may be extended even further with the help of regular oil sampling and trending analysis. Oil samples can be taken regularly and sent to a lab for testing and analysis. The oil will be analyzed for contaminants such as water, soot, coolant and metals. Over time, these samples will reveal a trend as to how quickly the oil is aging or the engine is wearing. If the trend shows that the oil and engine are wearing faster than normal for that application, then the oil change interval can be shortened to minimize engine wear. Conversely, if the trending shows less than normal wear, the oil change interval may be extended without undue risk, thereby reducing costs further. (It is best to always follow the engine manufacturer's recommended oil change intervals to avoid invalidating the warranty).

G. You will read a circular on fuel handling on board. Decide whether the statements below are true or false, according to the text.

TRUE / FALSE	The circular highlights the importance of structured training of crew members to prevent operational problems and engine damage.

12. MTU Detroit Diesel, www.mtu-online.com.

TRUE / FALSE	Mixing of incompatible fuels is one of the causes for engine problems.
TRUE / FALSE	The fuel change-over procedure is error-prone.
TRUE / FALSE	Sediment in the storage tanks causes no problems because it is heavy and settles at the very bottom of the tank.
TRUE / FALSE	Separators still work efficiently when you reduce their temperature.
TRUE / FALSE	Separators can easily be disassembled and checked by crew on board, there is no need for manufacturer service.
TRUE / FALSE	You can verify the efficiency of separators by fuel sampling before and after the separator.
TRUE / FALSE	Whatever changes may take place in regulations, the onboard procedures remain the same.

Fuel handling and treatment on board (Loss Prevention Circular No. 05-12)[13]

Introduction

Fuel-related engine breakdowns are not a new problem. Between storage and combustion, the fuel must be transferred, heated, filtered and purified in order to meet the engine manufacturer's specifications. Depending on the quality of the fuel delivered on board, this can be a complex process and P&I clubs regularly see engine breakdowns and operational problems caused by poor fuel quality or poor fuel treatment on board. The bulk of such engine breakdowns arises from the use of heavy fuel oil (HFO) and the number of cases where engine damage caused by catalytic fines seems to be in the majority. There are also engine problems caused by mixing of incompatible fuels and filters clogged by sludge. The purpose of this circular is to highlight important issues regarding fuel handling and treatment on board.

Changes in rules and regulations

The drive towards the use of low sulphur fuel oils (LSFO) is causing fuel refining processes to change, sometimes resulting in lower quality HFO being delivered to ships. More blending of different oil components to optimise sulphur content may create side effects such as instability, incompatibility, ignition and combustion difficulties and an increase in the levels of catalytic fines. The need for frequent changeovers between different types of fuels clearly increases the opportunity for errors. Therefore, it is very important that the crew be familiar with the properties of the fuel supplied and the limitations of the particular ship's fuel treatment plant.
Below is a summary of advice on fuel handling and treatment on board. It is considered especially important to emphasise this advice to new crew members and junior engineers.

Fuel oil storage and tanks

Even if fuel is within specification, problems can arise at the very first stage of storage. Build-up of sediment inside the tanks can cause contamination of new fuel and mixing of different batches of fuel can lead to unstable fuel. Important precautions are:

- Regularly clean storage and settling/service tanks. Large particles will settle in the tanks and these particles can be whirled up during rough weather and supplied to the separators, sometimes in concentrations above the limits set out in ISO 8217. Cleaning of fuel oil tanks is

13. From Bunkers and bunkering, a selection of articles published by Gard AS, January 2014.

often only performed during scheduled yard stay and the implementation of routines for more frequent cleaning should be considered.
- Regularly drain settling/service tanks to remove water and sludge, preferably on a daily basis.
- Place new bunkers into empty tanks whenever possible. Be aware that mixing of two stable fuels does not guarantee a compatible mixture and the sediment potential can increase drastically after mixing.

Fuel oil separation

Even if the HFO received complies with the requirements of ISO 8217, operational problems can arise if the treatment plant and in particular the HFO separators are not properly operated and maintained. In order to efficiently reduce the level of catalytic fines and other impurities present in the fuel, such as rust, sand, dust and water, separator manufacturer's recommendations should be followed. Important precautions are:

- Keep the HFO inlet temperature at 98°C. The efficiency of the separators is dependent on the inlet temperature of the fuel and even a small reduction in temperature will reduce the quality of the separation. Some commonly observed causes of failures are leaking heating coils, wrong set points for temperature sensors and defective monitoring systems.
- Use the correct flow ratio and gravity disc. The longer the fuel is in the separator, the better the cleaning of the fuel oil will be. For separators without gravity discs, it is recommended to always use all available HFO separators and to run them in parallel, with a corresponding feed rate. If the separators are of the manual type with gravity discs, they must be operated in series with a purifier followed by a clarifier, but with the lowest possible flow. On this type of separators, the use of correct gravity discs is crucial and the discs have to be changed depending on the density of the fuel used.
- Maintain the separators according to manufacturer's instructions and, as far as practically possible, use manufacturer's approved parts only. In addition, the separators should be checked by the manufacturer's service engineers at regular intervals. One commonly observed causal factor for failure is incorrect assembly of the separators after cleaning.
- Verify the efficiency of the separators and the cleanliness of the service tank by sampling the fuel in the system before and after the separators and as close to the engines as possible. Send the samples in for analysis by a recognised laboratory. Verification of separators should be carried out at least once per year.

Fuel changeover

Ships that trade between areas with different sulphur limitations should have detailed changeover procedures. Insufficient knowledge of the actions required in a given situation may result in engine failure, so changeover procedures should be practised before entering restricted waters, especially in ships that do not perform fuel changeovers on a regular basis. The risk of incompatibility when mixing HFO and low sulphur distillates, or even marine gas oil (MGO), can be high and requires increased awareness.

Conclusion

For the safety of the crew, ship and cargo, and to minimise costs and periods off-hire caused by engine breakdowns, it is important that shipowners and operators focus on the quality of fuel handling and treatment on board. All engine crew must receive proper and regular training and it is particularly important to ensure that junior engineers become familiar with the ship's fuel treatment equipment and how to perform regular maintenance. Changes in rules and regulations may lead to changes in procedures so training and facilitation of experience exchange are essential for the crew to be able to detect the cause of a fuel-related problem when it occurs, and adjust the fuel handling and treatment procedures to minimise potential losses.

Part Two

1. Diesel Engine Vibration

A. Lead-in: Discuss the following questions.

- How can we reduce the level of vibration in the main engine?
- How does vibration affect habitability on board?

Look at simple dictionary definitions of the ***terms from physics and mechanics*** you need to know in order to be able to read about vibration. You will see how these words are used in context in the texts of this section.

Simple definitions of useful terms

torsion	➡ twisting, esp. of one end of something while the other end is held fixed *(adjective: torsional)*
amplitude	➡ the greatest distance that a wave, especially a sound or radio wave, vibrates (moves up and down)
vibration	➡ a continuous quick, slight shaking movement
oscillation	➡ movement back and forth in a regular rhythm
frequency	➡ the rate at which a sound (or electromagnetic wave) vibrates
natural frequency	➡ frequency at which a system oscillates when not subjected to a continuous or repeated external force
resonance	➡ the sound or other vibration produced in an object by sound or vibrations of a similar frequency from another object
damp	➡ reduce the amplitude of a sound source *(also dampen is used)*
damper	➡ a device for reducing mechanical vibration
detune	➡ change the frequency (of an oscillatory system) away from a state of resonance
velocity	➡ the speed of something in a particular direction

Now, check the more formal definitions of the following four key terms:

Amplitude	***Resonance***	***Vibration***	***Damping***
the maximum extent of a vibration, measured from the position of equilibrium	the reinforcement or prolongation of sound by the synchronous vibration of a neighbouring object	an oscillation of the parts of a fluid or elastic solid whose equilibrium has been disturbed	a reduction in the amplitude of an oscillation

B. Read the following text on vibration[1] and answer the questions:

1. What is balancing?
2. What are anti-vibration mountings?
3. How do dampers work?
4. How do detuners work?

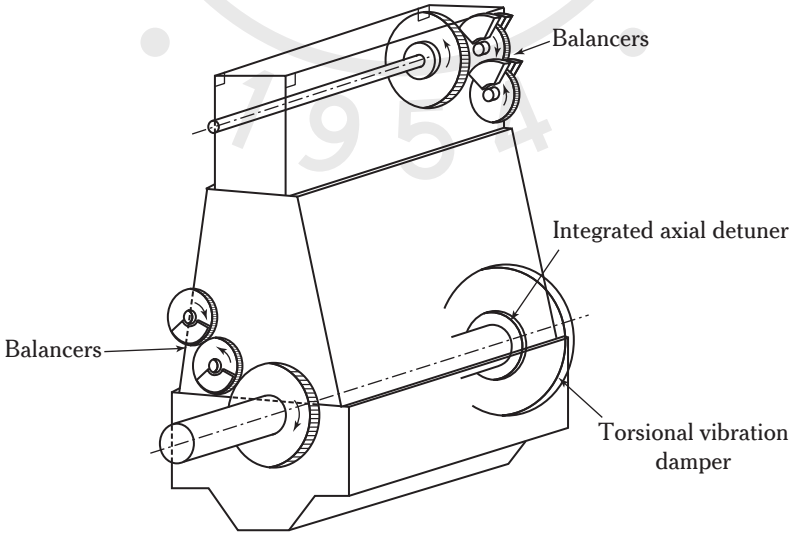
Marine diesel engine vibration

Many problems have their roots in, or manifest themselves as, *vibration*. Vibration may be in any linear direction, and it may be rotational (torsional). Vibration may be resonant, at one of its natural frequencies, or forced. It may affect any group of components, or any one component. It can occur at any frequency up to those which are commonly called noise. Vibration can be controlled, once recognized, by design and correct maintenance, by minimizing at source, by damping and by arranging to avoid exciting resonance.

The reciprocating motion of the piston in an engine cylinder creates out-of-balance forces acting along the cylinder, while the centrifugal force associated with the crankpin rotation creates a rotating out-of-balance force. If not in themselves necessarily damaging, these forces create objectionable vibration and noise in the engine foundations, and through them to the ship in which the engine is operating. *Balancing* is a way of controlling vibrations by arranging that the overall summation of the out-of-balance forces cancels out, or is reduced to a more acceptable amount.

Elastomer-based mounting systems are used to suppress or attenuate noise and vibration in ships. Rubber-to-metal bonded systems are the most commonly applied *anti-vibration mountings*. Such (passive) mountings mainly benefit propulsion engines, gensets and diverse auxiliary machinery such as ventilation fans, compressors, pumps, sewage treatment units, refrigeration plants and instrument panels. There are also active mountings, which can enhance noise insulation many times over by exploiting anti-vibration to counteract vibration from the engine.

Ship machinery installations have two principal sources of excitation: the main engines and the propellers. The two components are essentially linked by elastic shaft systems and may also embrace gearboxes and elastic couplings. The whole system is supported in flexible hull structures, and the forms of vibration possible are therefore diverse. For low-speed engines, an appropriate axial damper is fitted to minimize axial vibrations. A torsional vibration damper and balancers can be used to minimize torsional vibration.



1. Sources: "Vibration" in *Pounder's Marine Diesel Engines & Gas Turbines*, edited by Doug Woodyard (9th edition, 2009) and "Dampers and Detuners" in www.marineinsight.com (2012).

Reducing vibration in marine engines

Every running machine has a tendency to vibrate because of several moving parts incorporated within it. When in motion, the machine will have an oscillatory motion around an equilibrium point. This is the basic definition of vibration, a phenomenon common with all kinds of mechanical equipment. The natural frequency of vibration is always present in marine engines, but the effect can be dangerous when the vibration frequency reaches high levels. This happens when the natural frequency of vibration from an external source integrates with the engine vibration or when there are out-of-balance forces generated inside the engine. The result is severe damage to the marine engine's internal moving parts, cracks in the structure, loosening of bolts and securing and damage to bearings. Dampers and detuners are used to reduce marine engine vibrations.

Dampers: As the name suggests, dampers are used to damp or reduce the frequency of oscillation of the vibrating components of the machine by absorbing a part of the energy evolved during vibration.

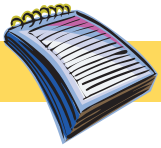
The *Axial damper* is fitted on the crankshaft of the engine to dampen the shaft-generated axial vibration, i.e. oscillation of the shaft in forward and aft directions, parallel to the shaft horizontal line. It consists of a damping flange integrated to the crankshaft and placed near the last main bearing girder, inside a cylindrical casing. The casing is filled with system oil on both side of flanges supplied via a small opening. This oil provides the damping effect. When the crankshaft vibrates axially, the oil in the sides of the damping flange circulates inside the casing through a throttling valve provided from one side of the flange to the other, which gives a damping effect. The casing is provided with high temperature alarm and pressure monitoring alarms located on both sides of damping flanges. They give alarm if one side oil pressure drops more than the set value as a result of low LO supply, sealing ring failure etc.

Torsional vibration is a twisting phenomenon in the crankshaft which spreads from one end to the other due to uneven torque pulses coming from different unit pistons. The most famous type of *torsional damper* used on marine engines is the viscous type damper, which consists of an inertia ring added to the crankshaft enclosed in a thin layer of highly viscous fluid like silicon.

Detuners: Detuners are used to alter the frequency of the vibrating machinery reducing the vibration of the engine.

If the engine has a power turbine connected to its crankshaft via a reduction gear, then *flexible coupling* is used to compensate for the vibration occurring during motion transfer. The flexible elements are mainly spring or special material rubber for detuning the vibration.

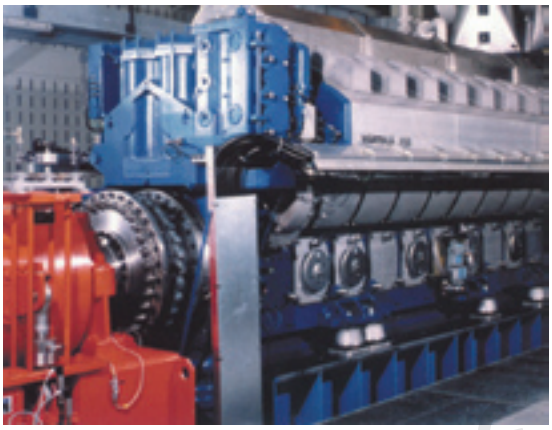
Engine *strut or bracing* are stud-like structures usually incorporated with hydraulic or mechanical systems to transfer engine vibration to ship's hull. One end is fitted at the upper part of the main engine and the other end is attached at a very stiff location in the ship's hull. This strut or bracing acts as a detuner which increases the natural frequency of the system, so that resonance occurs above the engine rotational speed.



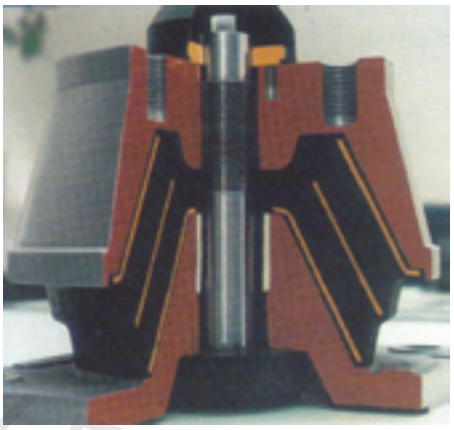
Glossary

summation	a sum total of things added together
attenuate	reduce the amplitude of (an oscillation)
excitation	the process in which an atom or other particle adopts a higher energy state when energy is supplied
stiff	not easily bent or changed in shape; rigid; firm and difficult to bend or move

C. What is shown in the pictures? Read the text[2] and fill in the missing words in the picture titles.



An engine placed on c_____ m_____



Cross section of a f_____ s_____

Vibration can result in fatigue-defects, noise, and discomfort for the crew. Adding weight and structure, and so changing the resonance frequency or local stiffening are remedies to vibration. Vibration can also be eliminated by inducing another vibration source, with contra pulses.
Vibrations are usually accompanied by sound or noise as vibrations and noise often have the same source. On a ship, these sources are generally the propeller, the various diesel engines and even the waves at sea. Insulation techniques and the prevention of local resonance are used to keep the vibrations in the accommodation and at other locations within acceptable levels. Installing the diesel engines on cushion-mounts reduces vibrations considerably.
Vibration has a negative effect on many things. Sophisticated machinery gets damaged. Resonance can result in fractures in the structure. According to ISO-criteria, vibrations of 4-5 mm/sec are tolerated, whereas values larger than 10 mm/sec are unacceptable.
Flexible support of the (main) engine reduces the level of air sound. The flexible placing of the engine has two goals:

- Reduction of the dynamic stress on the ship.
- Reduction of dynamic forces on the engine foundation. Less sound will be led through the ship into the accommodation. If a hammer hits the foundation, the sound will travel through the construction and the sound can be heard in the fore ship. If, however, a layer of rubber is placed between the foundation and the hammer, the sound will be largely absorbed.

D. Read the text and answer the questions.

1. Who is vibration analysis conducted by?
2. What methods do vibration analysts use to describe vibration?
3. What problems can be identified through vibration analysis?

Vibration analysis

An engineer on board can identify something erratic in equipment by feeling the heat, or by listening to the noise, or by watching the device's status. It may vary from person to person. Vibration analysis, where needed, can be conducted by maintenance engineers who work in specialist companies and use reliable methods that produce written data.

2. From *Ship Knowledge*, 5th ed., pages 107 and 175.

Amplitude and frequency are measurable parameters used by vibration analysis to describe the vibration. Amplitude describes the amount of vibration noted on the object. More movement means more criticality of the object condition. Velocity is measured in a specific direction and how fast the object movements take place at any given time is displayed in graphical waveform. Vibration analysts measure velocity data for a specified time period and carry out analysis accordingly.
Rotating machines tend to vibrate, so vibration analysis on a regular basis is needed to predict the operational health of equipment. Machine failures can be drastically reduced by adopting a "Preventive Maintenance Tool" program, which is also known as a "Condition Based Maintenance System." The aim of Vibration Analysis is to determine the deteriorating condition of equipment before it leads to a breakdown. Whenever machine vibration crosses normal limits, it indicates some problem in the mechanism, which could involve alignment, wear and tear, or loosening of parts. To overcome this, corrective action should be undertaken based on the data collected from the machine.
Critical machines should be monitored by installing permanent type vibration meter on the required part. This should give signs of wear and tear to be rectified well in advance before the fault converts into an expensive problem.

E. Fill in the gaps, using the words in the box.

loosening	bracing	damp	discomfort	intensity	acceptability

When vibrations occur in big-sized machines, operating under heavy loads, the (1) _____ of vibration magnifies because of large mass rotation and combustible gases forced inside the machinery. If the vibration levels increase beyond the minimal level, it may lead to deformation or breakage of engine components. It is therefore important to (2) _____ the vibration by some external arrangement. In a 2-stroke marine propulsion engine vibrations may cause wear of internal components, (3) _____ of holding bolts, damage to the engine structure, and even failure of the crankshaft. (4) _____, normally fitted on the top of the engine, transmits the engine's rocking vibration to the ship's hull.
There are two basic criteria for determining (5) _____ in the level of vibrations:

1) The vibration level must not result is stress levels that may cause fatigue damage to the engine or the connected hull structure.
2) Vibration must not result in annoyance and/or (6) _____ for the operating personnel.

F. You will read about an incident. Match the two halves to make full sentences that summarize the text.

1. Some auxiliary diesel engines were	☐ suspected as a contributing factor because of a layer of lead oxide found on the affected bearings.
2. Damage was	☐ affected by severe vibration.
3. The auxiliary engines were	☐ excite severe vibration of the genset and the platform.
4. 5-cylinder auxiliary engines are	☐ more probable to cause vibration problems than units with 6 or 8 cylinders.
5. Water in the lube oil is	☐ found in the crankshaft of the auxiliary diesel engines.
6. Auxiliary engines may	☐ mounted on platforms in the engine room.

Casualty information – by DNV

Course of events

Severe vibrations were felt on the engine room platform near the auxiliary engines when one or more auxiliary engines were running. On some of these engines, the crankshaft was found damaged due to overheating of the main bearings. Damage of this kind has been reported in various vessels with 5-cylinder auxiliary engines, mounted on platforms in the engine room.

Extent of damage

The following damage was found:

- overheated and scored main journals and crank pins
- broken crankshaft
- piston seizure
- overheated gudgeon pin
- damage to bottom end bearings of connecting rods.

The bearing metal of some bearings was discoloured. No damage was reported on the engine foundations, the platform or the hull structures in way of the platform.

Probable cause

The most probable cause of the damage to the auxiliary diesel engines is assumed to be the high vibration level. High vibration levels may cause damage to the bearings of the engine and the generator of the genset(s) not in service. This may in turn cause overheating of the bearings when the genset is put back in use. However, it cannot be ruled out that water in the lubricating oil and inadequate maintenance may have served as contributing factors to the incidents. The discoloured bearings were found to have a layer of lead oxide which is much harder than the original bearing metal. Water in the oil is a promoting factor to this kind of damage.

Lessons to be learned

- Four stroke, 5-cylinder engines, produce greater unbalanced mass forces and mass moments (vibration excitation sources) than for instance 6 and 8-cylinder units. Thus 5-cylinder engines are more probable to cause vibration problems on board under otherwise equal conditions.
- This should be taken into consideration at the design stage in order to avoid severe vibration of the genset and/or the platform excited by the auxiliary engine(s).
- When resilient mounts are used, it is important to know the natural frequency of the genset in order to avoid coincidence with the excitation frequencies from the auxiliary engines, propeller(s) and main engine(s)(slow speed).
- Vibration measurements should be carried out to assure that the vibration level is within ISO requirements. If severe vibrations are felt or measured, their cause should be identified and appropriate countermeasures taken. The genset arrangement should also be examined for severe vibrations when one or more gensets are not running.
- In case high vibration level is indicated, it is recommended that regular maintenance services are followed, including checking of the main bearings and the connecting rod bottom end bearings and tension bolts.
- The lubricating pumps should be kept running also for gensets which are not running. The oil film may have a damping effect and reduce adverse effects of vibration (fretting, hammering).
- The lubricating oil should be checked regularly for water and contaminants, as this combined with severe vibrations may speed up the damage process.

G. Cross the odd one out from the words in blue.

1. ***flexible, stiff, resilient*** mounting
2. ***excite, damp, attenuate*** noise/vibration
3. ***fatigue, breakage, torsion*** of machinery
4. ***remedy, cure, deformation*** for a problem
5. ***overheated, objectionable, scored*** crankpin

H. Do you know the following key words that are related to vibration? Tick the ones you can explain and make a sentence for each one, putting them in context.

☐ damper ☐ detuner ☐ resonance
☐ vibration amplitude ☐ flexible mountings ☐ frequency

2. Gas exchange

A. You will read two texts[3] that explain gas exchange in diesel engines. Fill in the gaps, using the words in the box.

simpler	mounted	cooled	per	atmospheric	dead	remaining

The gas exchange process

A basic part of the cycle of an internal combustion engine is the supply of fresh air and removal of exhaust gases. This is the gas exchange process. *Scavenging* is the removal of exhaust gases by blowing in fresh air. *Charging* is the filling of the engine cylinder with a supply or charge of fresh air ready for compression. With *supercharging,* a large mass of air is supplied to the cylinder by blowing it in under pressure. Older engines were 'naturally aspirated' – taking fresh air only at (1) _____ pressure. Modern engines make use of exhaust gas driven turbochargers to supply pressurised fresh air for scavenging and supercharging. Both four-stroke and two-stroke engines may be pressure charged. On two-stroke diesels, an electrically driven auxiliary blower is usually provided because the exhaust gas driven turboblower cannot provide enough air at low engine speeds, and the pressurised air is usually (2) _____ to increase the charge air density.

Uniflow and Loop scavenging

Scavenging is the process whereby air at a pressure greater than that of atmospheric pressure is used to push the exhaust gas out of the cylinder of an engine. Unlike the 4-stroke engine, a two-stroke diesel engine does not use the piston to push out the exhaust gas. Instead, air enters the cylinder around bottom (3) _____ centre and sweeps or scavenges the exhaust gas from the cylinder.

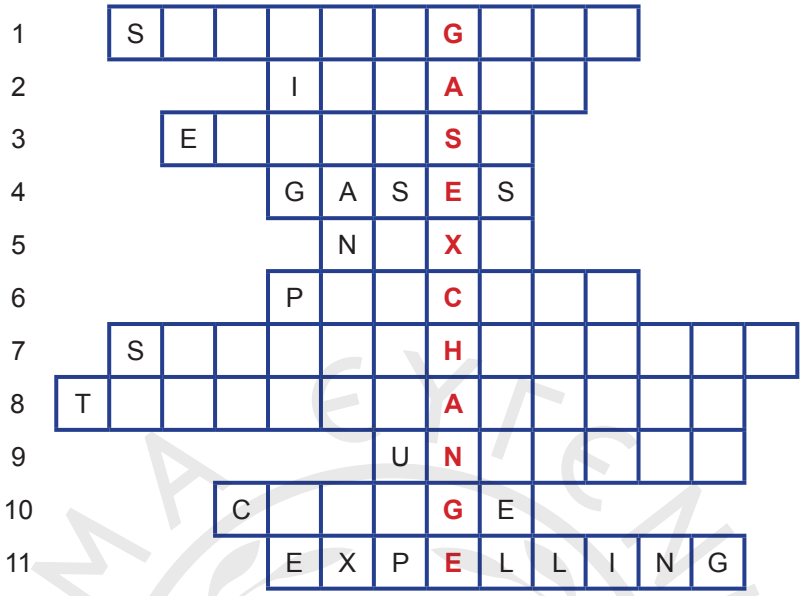
Two-stroke engines with an exhaust valve (4) _____ in the cylinder head are known as uniflow scavenged engines. This is because the flow of scavenging air is in one (uni) direction.

Some two-stroke engines do not have valves; as well as scavenge ports in the cylinder liner, they are fitted with exhaust ports located just above the scavenge ports. As the piston uncovers the exhaust ports on the power stroke, the exhaust gas starts to leave the cylinder. When the scavenge ports are uncovered, scavenge air loops around the cylinder and pushes the (5) _____ exhaust gas out of the cylinder. This type of engine is known as a loop scavenged engine. Note that the piston skirt is much longer than that for a uniflow scavenged engine. This is because the skirt has to seal the scavenge and exhaust ports when the piston is at TDC.

Although (6) _____ in construction with less moving parts, these engines are not as efficient or as powerful as uniflow scavenged engines. The scavenging of the cylinder is not 100%, and thus less fuel can be burnt (7) _____ stroke. All modern large 2-stroke crosshead engines being built now are of the uniflow scavenged type.

3. From www.machineryspaces.com and www.marinediesels.co.uk.

B. Read the short description of the gas exchange process and fill in the missing words, using the word grid (the words you are looking for will be formed horizontally; also the first letter is given).



The fundamentals of gas exchange process:

- (1) _____ in 2-stroke engines
- (2) _____ and (3) _____ in 4-stroke engines

The purpose is to remove the burnt (4) **gases** at the end of the power stroke and admit fresh charge for the (5) _____ cycle. The power output of an engine at a given speed is proportional to the mass flow rate of air. Inducing the maximum air mass at wide-open throttle or full load is the primary goal for gas exchange (6) _____.
(7) _____ and (8) _____ are used to increase air flow through the engines and hence power density.
(9) _____ scavenging is the gas exchange process in which the (10) _____ air passes straight up through the length of the cylinder, forcing the exhaust gas through the exhaust valve at the top of the cylinder.
Loop scavenging is the gas exchange process in which the charge air passes over the piston crown and rises to form a loop within the cylinder, (11) **expelling** exhaust gases through exhaust ports cut in the same side of the liner above the scavenge ports.

C. The following notes give information about scavenging. Some nouns are missing. Write the missing nouns; they derive from the words in brackets.

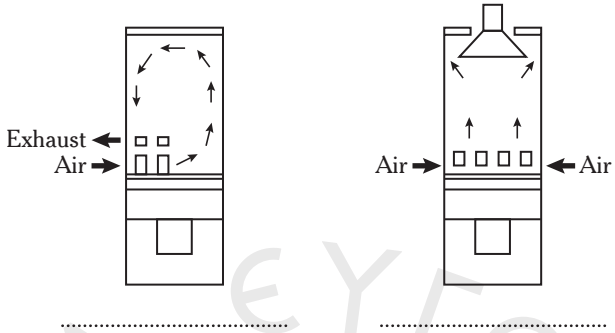
Scavenging in diesel engines[4]

Scavenging is the process of removing exhaust gases from the cylinder after combustion and replenishing the cylinder with fresh air. Efficient scavenging is necessary for good combustion of fuel inside the engine cylinder. The (1) _____ [PASS] of scavenge air will also assist cooling of the cylinder, piston and valves.
Satisfactory scavenging depends on efficient (2) _____ [EVACUATE] of exhaust gases and minimum (3) _____ [LOSE] of fresh air through the exhaust passage.

4. http://marineengineeringonline.com/scavenging-in-diesel-engines/, May 2014.

Scavenging is important because it affects the overall (4) _____ [EFFICIENT] of the engine, the power output and the fuel (5) _____ [COMSUME]. Incomplete scavenging results in poor combustion, lubricating oil (6) _____ [CONTAMINATE], piston rings wear, as well as high mean temperature in the cylinder.

D. Which type of scavenging is shown in the pictures? Write it under each picture.



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3. Engine logbook

A. You will read a text on the entries made in the engine room log book. Then, match the words to make appropriate collocations that appear in the text.

An engine room log book is a track record of all ship machinery parameters, performance, maintenance, and malfunctions. The recorded values and information are used as a reference, to compare and record data that can be used for insurance claims in case of an accident. It is of prime importance to note down the relevant information at a place (paper daily log book or electronic log book) for future reference and retrieval when required. The engine room log book is an important document that gives a clear picture of the engine room working conditions and the situation that existed in the engine room at any given time.

The following entries must be filled in the engine room log book:

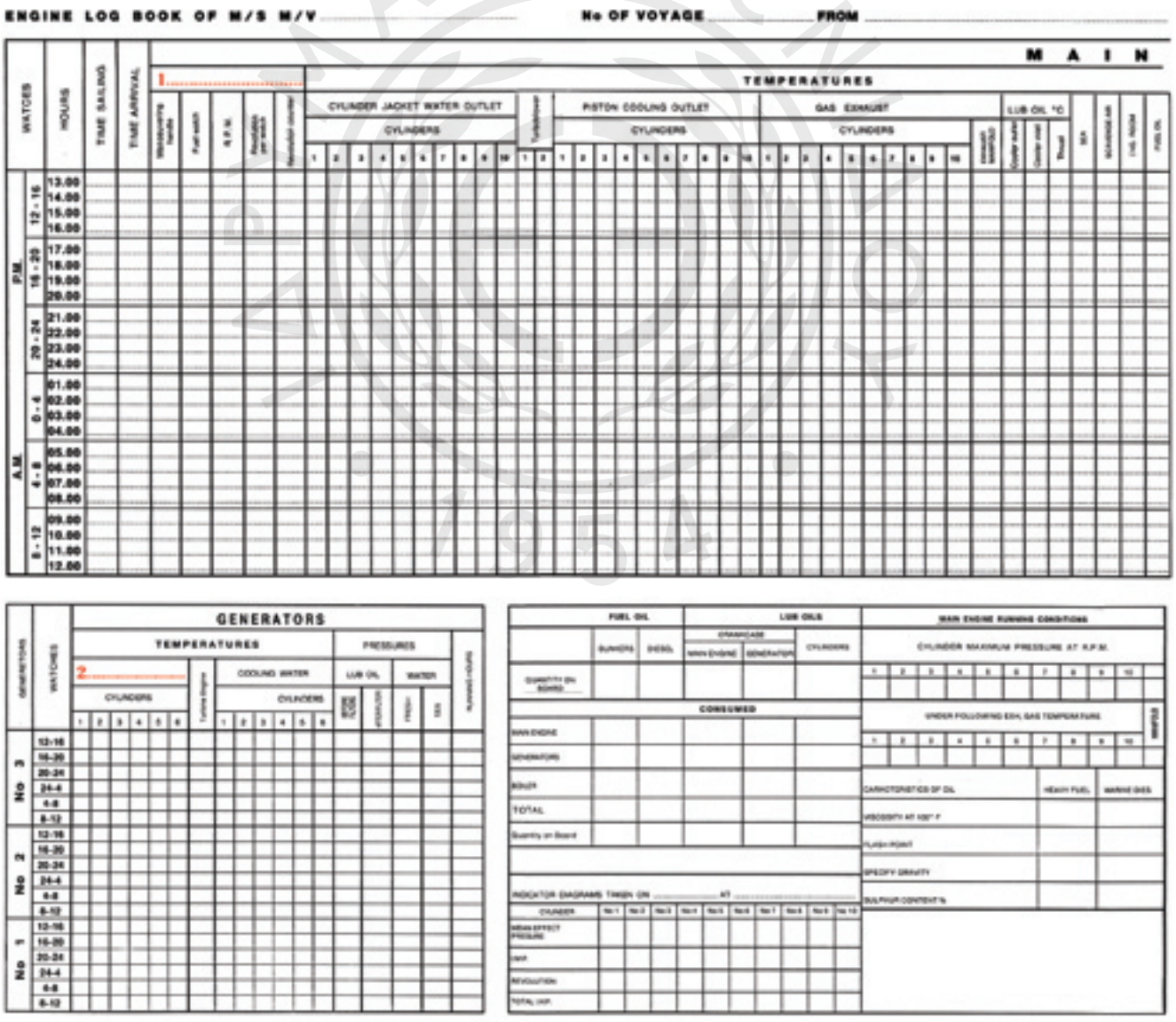
- Date and voyage where the ship is heading
- The position of the ship (at sea, in port or at anchorage)
- Readings and Parameters of Main Propulsion Engine
- Readings and Parameters of Auxiliary Engine (Generators)
- Readings and Parameters of Other running machinery
- Main engine RPM and Load on the Engine
- Speed of the ship in knots
- Daily Entry for all the lube oil ROB (Remaining onboard)
- Daily entry for all grade of Fuel Oil Remaining onboard
- Remaining onboard value of Sludge and Bilge
- Running Hour Counter for important machinery
- Running details of Oil Pollution Prevention Equipment (Time and Position)
- Record of any Major Breakdown and reason for the same
- Record of incident or accident in the engine room (Fire, Flooding etc)
- Record of grounding, collision and other accidents
- Record of major overhauling of important machinery
- Record of all Bunkering operations (Time, Place and Quantity)
- Record of all Sludge and garbage disposal operations
- Remarks for additional work done in a watch

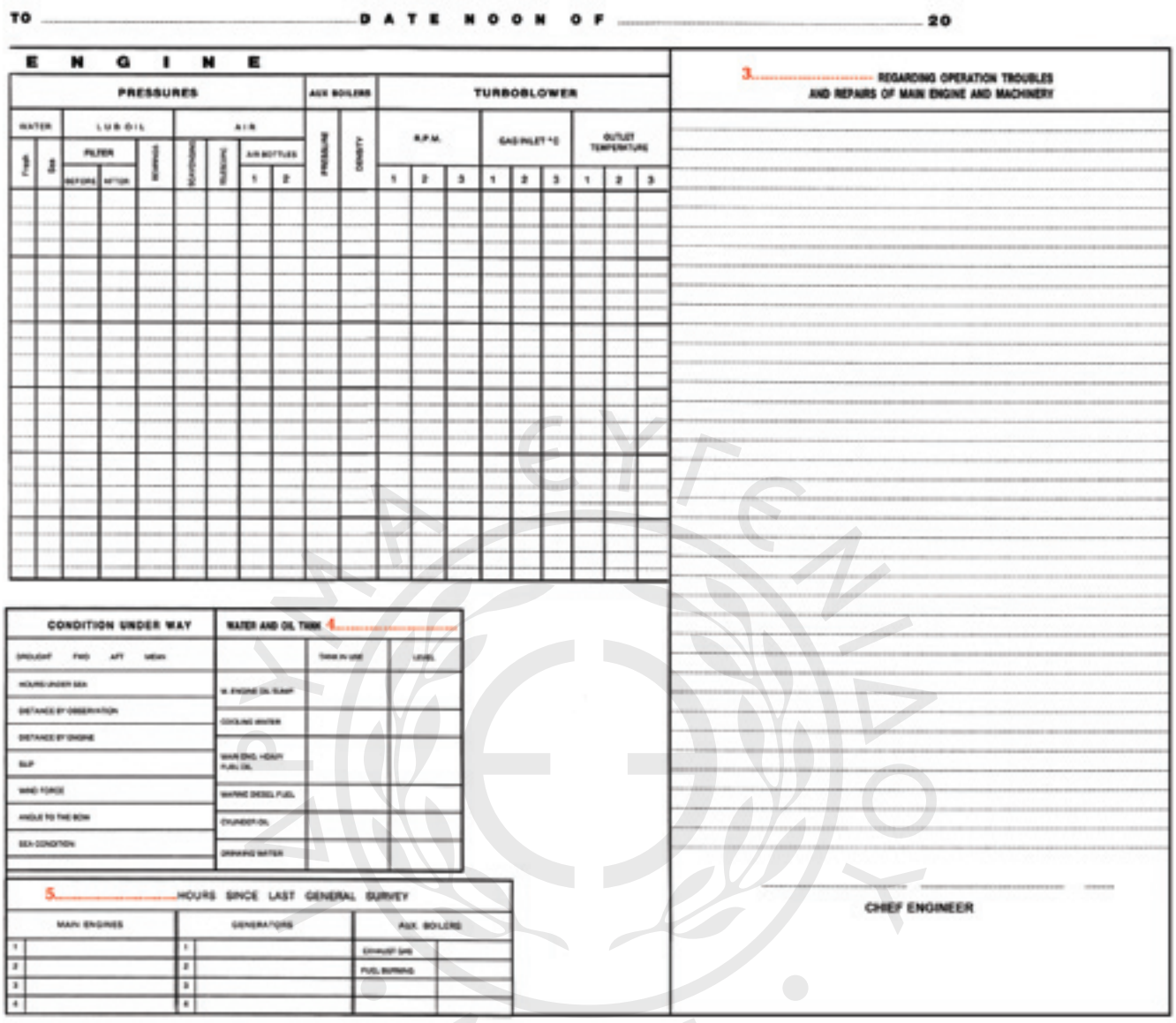
- Remarks for Surveys and PSC inspection
- Signature of Chief Engineer to make sure all entries are in position

1. insurance	reference
2. of prime	operation
3. track	disposal
4. for future	conditions
5. working	claims
6. at any given	inspection
7. remaining	importance
8. bunkering	record
9. garbage	time
10. PSC	on board

B. Fill in the missing words in the engine log book below.

exhaust	controls	soundings	remarks	running




TO _____ DATE NOON OF _____ 20

ENGINE

PRESSURES | AUX BOILERS | TURBOBLOWER

WATER | LUB OIL | AIR

Fresh | Sea | FILTER (BEFORE | AFTER) | BEARINGS | AIR BOTTLES (1 | 2) | PRESSURE | DENSITY | R.P.M. (1 | 2 | 3) | GAS INLET °C (1 | 2 | 3) | OUTLET TEMPERATURE (1 | 2 | 3)

3._____ REGARDING OPERATION TROUBLES AND REPAIRS OF MAIN ENGINE AND MACHINERY

CONDITION UNDER WAY

DISTANCE | FWD | AFT | MEAN

HOURS UNDER SEA

DISTANCE BY OBSERVATION

DISTANCE BY ENGINE

SLIP

WIND FORCE

ANGLE TO THE BOW

SEA CONDITION

WATER AND OIL TANK 4._____

	TANK IN USE	LEVEL
M. ENGINE OIL SUMP		
COOLING WATER		
MAIN ENG. HEAVY FUEL OIL		
MARINE DIESEL FUEL		
CYLINDER OIL		
DRINKING WATER		

5._____ HOURS SINCE LAST GENERAL SURVEY

MAIN ENGINES	GENERATORS	AUX. BOILERS
1	1	EXHAUST GAS
2	2	FUEL BURNING
3	3	
4	4	

_____ _____ _____

CHIEF ENGINEER

C. Fill in the gaps, using the words in the box.

average	remote	ejector	timing	advisable	consumption	judge

Types of Engine Logbook Entries

Main engine: (1) _____ of watch, fuel level settings, engine load, (2) _____ rpm, flow meter reading, main engine fuel (3)_____ for 4 hours, main engine exhaust units temperature, main engine fuel oil inlet temperature, all coolers sea water inlet/outlet of air, lube oil, piston and jacket cooler temperature.

Pressures: Sea water pressure, jacket cooling water pressure, piston cooling water pressure, lube oil pressure (bearing, crosshead, camshaft), fuel oil pressure, air bottle pressure (1 & 2).

Turbochargers: Turbocharger rpm, cooling water in & out temperature, air cooler in & out temperature, pressure drop across turbocharger air cooler filter to (4) _____ the blockage, air temperature in and out of the turbocharger, exhaust gas temperature in & out.

Other Temperatures/Levels: Heavy oil service and settling tank temperature, thrust bearing

temperature and pressure, stern tube temperature and pressure, sea water temperature, engine room temperature, main engine sump level.

Fresh Water Generator: Jacket cooling water in & out temperature, condenser sea water in & out temperature, (5) _____ pump pressure, distillate pump pressure, feed line pressure, flow meter reading for fresh water.

Auxiliary Machinery: Exhaust temperatures of all units, alternator forward and aft bearing temperatures, scavenge air pressure and temperature, air cooler in & out temperatures, lube oil in & out temperatures, sea water in & out temperatures, turbo charger of auxiliary engine exhaust temperature.

***Tank Levels*:** Heavy oil service & settling tank readings, diesel oil service & settling tank readings, cylinder lube oil storage and daily tank reading, main engine crankcase lube oil storage tank reading, auxiliary engine crankcase lube oil storage tank reading, stern tube gravity tank (high/low) tank readings, stern tube aft & fwd seal tank level.

Engine Control Room

Most of the readings and entries mentioned above can also be taken from the ship's control room, although it is (6) _____ to take local readings. Yet, these readings can be compared to those of the (7) _____ indications. This will also give an idea about the variation in the two so that, in case of any large deviations, necessary checks can be performed. Also, in case of rush hours such as manoeuvring, the engineers would know the actual readings if they are familiar with the deviations in control room and actual readings.

D. You will read a text on certain good practices regarding the filling of the engine log-book. Answer the questions below. Also, fill in the glossary with words from the text.

1. Why do you need to note down and highlight near misses in the engine log book?
2. What is the role of the engine log book in case of claims arising after an accident?
3. What is the appropriate way of correcting the log book if you make a mistake?
4. How can the log book help in machinery condition monitoring and good maintenance?

Some Important Points to Consider While Filling in Engine Room Log Book

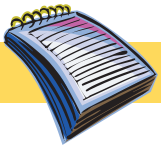
Marine engineers are required to keep a log of all important machinery parameters such as pressure, temperatures etc. in the engine room log book. This daily record-keeping book is a complete log of engine room readings which are compared with the design and trial conditions at regular intervals to analyze the performance of engine room machinery and systems. Additionally, the log book parameters are also checked during surveys and investigations related to any kind of accident in the engine room.

Filling in the log book with assumed parameters, without actually doing the appropriate round to physically check them, or just copying data from previous entries is dangerous and must be avoided. Mentioned below are some important points which marine engineers must remember while filling in the engine room log book.

- Any important event taking place in the engine room should be noted down in the log book. Unusual changes in the performance of any particular machinery, sudden increase or decrease of parameters, accidents, near misses, or breakdown of any equipment should be noted down and highlighted in the log book. This is to ensure that additional attention will be given to the mentioned issue. In case of major problem, don't forget to note down the date and time of the event in the log book. The data from the log books is often used for insurance claims in case of accidents and near misses are discussed during safety meetings as references that can help in making safety plans.
- Engineers working in the engine room must ensure that the log book is kept neat and clean without oil smudges or over-writing. The data in the log book is extremely important records which

should be properly visible for future references. In order to prevent the log book from getting torn or spoilt, use a proper cover or case for protection.

- Use only ballpoint pen to fill the log book. Pencil should not be used, as these are official records which should be prevented from getting tampered or spoilt. If wrong readings have been written by mistake, they should be crossed out (strike out with one line) and correct readings must be written beside them along with the signature of the authorized officer.
- Lastly, it is worth noting that a log book is not just for filling records. It is also to be used as a reference to study previous data of machinery parameters and to compare them with the current data in order to understand the condition of machinery systems and detect any major fault early, as well as to plan maintenance work more effectively.



Glossary

_____ tidy and in order; carefully done or arranged
_____ a dirty mark with no clear shape
_____ to make changes to something without permission; interfere with

4. Review to Part Two *(Consolidation and expansion)*

A. You will read a text on engine room and ship noise[5]. Decide if the following statements are true or false, according to the text.

TRUE / FALSE	1. The acceptable noise level in the messroom is more than in the cabins but less than in the galley.
TRUE / FALSE	2. It makes no difference if you have the control room door open or closed, the control room still provides the same noise insulation.
TRUE / FALSE	3. Advances in engine design that aim at economy and efficiency also lead to less noise on board.
TRUE / FALSE	4. It is the engine room noise that affects other areas such as the accommodation spaces.
TRUE / FALSE	5. The noise level in the control room is the same as in the workshop.
TRUE / FALSE	6. 85 dB is the limit; above this limit ear defenders are mandatory.

Noise

Noise is an unwanted sound. It is also a pervading nuisance and a hazard to hearing, if not to health itself. Noise is basically a form of vibration. It is also essentially subjective, that is to say, it is of interest because of its effect on people via the human ear. Noise is measured and expressed in decibels. It is worth remembering that:

- 30 dB correspond to a gentle breeze in a meadow

5. From *Pounder's Marine Diesel Engines & Gas Turbines*, edited by Doug Woodyard, 9th edition, 2009 and IMO Code on Noise Levels on board ships, 2014.

- 70 dB to an open office
- 100 dB to a generator room

Any prolonged exposure to levels of 85 dB or above is likely to lead to hearing loss in the absence of ear protection; 140 dB or above is likely to be physically painful.

The scope for reducing the source of noise emitted by a diesel engine is limited, without fundamental and very expensive changes of design principle. However, all the measures which lead to efficiency and economy – higher pressures, faster pressure rise and higher speeds – unfortunately lead also to greater noise, and to noises emitted at higher frequencies.

Anti-vibration mounts help, but are not always practical. Another measure which can successfully reduce noise is to put weight, particularly if a suitable cavity (or vacuum) can be incorporated between the source and the observer. A screen, of almost any material, will effect a reduction in perceived noise. The screen must be totally effective. A relatively small aperture will destroy much of the benefit. For example, engine rooms now incorporate a control room to provide some noise protection. The benefit will be appreciated every time the door is opened.

Achieving quieter engine rooms

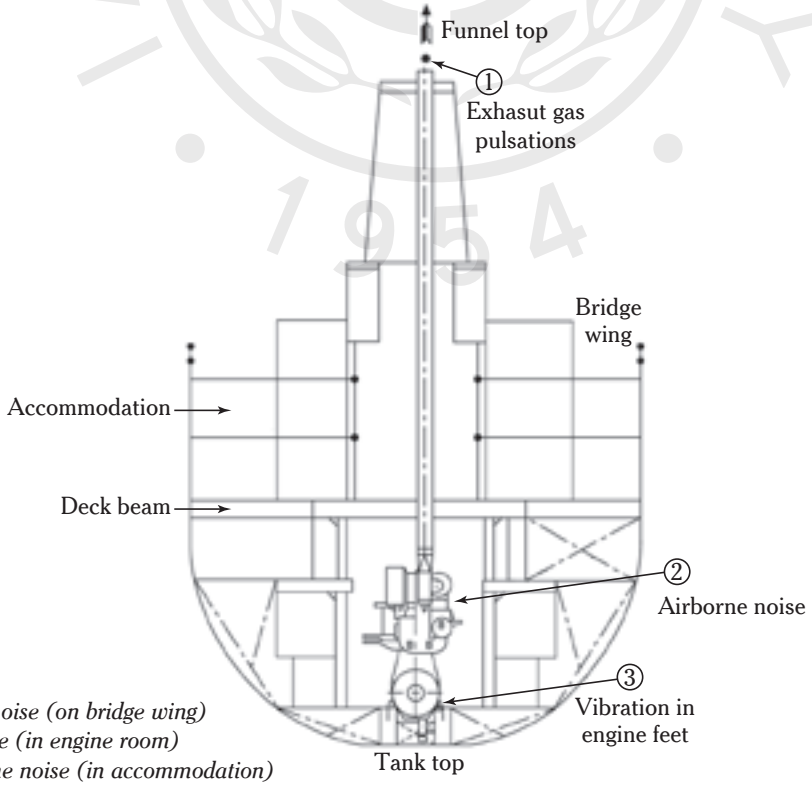
On the basis of engine noise measurements and frequency analyses, MAN Diesel explains, it can be determined that noise emissions from 2-stroke engines primarily originate from:

- the turbocharger, air and gas pulsations
- exhaust valves
- fuel oil injection systems

The best way of reducing engine-related noise is, naturally, to reduce the vibrational energy at the source or, if this is neither feasible nor adequate, to attenuate the noise as close to its source as possible.

On the bridge wing, where exhaust gas noise predominates, there are certain limitations as this area is regarded as a listening post, as per IMO recommendations. The requirement is a maximum of 60-70 dB, which can always be satisfied by installing a suitable exhaust gas silencer.

Noise emitted by the main diesel engine's exhaust gas and the superstructure-borne noise excited



1. Exhaust gas noise (on bridge wing)
2. Airborne noise (in engine room)
3. Structure-borne noise (in accommodation)

by the engine are generally low. Airborne noise emitted from the engine, on the other hand, is so high that in some cases there is a risk that the noise limits for the engine room cannot be met unless additional noise reduction measures are introduced. These measures may include:

- a Helmholtz resonator lining in the scavenge air pipe
- external insulation of the scavenge air receiver and air cooler
- additional absorption material and the engine room walls (shipyard's responsibility)
- additional turbocharger intake silencer attenuation (turbocharger maker's responsibility)
- additional attenuation material at the turbocharger inspection cover
- low noise diffuser for turbocharger compressor (if available).

In the engine room, sound reverberates and noise is emitted by other machinery, too. There are many noise transmission paths through which vibrational energy is transferred from one area to another through the engine. In principle, however, the transmission of airborne noise from the engine room to other locations (e.g. accommodation quarters) normally has no influence on the actual noise level, in these locations.

Maximum noise level in dB(A), effective from July 2014, as per IMO CODE ON NOISE LEVELS

Compartment type	Location	Ship size (GT)	
		1,600 – 10,000	> 10,000
Work spaces	Machinery spaces	110	110
	Machinery control rooms	75	75
	Workshops other than those part of machinery spaces	85	85
	Non-specified work spaces (other work areas)	85	85
Navigation spaces	Navigating bridge and chartrooms	65	65
	Look-out posts, incl. navigating bridge wings and windows	70	70
	Radio rooms (radio equipment operating)	60	60
	Radar rooms	65	65
Accommodation spaces	Cabin and hospitals	60	55
	Messrooms	65	60
	Recreation rooms	65	60
	Open recreation areas (external recreation areas)	75	75
	Offices	65	60
Service spaces	Galleys (food processing equipment not operating)	75	75
Miscellaneous	Serveries and pantries	75	75
	Normally unoccupied spaces	90	60

IMO recommended warning notices to be displayed on board: examples of signs at the entrance to noisy rooms.

80-85dB(A)	HIGH-NOISE LEVEL – USE HEARING PROTECTORS
85-110 dB(A)	DANGEROUS NOISE – USE OF HEARING PROTECTORS MANDATORY
110-115 dB(A)	CAUTION: DANGEROUS NOISE – USE OF HEARING PROTECTORS MANDATORY – SHORT STAY ONLY
>115 dB(A)	CAUTION: EXCESSIVELY HIGH-NOISE LEVEL – USE OF HEARING PROTECTORS MANDATORY – NO STAY LONGER THAN 10 MINUTES

Glossary

pervading	be present and apparent throughout; spread through and be noticeable in every part of something
nuisance	something that annoys you or causes trouble for you
cavity	an empty space within a solid object, or between two surfaces
aperture	an opening, hole or gap
feasible	able to be achieved; possible and practical to do easily or conveniently
predominate	to be greater in amount than something else in a place; to be the strongest or main element
reverberate	(of a sound) to be repeated several times as it is reflected off different surfaces

B. You will read about an experimental project for the use of a tuned mass damper on board[6]. Six phrases have been extracted from the text. Fill in the missing phrases in the appropriate spaces.

- ☐ due to its relatively large mass
- ☐ a new firing order was introduced
- ☐ advanced analysis and simulation tools
- ☐ is producing a counter force
- ☐ making a reliable construction
- ☐ detuning natural frequencies

The increasing demand for lowering the noise and vibration levels of engines has forced manufacturers to make use of **...[1]...** In most cases, the practical means to reduce vibration is simply to detune the lowest natural frequencies away from the main dynamic excitation frequencies. When **...[2]...**, the most effective course is to concentrate on the heavy structures built on to the engine and its mounting. A good example is the turbocharger, because its influence on the vibration system is very dominating **...[3]...** .
In certain problematic situations, a tuned mass damper can be used to change the vibration system dramatically. As regards reducing vibration on the Wärtsilä 9L46 engine, a study ended up with two different solutions: for the current production engines, **...[4]...**, offering a better distribution

Wärtsilä 8L46 engine with ABB TPL turbocharger

6. "Engine dynamics and vibration control", by Hannu Tienhaara and Heikki Mikonaho, Wärtsilä in Finland, Marine/ in detail magazine, August 2014.

of the excitation forces at certain harmonic orders. This solution requires the use of a special balancing device in order to cope with the increased first order free couples. However, changing the firing order on a 9-cylinder engine is not a feasible solution for existing engines already in the field. For these engines the tuned mass damper was chosen as being the most suitable solution.
A tuned mass damper is a device whereby an additional mass is mounted with flexible elements on the vibration machine. The damper is tuned in such a way that its own vibration **...[5]...** against the main structure's vibration. Normally, a damper is tuned to dampen a certain natural frequency, but in the case of a constant speed engine, it can also be tuned to a specific excitation frequency. The two biggest challenges in designing and tuning this kind of a system are:

i. Handling a wide range of running speeds and several natural frequencies and mode shapes.
ii. **...[6]...** capable of operating for thousands of running hours without maintenance.

C. You will read an article published in a technical magazine[7]. Answer the questions.

- Why is it important for ships to save energy nowadays?
- What is a very common and easy practice followed to decrease fuel consumption?
- The article proposes a new system for turbocharging. What is it?
- The system is particularly fitting for low-load engine operation. Why is that?
- Why can't conventional turbochargers perform well in low-load engine operation?
- How does the system save energy?

Electric-assist hybrid supercharging

The extremely slow steaming of ships has become the mainstream as a result of the recent energy-saving trend. Turbochargers (super chargers) for marine diesel engines are generally driven only by exhaust gas energy. Mitsubishi Heavy Industries Marine Machinery has developed an electric-assist system for large turbocharger for marine diesel engines, and verified high energy saving advantages in the low-load operating range of the engine.

The ratio of fuel oil costs in ship operational costs has become nearly 50% with the recent price hike in fuel oil. As a result, the reduction of fuel consumption in the total ship operational costs has become an important issue for shipping companies. Many ships have begun to adopt high-efficiency propellers, waste-heat recovery systems of propulsion (main) diesel engines, friction reduction systems that generate bubbles under the ship hull, etc. Slow steaming is the easiest way to reduce fuel oil consumption. Slow steaming at 30% or lower engine load is not uncommon these days. Under such low-load operation, energy saving through waste heat recovery from the main engine is difficult, and the poor performance of a turbocharger driven by scarce exhaust gas energy becomes evident. For this reason, the two-stroke engine requires the combined use of the turbocharger and electric auxiliary blower under low-load operation. In addition, four-stroke engines tend to show a rather high exhaust gas temperature with air shortages under low-load operation, which may result in decreased reliability, increased fuel consumption, and more smoke caused by poor combustion.

In the uniflow scavenging air model two-stroke diesel engines, which is the main configuration of large-commercial-ship propulsion plants, the scavenging air flows into the cylinder when the piston is pushed down by combustion pressure, and moved down below the scavenging ports.

7. "Energy savings through electric-assist turbocharger for marine diesel engines", *Mitsubishi Heavy Industries Technical Review,* Vol. 52 No.1 (March 2015).

At this timing the exhaust valve located at the cylinder upper position is already opened, and the air scavenges exhaust gas. The piston then moves upward to compress air. The scavenging air pressure should be raised enough to effectively replace the combustion gas in the cylinder with air. The turbocharger has the function to raise the scavenging air pressure, but the turbocharger alone cannot raise the pressure sufficiently under low-load operation with a small amount of exhaust gas energy. An electric auxiliary blower is provided at the compressor outlet of the turbocharger, and it is operated when the engine load is 30% or below. The auxiliary blower performance, reliability and economic efficiency had not been very important because the engine operation at such a low load had been limited to the time of departing and arriving in port. Slow steaming has become the main stream of shipping for the reduction of fuel oil cost, and the continuous operation of the auxiliary blower is sometimes required. The auxiliary blower generally consists of a centrifugal blower and an induction motor operated at a constant speed, and it automatically turns ON and OFF with the change of engine scavenging air pressure. Therefore, the blower has a low efficiency and consumes a comparatively larger amount of electric power, while also requiring periodic maintenance.

The generator in a hybrid turbocharger can be used as a motor to work instead of an auxiliary blower by increasing the turbocharger rotational speed (variable speed operation) and increasing the scavenging air pressure of inlet air to the engine. The advantages compared with the auxiliary blower are as noted below:

1) Low electric power consumption with high efficiency.
2) Continuous operation at the optimum scavenging air pressure at any engine load.
3) Fuel oil consumption reduction of the engine.

Part Three

1. Cylinder liner wear

A. Read the text and find the words that are explained in the definitions below.

1. To _ _ _ _ _ is to measure the dimension of the liner with an instrument.
2. The _ _ _ _ of a diesel engine cylinder describes the inside diameter of the cylinder.
3. _ _ _ _ _ _ _ _ is an adhesive type of wear which occurs when there is a breakdown of lubricant film thickness.
4. _ _ _ _ _ _ _ _ particles (in the fuel or the air) cause abrasion.
5. Wear _ _ _ _ is a measurement of the speed at which wear happens.

Cylinder liners will wear in service. Correct operation of the engine (not overloading, maintaining correct operating temperatures) and using the correct grade and quantity of cylinder oil will all help to extend the life of a cylinder liner. Wear rates vary, but as a general rule, for a large bore engine a wear rate of 0.05mm/1000 hours is acceptable. The liner should be replaced as the wear approaches 0.8 - 1% of liner diameter. The liner is gauged at regular intervals to ascertain the wear rate.
As well as corrosive attack, wear is caused by abrasive particles in the cylinder (from bad filtration/purification of fuel or from particles in the air), and scuffing (also known as adhesive wear). Scuffing is due to a breakdown in lubrication which results in localised welding between points on the rings and liner surface with subsequent tearing of microscopic particles. This is a very severe form of wear.
On some large bore, long stroke engines it was found that undercooling further down the liner was taking place. Why is this a problem? The hydrogen in the fuel combines with the oxygen and burns to form water. Normally this is in the form of steam, but if it is cooled it will condense on the liner surface and wash away the lube oil film. Fuels also contain sulphur, which burns in the oxygen and the products combine with the water to form sulphuric acid. If this condenses on the liner surface, then corrosion can take place. Once the oil film has been destroyed then wear will take place at an alarming rate. One solution is to insulate the outside of the liner so that there is a reduction in the cooling effect. On the latest engines, the liner is only cooled by water at the very top, relying on the air in the scavenge space to cool the lower part of the liner.

Wärtsilä cylinder liner

Typical MAN B&W cylinder liner

B. You will read a text on cylinder liner wear. Scan the text and fill in the diagram below, using the words highlighted in the text in blue. The diagram outlines the text, giving titles for each type of wear and some key words that either describe or give causes for the types of wear.

Types of liner wear in marine engines.

Cylinder liners form an integral part of the marine engine. They are fabricated from a cast iron alloy before being machined internally and externally to the required dimensions. Various types of

cylinder liner wear take place in ship engines, mostly occurring between the piston rings and the liner. Cylinder liner wear occurs over a period of time. The main factors that contribute to liner wear can be one or more of the following:

Friction	***Corrosion***	***Clover leafing***
Abrasion	***Adhesion***	***Micro-seizure***

Frictional Wear

Frictional wear takes place between the sliding surfaces, between the cylinder liner and piston rings, and can somewhat be controlled by adequate cylinder lubrication, but is also affected by:

Materials of construction	Choice of cylinder lubrication	Engine load
Surface finish	Piston speed	

Other factors that can either increase or reduce the rate of wear include the cylinder working pressure, temperature, and maintenance of piston rings, combustion efficiency, and any contamination from air or fuel.

Corrosion

Corrosion occurs mainly in engines burning heavy fuels, particularly those with a high sulphur content. It is caused by the acid formed during combustion, and this may be neutralized by the use of high alkaline cylinder oil. Sulphuric acid corrosion may be caused in the lower part of the liner if the jacket cooling water temperature is too low. This may allow vapors present after combustion to condense. The moisture formed absorbs any sulphur present to form sulphuric acid. This can be prevented by maintaining jacket temperature above the corresponding dew point. Water vapor will be present from the combustion of hydrogen together with any water present in the fuel. It may be increased if water passes from the charged air cooler.

Abrasion

Abrasion is caused from metal particles, both from the splintering of piston rings and fuel oil, ash being present in some heavy fuels, along with catalytic fines that will act as an abrasive. These hard particles act as an abrasive material between the piston rings and the cylinder liner causing liner abrasive wear.

Adhesion

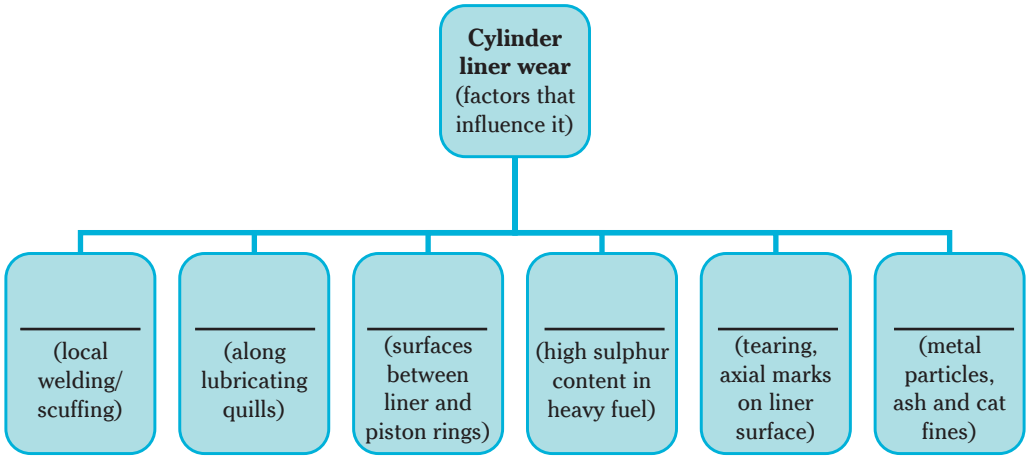
Adhesion or scuffing is a form of local welding between particles of the piston rings and liner rubbing surface, resulting in a rapid wear. This is exacerbated if the lubrication oil film between piston rings and liner is reduced due to excessive temperature, insufficient supply or incorrect distribution of oil, and piston blow-by. Engines operating on some low sulphur grades of fuel oil may also be prone to scuffing damage.

Clover Leafing

This is a form of wear on cylinder liners due to high sulphur content in the fuel oil. Clover leafing takes place between each pair of lubricating quills. Cylinder oil is injected with maximum alkalinity from the quills and as it passes down, the alkalinity reduces and acidity increases. This results in acidic etching on the liner surface in the form of leaf scales along the sides of lubricating quills.

Micro-seizure

Appearance: micro seizure marks run axially on the liner surface. *Causes*: this is due to irregularities in the liner and piston rings coming into contact during operation. They occur as a result of breakdown of lubrication due to an insufficient quantity of lube oil, insufficient viscosity, or excessive loading. *Effects:* this results in instantaneous seizure and tearing takes place on the liner surface and on the piston rings surface. Micro-seizure may not be destructive; indeed it often occurs during a running in period. However, it does become destructive if it is allowed to continue.



Blow-by: during normal operation, a small amount of unburned fuel and exhaust gases escape around the piston rings and enter the crankcase, referred to as "blow-by".

C. Read the text and fill in the missing words. The first letter is given.

Reasons for Cylinder Liner Wear (and ways to measure it)

The wear in the cylinder liner is mainly because of the following reasons:

1) Due to f_____.
2) Due to c_____.
3) Abrasion
4) Scuffing or Adhesion

Whenever two surfaces slide over each other, friction is produced which leads to wearing down of both the surfaces. In cylinder liner wear the surfaces of piston rings are sliding over the cylinder liner. The frictional wear depends upon various factors like speed of movement between the surfaces, material involved, temperature, l_____ on engine, pressure, maintenance, lubrication, and combustion efficiency.

The wear due to corrosion is caused due to the burning of heavy fuel oil in the combustion space. This happens because heavy fuel oil contains high sulphur content. During c_____, acids are formed inside the space which should be neutralized by cylinder oil which is alkaline in nature. The production of acids will be more if sulphur content is more, leading to the formation of sulphuric acid. Sulphuric acid is formed due to absorption of the condensate or moisture present inside the combustion space. Sulphuric acid corrosion is found more in the lower part of the liner as the temperature of jacket water is very l_____. Corrosion due to sulphur will be high due to the presence of water in fuel and condensate in the air. This wear is generally seen between the quills. The wear near the quills enlarges and gives a characteristic of the clover leaf shape to the wear pattern. This phenomenon is called clover leafing.

Abrasion is a wear due to the hard particles present and formed during combustion. Catalytic f_____ in the fuel and the ash formed during the combustion causes abrasive wear.

Adhesion or Scuffing is a form of local welding between the particles of piston rings and the liner surface. As the piston is moving inside the liner, the welding which has occurred breaks and leads to the formation of abrasive material. The abrasive material will increase the r_____ of wear of the liner. This is generally caused by insufficient lubrication due to which large amount of heat is produced and microscopic welding of rings and liner surface takes place. Due to this type

of wear the liner loses its properties to adhere cylinder oil to the surface. One more reason for this phenomenon is polishing of the surface caused by scuffing, giving liners a mirror finish.

D. You will read a text on gauging the cylinder liner and minimizing its wear. Six phrases have been extracted from the text. Fill in the missing phrases in the appropriate space. Write the correct number in each box.

☐ per 1000 running hours ☐ from the charge air ☐ as per
☐ for both port starboard and forward aft positions ☐ at regular intervals ☐ or vice versa

How can cylinder liner wear be minimized?

Cylinder wear can be minimized by carrying out the following steps:

1) By avoiding any ingress of water inside the liner by properly treating the fuel oil.
2) By maintaining the correct feed rate and grade of cylinder oil.
3) By avoiding ingress of moisture **…[1]...**
4) By maintaining proper jacket water temperature.

How is cylinder liner wear gauged?

Cylinder liner has to be gauged **…[2]…** as specified in the maintenance manual. The records of gauging are kept for each cylinder and wear rate is calculated. The liner has to be cleaned and inspected before the gauging. Generally while taking the measurement, the temperature of the liner and micrometer should be the same. If the temperature exceeds that of the liner **…[3]…** then the reading has to be corrected by multiplying the value with the correction factor and deducting the value obtained from the reading taken. The reading obtained at the end will be the correct reading.
The cylinder liner wear is measured by a standard template, which consists of strategically positioned holes, wherein the micrometer is placed and the readings are taken. The readings are taken **…[4]...** This is done because the wear is not the same in both directions and the ovality is checked.
The wear rate will be different in the liner. The wear will be more in the top one third part as combustion takes place there and temperatures and pressure are also very high at the top.
An approximate normal wear rate of the liner is about 0.1 mm **…[5]...** The wear rate increases if the engine is overloaded. Generally the liner has to be replaced when the wear is about 0.6-0.8% of the bore diameter or **…[6]…** the manufacturer's recommendation.

E. Listen to a presentation that explains* cold corrosion *and fill in the missing words, found in the box.

feed rate	iron content	sulphuric acid	Base Number
70BN cylinder oil	lube oil	abrasive iron	100BN cylinder oil

1. The basis of cold corrosion is _____.
2. To combat cold corrosion you must identify the optimum _____ and _____.
3. The recommendation for highly corrosive engines is a _____.
4. The recommendation for moderately corrosive engines is a _____.
5. Onboard cylinder oil analysis tests the following two key parameters: _____ and _____.
6. There are two different wearing mechanisms that result in the iron content of oil:
   - corrosive iron wears off due to the acids present
   - _____ wears out of the cylinder liner surface

F. Read about the problem of cold corrosion and answer the questions.

- Why is cold corrosion a big problem recently and which type of engine operation leads to it?
- What are the "sweep test" and "quick test"?
- What is a "condition monitoring programme"?

What is cold corrosion?[1]

Cold corrosion is when sulphuric acid forms on the liner walls in an engine cylinder and corrodes the liner surface. This abnormal corrosion then creates excessive wear of the liner material. This has become an issue recently in new engines which are now designed to comply with the Tier II NOx regulations and Energy Efficiency Design Index (EEDI) guidelines. To meet the new regulations, engine cylinders must operate under increased pressures and reduced operating temperatures. This creates conditions below the dew point that allows water to condense on the cylinder liner walls. This then combines with sulphur from the combustion process to form sulphuric acid, which leads to cylinder liner wear or cold corrosion.

How serious is cold corrosion for my engine?

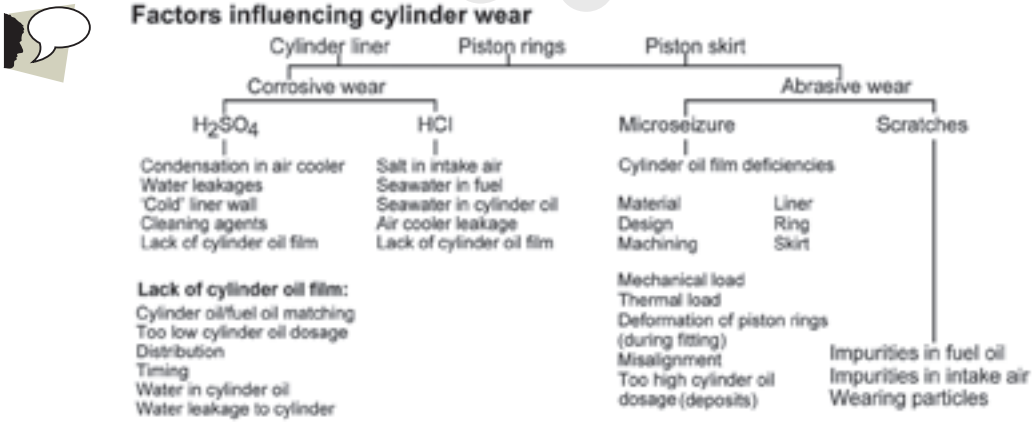
Cold corrosion is at its most serious in the latest engine designs. It also impacts earlier engine designs modified for part-load or low-load operation (known as 'slow steaming', where vessels may operate as low as 10% load). These modifications may include; turbocharger cut-out, variable turbo charger nozzle rings fitted, exhaust gas by-pass valve fitted, and engine tuning changes. Some modified engines become mildly corrosive whereas others may be more seriously affected.

How do I manage cold corrosion?

Whilst it is very difficult to avoid cold corrosion, there are a number of steps you can take which can help to tackle the issue:

- Identify how serious the problem is through onboard oil analysis – MAN recommends the use of a 'Sweep Test' and Wärtsilä have a similar 'Quick Test'.
- Implementing a condition monitoring programme to monitor the performance of the engine and cylinder oil is crucial. This programme should monitor the parameters of iron wear and the residual Total Base Number (TBN) in scrape down oil.
  - It will enable the correct cylinder oil to be selected.
  - It will enable the feed rate to be optimised to suit the engine, operating conditions and the cylinder oil in use.

G. Use the information given in the diagram below to talk about cylinder liner wear and its causes.



1. From https://www.exxonmobil.com/MarineLubes-En/your-industry_hot-topics_clo-cold-corrosion.aspx.

2. Diesel Engine Troubleshooting

A. You will read a list of possible starting difficulties, some causes and their remedies. What do the words in bold italics in the list mean? Match them to the explanation. Write the correct letter (a-g) in the boxes.

☐ 1. defective
☐ 2. solenoid valve
☐ 3. puncture valve
☐ 4. faltering
☐ 5. sluggishness
☐ 6. alternatively
☐ 7. respectively

a) slow motion, idleness
b) faulty
c) irregular running of the engine
d) as a second choice
e) electromagnetic valve
f) correspondingly, to the relevant one
g) injection valve

Starting Difficulties

Difficulty	Point	Possible Cause	Remedy
Engine fails to turn on starting air after START order has been given	1	Pressure in starting air receiver too low.	Start the compressors. Check that they are working properly.
	2	Valve on starting air receiver closed.	Open the valve.
	3	Valve to starting air distributor closed.	Open the valve.
	4	No pressure in the control air system.	Check the pressure (normally 7 bar). If too low, change over to the other reducing valve and clean the filter.
	5	Main starting valve (ball valve) locked in closed position.	Lift locking plate to working position.
	6	Main starting valve (ball valve) does not function owing to activated turning gear locking device.	Release the turning gear locking device.
	7	Control selectors are wrongly set.	Correct the setting.
	8	The starting air distributor has not activated its end stop valve.	Lubricate and make the shaft movable so that the distributor moves easily. Check and adjust the air cylinder and end stop valves.
	9	Pistons in starting air distributor sticking.	Lubricate and make the pistons movable. Overhaul the starting air distributor.
	10	Distributor wrongly adjusted.	Check the timing marks. ***Alternatively***, with engine piston 1 in TDC, check that the starting air distributor piston for cyl. 1 is lifted to the same height (with a tolerance of about 0.2 mm) by, ***respectively***, the AHEAD and ASTERN cam of the starting air distributor.
	11	Sticking control valve for starting air distributor.	Overhaul the control valve slide.

Difficulty	Point	Possible Cause	Remedy
Engine does not reverse when order is given	12	Starting air valves in cylinder covers defective.	Pressure-test the valves. Replace or overhaul defective valves.
	13A	Control air signal for staring does not reach the engine.	Find out where the signal has been stopped and correct the fault.
	13B	Propeller blades are not on zero-pitch (CPP-plants).	Set pitch to zero position.
	14	Coil of ***solenoid valve*** for the desired direction or rotation does not reach the engine.	See the “Bridge Control” instruction book.
	15	Control air signal for the desired direction of rotation does not reach the engine.	By loosening one copper pipe at a time on the signal’s route through the system, find the defective valve or pipe which stops the signal. Repair or repair the valve.
	16	‘Slow-turning’ (option) of engine adjusted too low.	Set the “slow-turning” adjustment screw so that the engine turns as slowly as possible without ***faltering***.
	17	‘Slow-turning’ (option) is not cancelled (automatic control).	See the “Bridge Control” instructions.
	18	Faulty timing of starting air distributor.	Check the timing, see also point 10.
	19	***Defective*** starting valves in cylinder covers.	Pressure-test the valves for leakages. Replace or overhaul the defective valves.
Engine turns on starting air but stops after receiving order to run on fuel	20	***Puncture valves*** not deaerated.	Find the cause of the stop-order and correct the fault.
	21	Shut-down of engine.	Check pressure and temperature. Reset “shut down”.
	22	***Sluggishness*** in the manoeuvring gear.	Lubricate the manoeuvring gear. Ensure that the fuel pumps, rod connections and bearings are movable.
	23	Faulty adjustment of manoeuvring gear.	Check the rod connections. Check that the fuel pump index corresponds to “Adjustment on testbed”.
	24	Governor air booster (Woodward) does not supply oil pressure to the governor during the starting air period (Woodward governor only).	See the Governor instructions.
	25	The pre-set speed setting pressure to the governor (Woodward), is set too low, or for too short a period.	The pressure shall be set between 1.6 and 2.0 bar, and maintained for about 6 seconds.
	26	Engine runs too long on starting air, so the governor has time to regulate the pump index downwards, before running starts on fuel oil.	Automatic running: Adjust the starting level. Manual running: shorten the starting air period.

(continue)

Difficulty	Point	Possible Cause	Remedy
Engine turns on fuel, but runs unevenly (unstable) and will not pick up rpm	27	Fault in governor.	Woodward governor Check that the governor functions with the correct oil pressure. Check that the limiting functions in the governor are adjusted correctly. Deflection at the starting moment shall be about 6 on the terminal lever scale. Electronic governor See the Governor instruction book.
	28	Auxiliary blowers not functioning.	Start auxiliary blowers.
	29	Scavenge air limit set at too high or too low level.	Check level of scavenge air pressure and the exhaust gas pressure at the actual load. Compare the pressures with shop or sea trial observations.
	30	Fuel filter blocked.	Clean the filter.
	31	Too low fuel pressure.	Increase the pressure.
	32	One or more cylinders not firing.	Check suction valve and puncture valve in fuel pump. Check individual index; if no index, check the rod connections and the safety shut-down system. If fault not found, change fuel valves.

B. You will read a list of running difficulties, some possible causes and their remedies. Fill in the missing words. Use the words in the box.

appear	drain	raise	repair	observed	adjusted	sticking	fouled

Running Difficulties

Difficulty	Point	Possible Cause	Remedy
Exhaust temperature rises a) all cyl.	1	_____ air and gas passages.	Clean the turbine by means of dry cleaning/water washing. Clean the blowers and air coolers. Check the backpressure in the exhaust gas system just after the T/C turbine side.
	2	Wrong position of camshaft (maladjusted or defective chain drive).	Check pmax. Check camshaft with pin gauge. Check chain tension.
b) single cyl.	3	Leaking exhaust valve.	Replace or overhaul the valve.
	4	Wrongly _____, or slipped, fuel cam.	Check the fuel pump lead.
Exhaust temperature decreases a) all cyl.	5	Falling scavenge air temperature.	Check that the seawater system thermostat valve is functioning correctly.
	6	Air/gas/steam in fuel system.	Check the fuel oil supply and circulating pump pressures. Check the function of the de-aerating valve. Check the suction side of the supply pumps for air leakages. Check the fuel oil preheater for steam leakages.

Difficulty	Point	Possible Cause	Remedy
b) single cyl.	7	Defective fuel pump suction valve.	_____ the suction valve.
	8	Fuel pump plunger or puncture valve _____ or leaking.	Replace the fuel pump or the puncture valve.
	9	Reversible roller guide in wrong position (reversible engines).	Check the roller guide mechanism for seized bearings, roller guide, roughened rollers or cam etc. In case of seizure being _____, check the camshaft lube oil filter as well as the by-pass filter for possible damage.
Engine r/min decrease	10	Exhaust valve sticking in open position.	Replace the exhaust valve.
	11	Oil pressure before fuel pumps too low.	_____ the supply and circulating pump pressures to the normal level.
	12	Defective fuel valve(s) or fuel pump(s).	Replace and overhaul the defective valve(s) and pump(s).
	13	Water in fuel oil.	_____ off the water and/or clean the fuel more effectively.
	14	Slow-down or shut-down.	Check pressure and temperature levels. If these are in order, check for faults in the slow-down equipment.
	15	Combustion characteristics of fuel oil.	When changing from one fuel oil type to another, alterations can _____ in the r/min, at the same pump index.

3. Refrigeration

A. You will read a text on refrigeration and the components of a refrigeration unit. Match the words below to their definitions.

Refrigeration

The refrigeration plants on merchant vessels play a vital part in carrying refrigerated cargo and provisions for the crew on board. In reefer ships, the temperature of the perishable or temperature sensitive cargo, such as chemicals or liquefied gas, is controlled by the refrigeration plant of the ship. The same plant or a smaller unit can be used for maintaining the temperature of different provision rooms carrying food stuffs for crew members. The main purpose of ship's refrigeration plant is to avoid any damage to the cargo or perishable material so that the cargo is transported in good condition. Refrigeration prevents growth of micro-organisms, oxidation of cargo etc.

Any refrigeration unit works with different components in line to each other in series. The main components are:

1. A reciprocating single or two stage ***compressor*** is commonly used for compressing and supplying the refrigerant to the system.
2. The ***condenser*** is used to cool down the refrigerant in the system.

3. The cooled refrigerant is supplied to the ***receiver***, which is also used to drain out the refrigerant from the system for maintenance purposes.
4. The ***drier*** connected in the system consists of silica gel to remove any moisture from the refrigerant.
5. Different ***solenoid*** valves are used to control the flow of refrigerant into the hold or room.
6. An ***expansion*** valve regulates the refrigerants to maintain the correct hold or room temperature.
7. The ***evaporator*** unit acts as a heat exchanger to cool down the hold or room area by transferring heat to the refrigerant.
8. The ***control*** unit consists of different safety and operating circuits for safe operation of the reefer plant.

1. oxidation	☐ extremely important; necessary for the success of something
2. perishable	☐ likely to decay or go bad quickly
3. provisions	☐ control or maintain the rate or speed (of a machine, etc.)
4. plant	☐ the large machinery that is used in industry
5. vital	☐ an increase in the size, amount or degree of something
6. growth	☐ the result of the process of combining chemically with oxygen
7. regulate	☐ supplies of food, drink or equipment

B. Use the words in the previous exercise to fill in the sentences that follow.

1. The rapid _____ of piracy attacks in Somali waters is connected to political instability in the area.
2. We need to be extra careful with the storage of _____ foods.
3. Nowadays, a typical marine propulsion _____ is a slow-speed, turbocharged, two-stroke Diesel Engine directly coupled to the vessel's single, large diameter, fixed-pitch propeller.
4. When coal is burnt, sulphur dioxide is created due to the _____ of sulphur.
5. We have enough _____ to last us for 2 months.
6. Good leadership and management skills are of _____ importance in becoming a successful marine superintendent.
7. The valve is used to _____ the flow of water.

C. The following text comes from a company advertisement of refrigeration systems. Fill in the missing verbs in the description of the system operation.

returned	absorbs	compressed	starts	turns into	cools

Marine refrigeration system

A marine refrigeration system is a key element onboard any vessel. Well-maintained food and drinks are essential for passengers' and crew's health. And obviously, cargo ships need to be equipped with high quality marine refrigeration and air conditioning, as their core business is to assure the quality of the cargo during transport.

How a refrigeration system works

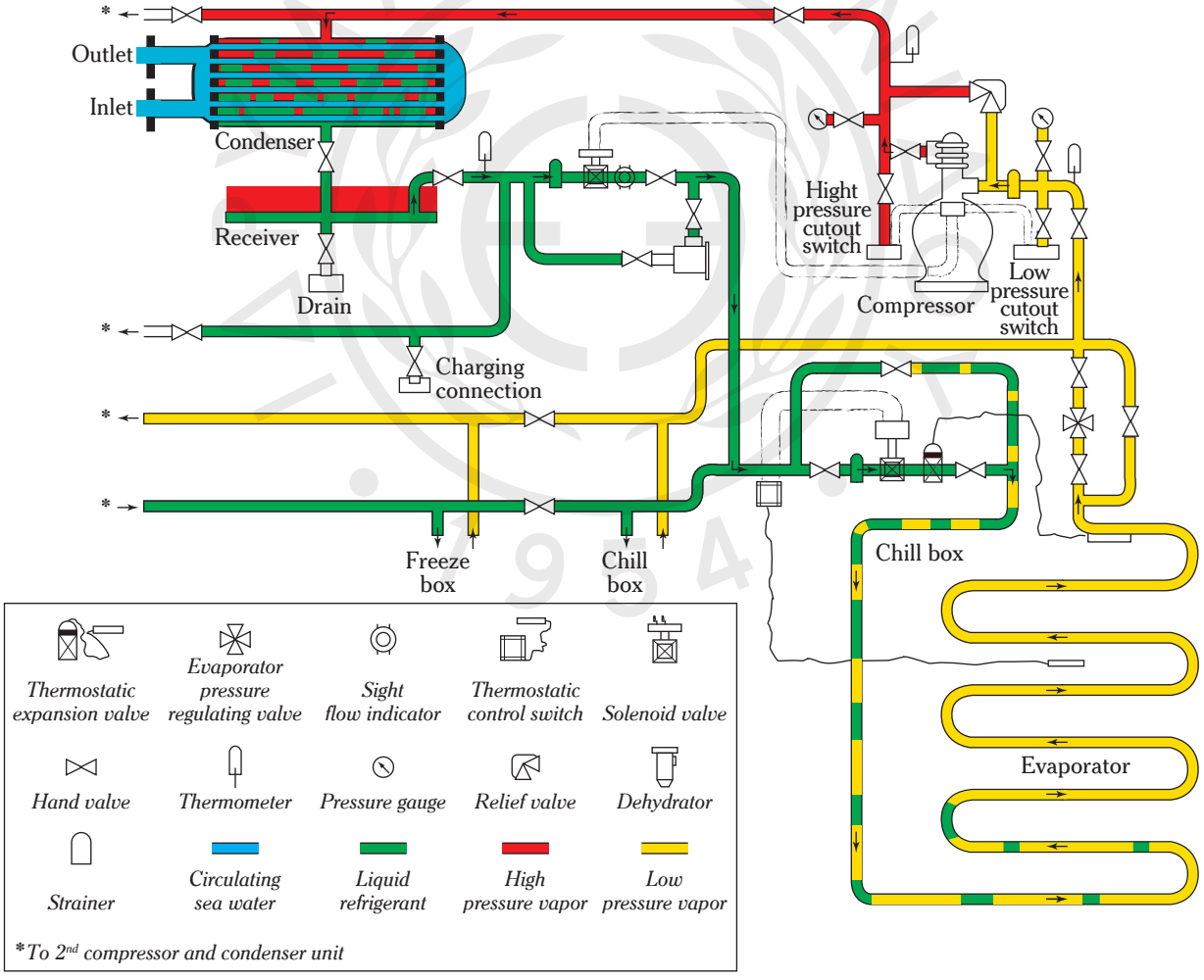
The refrigeration cycle consists of the following components: ***the refrigerant*** (R22 is an often used refrigerant, but due to the European F-gas Regulation, we have been researching alternatives like R290, Propane), ***the compressor*** (we use Turbocor compressors in our systems as these are exceptionally sustainable, totally oil-free and take up half the space of conventional compressors), ***the condenser*** (our condensing units are either sea-water cooled, fresh-water cooled or air-cooled), the evaporator and the expansion device.

The refrigerant starts as a gas and is (1) _____ in the compressor, which increases its temperature dramatically. Thereafter, the condenser (2) _____ the hot high pressure refrigerant and this way the refrigerant (3) _____ a liquid. Next, the evaporator boils the refrigerant back to a gas, at a very low temperature. The change from liquid to gas (4) _____ the heat from the evaporator, which in turn removes the heat from the insulated refrigeration box, thereby lowering its temperature. Hereafter, the refrigerant is (5)_____ back to the compressor and the refrigeration cycle (6)_____ again.

D. The main parts of a refrigeration system are shown in the diagram below[2]. Use the diagram to orally explain how the system works. Also, identify the relief valve.

Start like this:

The primary components of the system include the thermostatic expansion valve, evaporator, compressor, condenser, and receiver. All refrigeration systems must also be fitted with a relief valve, which in this case can be found in.....



2. From "Refrigeration systems", hawsepipe.net, merchant marine training, http://www.hawsepipe.net/chiefhelp/AC&R/Refrigeration.htm.

4. Insulation

A. You will read a text that gives information on insulation for marine applications. Fill in the missing words in the summary notes on the next page that outline the information given.

Insulation considerations[3]

Excessive heat and cold are good reasons to insulate for safety and comfort. In the marine and engine world heat problems are a condition to be identified and controlled.

Preventative Maintenance

Preventative maintenance is preferable to emergency downtime for repairs. The challenge is to identify problems well before they become critical. When equipment is not operating correctly, excessive heat is generated. Non-contact infrared "Laser pointer" Thermometers can be used as a diagnostic tool to identify such potential problems. By sweeping the thermometer over electric panels, bearings, and engines one can often identify where "hot spots" are present, and after investigation find perhaps an unknown problem developing. The correct diagnostic instruments go a long way to resolving problems. This valuable function for a non-contact thermometer makes it a valuable addition to your tool bag!

Heat loss from engine exhausts, piping, silencers etc., together with steam piping systems can be considerably reduced by insulating. Due to the narrow confines of Engine Rooms, galleys and gangways on board, in the interests of safety and good working environments, insulation is critical for personnel protection, reduction of ambient heat load, protection of heat sensitive sensors and equipment, fire prevention, and maximizing the effectiveness of exhaust catalytic purifiers/filters.

Insulation Materials

Since the outlawing of Asbestos, which was broad-spectrum temperature insulation, alternative insulation materials had to be found. Fiberglass, Mineral Wool, CalSil and Ceramic Insulation have been adopted as substitutes. All these materials are considered non-combustible by the various Insurance Authorities and Coast Guard. Fiberglass, Mineral wool and Calsil materials are rated up to 625°C and the Ceramic Insulation up to 1200°C. Fiberglass, Mineral Wool, and Ceramic Insulation are available in various forms, depending on the product, such as flexible blanket, and preformed pipe and elbow sections. Being fibrous they stand up well to high vibration conditions without breaking down. Calcium Silicate is a good insulator, comparative to glass fiber, available in pipe and elbow preforms but because of its rigid form, is not a good insulation in high vibration environments, as it tends to break up. Each type of insulation should be used where their best characteristics are used to full advantage. There are price differences between the different types of insulation, and often a decision made on price alone could lead to a short-term solution that has to be remedied well before the normal expected life span of the material. As these insulation materials do not have a wear resistant finish, they have to be covered with a protective outer skin. This could be galvanized or aluminum cladding, painted lagging, PVC, coated fiberglass or other suitable non-combustible material. The choice depends on whether permanent or removable insulation is required and considerations such as sea-air and other chemical environments.

Insulation Categories

There are basically two groups of insulation applications, Permanent and Removable. Similar insulation material is used for both applications; however the outer "cladding" or skin will differ.

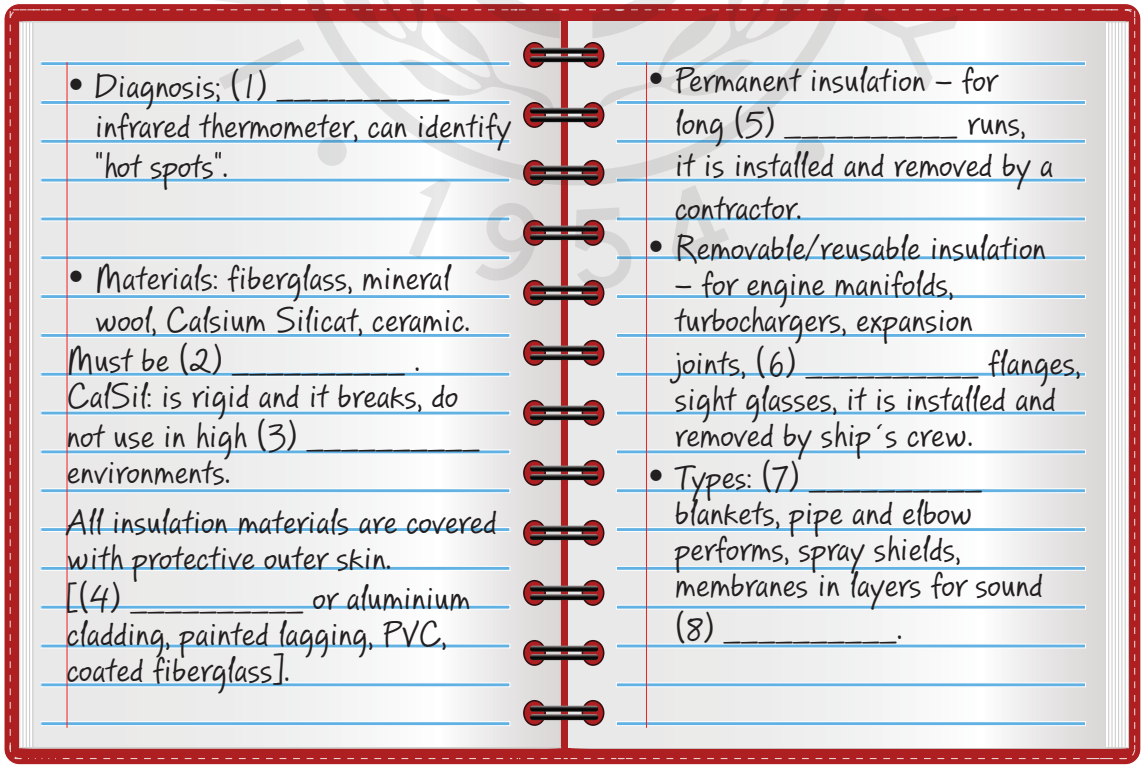
3. From http://www.firwin.com/pdf/marine-insulation-issues.pdf.

A. *Permanent* is ideal for long pipe runs but not for any application where ease of removal for maintenance and/or inspection is essential. Permanent insulation is routinely installed by an outside contractor and is messy to remove [not replaceable] – it can usually only be replaced by a contractor. Initial installation cost is usually less than removable blankets. However, replacement insulation obviously doubles the cost. This type of insulation is cut and fitted on site.
B. *Removable/Reusable* Insulation is modular – made up in convenient size panels or sections, and can be easily installed or removed by your own crew – only sufficient blankets have to be removed to enable a particular maintenance or inspection job to be done. After service or maintenance the blanket can be replaced without special tools. Although slightly more expensive than permanent insulation, it becomes more and more economical every time you remove and replace a module. These blankets are ideal for engine manifolds, turbochargers, expansion joints, valves of all types, flanges, and sight glasses and also any equipment that has to be repaired/serviced in remote areas where insulation contractors are not readily available. Measurements are taken on site, the blankets usually made off site in a factory, and the ship's crew can do installation. In order to be able to replace blankets that are damaged or require to be replaced, the manufacturer usually keeps complete records of each blanket on hand.

Other Insulation / Protection Systems

Steam Spray Shields: During the Second World War due to the high accident rate from steam burns due to burst flange gaskets, steam spray guards were introduced in combination with removable insulation covers to protect against accidental burns as sailors walked by. Nowadays, spray insulation can be used for thermal insulation, sound absorption and fire resistance (melting temperature up to 750°C).
Sound Attenuation The fibrous nature of some of the insulation materials used for heat insulation is also a sound absorber. You can reduce noise by using dense membranes in composite layers. It is important to specify composites that fall within the fire safety standards required.

valves pipe non-contact flexible attenuation non-combustible galvanized vibration



B. Match the following words, which are found in the text above, to their definitions.

1. cladding	☐ much, a lot, significantly
2. excessive	☐ a covering of a hard material, used as protection
3. considerably	☐ (of environment conditions) existing in the surrounding area
4. confines	☐ a thing that you use instead of the one you normally use
5. ambient	☐ making something illegal and unacceptable
6. outlawing	☐ the boundaries of a place which restrict freedom of movement
7. substitute	☐ greater than what is reasonable or appropriate

5. IMO SMCP: Handling liquid goods, bunkers and ballast pollution prevention (B3/1.3)

A. The following orders are given for safety measures preparation and ballast handling. Finish the responses (which report that the order is executed) in the appropriate way, as in the examples.

Order	*Response*
1. Plug the scuppers and report.	1. All scuppers are plugged.
2. Close the sea-valves and report.	2. All sea-valves are _____.
3. Stand by absorbent materials and report.	3. Absorbent materials standing by.
4. Stand by spill control gear and report.	4. Spill control gear _____ _____.
5. Stand by foam monitor and report.	5. Foam monitor _____ _____ .
6. Fit bonding wire and report.	6. Bonding wire _____ _____.
7. Instruct the pumpman and report.	7. The pumpman _____ _____.
8. Pump out ballast tank No 2 and report	8. Ballast tank No 2 _____ _____ _____.
9. Stop the ballast pump – ballast dirty!	9. Ballast pump _____ _____.

B. Fill in the missing words in the following questions.

maximum	washing	connect	operational	stripping
available	pressure	receiving	disconnected	inerted

1. Is the Oil Pollution Prevention Plan ..... ?
2. What is the ..... loading rate?
3. Is the inert gas system ..... ?
4. When will crude oil ..... start?
5. Are your tanks ..... ?
6. What is the pumping ..... ?
7. Can we ..... the loading arm?
8. What is the backpressure for ..... ?
9. Are the cargo hoses..... ?
10. Are you ..... ?

C. Fill in the missing preposition in the phrases below that are used when reporting spillage.

[choose from: *into, into, with, with, about, on, in, up, by, at*]

1. Leak _____ manifold connection!
2. Spill is _____ 2 tonnes.
3. Treat spill _____ dispersants.
4. Stand _____ oil clearance team and report.
5. Spillage stopped and cleaned _____.
6. Spill waste contained _____ save-all.
7. Oil escaping _____ harbour water!
8. Dispose the sludge _____ the sludge tank.
9. Maintain contact _____ the oil terminal _____ VHF channel 14.

D. Fill in the correct verb.

stop	start	order	inform	pump	keep	increase

1. _____ the slops into the slop tank.
2. _____ a shore slop barge.
3. _____ the ballast overflow pump.
4. _____ pumping rate.
5. _____ pollution control!
6. _____ a safe working pressure.
7. _____ pumping slowly.

6. Review to Part Three *(Consolidation and expansion)*

A. Check your ability to answer marine engineering questions in English. The following multiple choice test has been adapted from a USCG "motor plant" test for marine engineers. The correct answers are provided in the end.

	Question	Choice A	Choice B	Choice C	Choice D
1	A disadvantage of a four-stroke/cycle over a two-stroke/cycle diesel engine is _____.	higher working temperature of piston and cylinder	the required use of scavenging ports	greater weight per horsepower ratio	intake valve temperatures higher than exhaust valve temperatures
2	A diesel engine which is rated for normal operation at a crankshaft speed of 800 RPM is commonly classed as a _____.	slow-speed diesel	medium-speed diesel	high-speed diesel	constant-speed diesel
3	A diesel engine piston crown can crack from _____.	excessive piston to liner clearance	excessive dirt beneath the piston crown that reduces heat transfer	faulty nozzle spray	all of the above
4	A centrifuge will satisfactorily remove which of the following contaminants from fuel oil?	Gasoline	Water	Lubricating oil	Sulphur Compounds
5	A decrease in the flash point of the diesel engine lube oil indicates the lube oil is _____.	diluted with fuel oil	diluted with water	contaminated with carbon	contaminated with sludge
6	A diesel engine experiences a sudden loss in speed, there is black exhaust smoke, with the fuel rack at maximum, and the speed remaining below normal. The probable cause is _____.	engine overload	leaky valves	stuck or broken piston rings	low air injection pressure
7	A diesel engine is supercharged in order to _____.	lower the no-load RPMs	provide more air for combining with the fuel	increase the noload RPMs	provide more fuel for combining with the air
8	Air scavenging of a diesel engine cylinder _____.	blows out the exhaust gases	supplies oxygen for combustion	cools the valves and cylinder walls	all of the above

	Question	Choice A	Choice B	Choice C	Choice D
9	Combustion knock will most likely occur as a result of using a fuel with _____.	low ignition quality	a high volatility	low ignition delay	a high cetane number
10	A viscous damper, as used on a marine diesel, is a sealed precision built device which dampens the torsional vibrations in the _____.	camshaft	flywheel	crankshaft	thrust shaft
11	A scored diesel engine cylinder liner will cause _____.	high firing pressure	abnormally high cooling water temperature	rapid wearing of piston rings	combustion gases in the cooling water
12	A piston is said to be at top dead center when it is _____.	opening the exhaust ports	closing the fuel ports	farthest from the cylinder head	nearest to the cylinder head
13	A piston is at bottom dead centre when it is _____.	opening the exhaust ports	closing the fuel ports	farthest from the cylinder head	nearest to the cylinder head
14	A disadvantage of a two-stroke/cycle diesel engine is _____.	more power strokes per revolution	the use of scavenge air	more complicated valve gear	higher working temperatures of the piston and cylinder
15	Burning fuel with a high sulphur content in a diesel engine will _____.	increase thermal efficiency	cause clogging of the fuel system	increase the ability of the engine to start in cold weather	produce corrosion in the cylinder and exhaust system at low loads
16	Combustion knock can occur in the cylinders of a diesel engine under any condition permitting _____.	a shortened ignition delay period	a lean fuel/air mixture	excess fuel in the combustion chamber	rapid vaporization of injected fuel droplets
17	Diesel engine lube oil can become contaminated as a result of _____.	the water produced during combustion	the sulphur in the fuel	unburned fuel oil	all of the above
18	Diesel engine lube oil diluted with diesel fuel oil is indicated by _____.	decreased viscosity	decreased pour point	increased flash point	increased viscosity
19	Fuel oil day tanks for diesel engines must be checked and cleaned at regular intervals in order to remove _____.	sludge	water	micro-organism growth	all of the above
20	Heavy residual fuel oils are heated prior to centrifuging to	reduce fuel weight	increase specific gravity	separate fuel from lube oil	reduce fuel viscosity
21	If the analysis of used lube oil indicates a high content of iron particles, this could indicate _____.	corrosive deterioration of a bearing	inadequate air filtration	excessive ring and liner wear	excessive cooling of lubricating oil

	Question	Choice A	Choice B	Choice C	Choice D
22	In a diesel engine, excessive cylinder liner wear will cause: I. increased blow-by II. wear between the piston ring and groove	I only is correct	II only is correct	both I and II are correct	neither I or II are correct
23	In a diesel engine, pistons are attached to the crankshaft by	push rods	lash adjusters	connecting rods	piston guides
24	In a diesel engine, the function of lubrication oil is to _____.	provide a film between the shafts and bearings	cool the pistons and bearings	remove metal or dirt particles resulting from wear	all of the above
25	Loop, 'uniflow', 'cross flow', are terms used to describe various types of _____.	control air circuits	scavenging	turbochargers	supercharging
26	Lube oil contamination will increase due to normal wear of engine components as a result of _____.	abrasive particles	metallic oxides	corrosive acids	any or all of the above
27	Routine monitoring of a diesel engine should include _____.	checking for leaks	checking temperatures and pressures	listening for abnormal noises	all of the above
28	Which of the listed substances can be satisfactorily removed from diesel fuel by centrifuging?	Sludge	Gasoline	Fuel oil	Lube oil
29	The possibility of damage from operating a diesel engine at critical speeds is reduced by the use of _____.	an isochronous governor	elastic engine mounts	a vibration damper	a cast iron bed plate with good flexible qualities
30	The rate of wear on a cylinder liner depends on the _____.	quality of air filtration	effectiveness of lubrication	type of fuel used	all of the above
31	Vibrations from diesel engines and engine driven equipment are isolated from the hull structure by _____.	torsional-vibration dampers	harmonic balancers	a detuner flywheel	flexible engine mountings
32	What occurs in the combustion space of a diesel engine cylinder shortly after ignition and before the piston reaches TDC?	Rapid increase in temperature with constant pressure.	Rapid increase in pressure with constant temperature.	Rapid increase in pressure and temperature.	Rapid increase in volume and decrease in pressure.
33	Which of the following statements concerning cylinder liner wear is true?	Liner wear is distributed equally between the upper and lower portions of the cylinder.	Excessive liner wear causes wear between piston ring and groove.	Excessive, but uniform liner wear will not cause wear between piston ring and groove.	Liner wear is normally greatest in the middle of the cylinder.
34	Which of the following operations will have a direct impact on the rate of wear in a cylinder liner?	quality of fuel injected	amount of scavenge air to the cylinder	temperature of the scavenging air	compression ratio of the piston

	Question	Choice A	Choice B	Choice C	Choice D
35	Whether using a centrifuge or a simple filter, oil cleaning and filtration will be the most effective when the oil is at a ____ .	high temperature and a high viscosity	high temperature and a low viscosity	low temperature and a high viscosity	low temperature and a low viscosity

1-C	6-A	11-C	16-C	21-C	26-D	31-D
2-B	7-B	12-D	17-D	22-C	27-D	32-C
3-D	8-D	13-C	18-A	23-C	28-A	33-B
4-B	9-A	14-D	19-D	24-D	29-C	34-A
5-A	10-C	15-D	20-D	25-B	30-D	35-B

B. Match the questions to the answers.

Question	Answer
1. Which device is installed on a diesel engine to isolate some of the crankshaft vibrations caused by rotational and reciprocating forces?	☐ Contaminated fuel.
2. When overhauling a diesel engine, prior to removing the piston, which is the best tool to use to remove the wear ridge at the top of the engine cylinder liner?	☐ Ignition quality.
3. What is the name for the process of supplying a diesel engine cylinder with air at a pressure greater than atmospheric?	☐ Centrifuging.
4. What does the cetane number of a diesel fuel oil indicate?	☐ An electric hand grinder.
5. What is the main source of fuel injection system malfunctions?	☐ A torsional vibration damper.
6. What is the most effective method in removing water from diesel fuel oil?	☐ Supercharging.

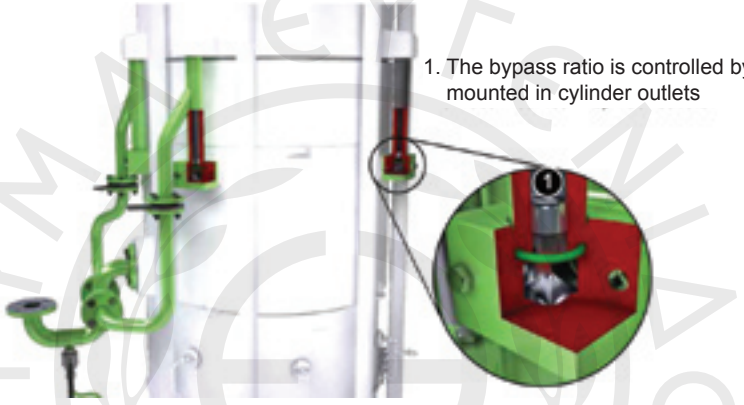
C. You will read a text on three systems developed by MAN Diesel for controlling cylinder liner corrosive wear[4]. Which system is shown in each picture below? Circle the correct picture number for each title.

1) Internal jacket cooling water bypass ***controlled*** (JBC) system ➡ *Picture number **1 / 2 / 3***
2) ***Load-dependent*** cylinder liner jacket cooling water (LDCL) system ➡ *Picture number **1 / 2 / 3***
3) Jacket cooling water bypass ***basic*** (JBB) system ➡ *Picture number **1 / 2 / 3***

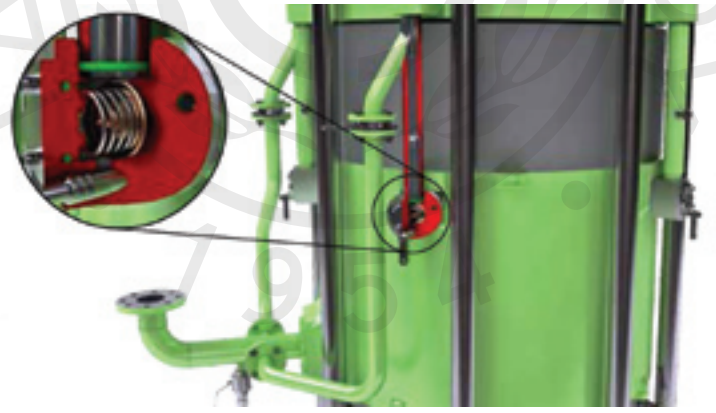
In order to suppress cylinder liner cold corrosion, we have introduced various systems to increase the cylinder liner wall temperature. A jacket cooling water basic bypass system (JBB) can determine the correct amount of cooling water to be bypassed. The amount of bypassed water is determined by orifices mounted in the cylinder outlet pipes. Bypassing 85% of the jacket cooling water will increase the liner wall temperature by approximately 15°C. In addition, the jacket cooling water outlet

4. "Increased jacket cooling water temperatures – various systems", in Service experience, MAN B&W Two-stroke Engines, MAN Diesel and Turbo, May 2014.

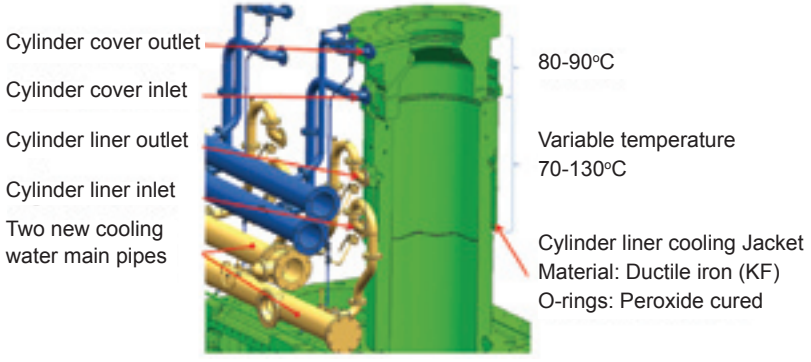
temperature is increased to 90ºC. All together, an approximately 20ºC increase of the liner wall temperature is achieved. Tests have revealed that bypassing an even larger amount is possible.
Furthermore, a controlled version of the JBB system, called JBC, is being developed. In this system, a thermostatic valve controls the amount of bypass in such a way that a large amount of water is bypassed at low load and less is bypassed at higher loads. The JBB and JBC systems can both be easily fitted on engines already in service. The system consists of two extra cooling water pipes along the engine. An extra pump and an extra control valve ensure up to 130°C on the cooling water for the cylinder liners while maintaining 80-90°C on the cover and exhaust valve. A high temperature on the cylinder liner is maintained up to 90% load.
The load-dependent (LDCL) system is designed with an extra mixing circuit on the engine comprising a pump, a three-way valve and a control system. Preliminary results of service tests have shown that a significant reduction of the specific cylinder oil consumption is obtained with this four-pipe jacket cooling water system. The LDCL system does not mean changing the connections to the vessel's cooling water system.



[1]



[2]



[3]

APPENDIX II
Fatigue at Sea

A. FATIGUE AT SEA – based on the findings of the Cardiff University Research Program.

Defining fatigue: The obvious manifestation of fatigue is falling asleep, you are so tired you actually fall asleep. For example, ANTARI was a vessel which grounded when the Chief Officer, who was on watch, fell asleep.

Seafaring culture: There is a seafaring culture in the maritime world of the ship coming first. Seafarers try to keep the ship running and to accommodate the shipowner. In aviation, working times and rest times are strictly regulated. But it's not just the rules and regulations; in the maritime world you have to adjust the culture and increase safety awareness.

Research methods: To research fatigue objectively, they measure hormone levels, such as cortisol, and measure reaction times to see how much performance is influenced by fatigue. The black dot test: after the watch seafarers are asked to sit and watch a black dot and this is a good indication of how sleepy they are.

Changes in the shipping industry: fatigue in the past was about physical strain but now crew numbers are reduced, ships are bigger, they are travelling at high speeds in closer proximity to navigational hazards and the level of automation and complexity of systems is problematic because people are asked to just monitor rather than actively work.

Comparing sectors: safety standards in tankers are very high, tanker ships are vetted by all the companies who use them and are regularly port state inspected; fatigue is greatest in mini-bulkers, short sea bulk carriers with multiple port calls.

Causes

- *ship design*: ships are designed to be as habitable as possible, but there is a lot of noise, vibration and movement with a negative impact in your ability to sleep
- *seafarer training*
- *watch systems*
- *port turn-arounds*
- *heightened security and anti-piracy arrangements*
- *communication and administration*
- *travel to the vessel:* crewmembers immediately go on watch without resting first
- *hours of work and timesheets:* in some companies seafarers themselves feel under pressure not to upset their owners because they are afraid of losing their job, so they don't record proper working times
- *manning*
- *competition between flags*

The future: The answer is larger crews, longer working hours and stronger regulations.

B. The causes and effects of fatigue.

There are the following fatigue causal factors:

a) ***Workload:*** The harder people work, the sooner they need time to recover from it. Workload itself is influenced by the design of the tools, equipment and procedures people must use and the expertise they have acquired through training and experience.

b) ***Sleep debt:*** People need enough sleep of the right sort to recover from their wakeful activi-

ties. In its absence, they build up a sleep debt which severely affects their ability to stay alert. Sleep debt causes people to misread situations, overlook key information and fall asleep even when they know it will put them and their colleagues at extreme risk.

c) ***Perceived risk or interest:*** If people are stimulated by their sense of risk or interest in what they are doing, they can stay awake and alert for longer. However, the time they then need to recover from sustained activity will also get longer. If people are engaged on tedious or boring tasks, they will feel tired sooner.

d) ***Time of day:*** People live by natural daily rhythms which means that they feel least alert in the small hours of the morning and most alert in the period before midday.

e) ***Environment:*** People become more fatigued in environments with bad levels of light, noise, vibration, temperature and motion.

These factors have the following effects on human behaviour:

a) ***Decreased attention and vigilance:*** People become less alert and slower to notice things. They fail to detect signals or their significance, especially during monotonous tasks. Tasks requiring sustained attention or surveillance are especially affected by fatigue.

b) ***Communication difficulties:*** It becomes increasingly difficult to decide what needs to be said, how to say it, or what another person said.

c) ***Inability to concentrate:*** Maintaining focus on the task at hand, even for a few seconds, is difficult. People cannot follow complex directions or numerical calculations, and are easily confused.

d) ***Omissions and carelessness:*** People increasingly skip steps, miss checks and make mistakes.

e) ***Slower comprehension:*** It takes increasingly longer to understand any written or spoken information, or display patterns (e.g. nautical charts).

f) ***Mood changes:*** Irritability, depression and apathy increases.

g) ***Faulty memory:*** Recall of recent events or orders becomes faulty. For example, the content of a radio message may be immediately forgotten or recalled incorrectly.

C. Effects of fatigue on the mind and body.

Fatigue occurs when the balance is lost between physical and mental effort when awake, and the need to recover from that effort.	
Going for a few nights without enough sleep affects the way a person's brain functions. Not getting enough sleep leads to: 1. feeling sleepier – eventually involuntary lapses into sleep begin to occur 2. having difficulty staying alert 3. getting irritable 4. slower reactions 5. poorer co-ordination 6. slower thinking 7. getting fixated on part of a problem and losing the big picture 8. less creative problem-solving 9. lower standard of performance becoming acceptable 10. performance becoming increasingly inconsistent.	Sleep deprivation affects the way a person's body functions. In experiments that restrict the sleep of healthy young adults for 2-6 nights: 1. Appetite increases, because of a decrease in the hormone (leptin) that makes people feel full, and an increase in a hormone (ghrelin) that increases appetite. This suggests that people who regularly miss out on sleep are more likely to put on weight. 2. The body becomes less able to handle glucose (it starts to become resistant to insulin). This suggests that people who regularly miss out on sleep may be more likely to end up with type II diabetes. 3. The body's ability to fight infection decreases. This suggests that people who regularly miss out on sleep are more likely to pick up infections in wounds, or get sick with things like colds and flu. 4. Other studies show that sleep restriction causes changes that could lead to high blood pressure in people who regularly miss out on sleep.

APPENDIX III
Audio material transcipts

Part One

Audio • CD tracks

1. Unit 1 Section 3, Exercise B (p. 15)
2. Unit 2 Section 2, Exercise II(g) (p. 33)
3. Unit 2 Section 2, Exercise III(b) (p. 34)
4. Unit 3 Section 3, Exercise B (p. 45)
5. Unit 4 Section 2, Exercise II(b) (p. 63)
6. Unit 4 Section 3, Exercise I(a) (p. 64)
7. Unit 4 Section 3, Exercise I(b) (p. 64)
8. Unit 5 Section 1, Exercise A (p. 76)
9. Unit 5 Section 2, Exercise H (p. 84)
10. Review 1 Section 1, Exercise A (p. 90)
11. Review 1 Section 4, Listening (p. 94)

Unit 1: Effective Communication

1. Section 3, Exercise B ***Common gestures easily misunderstood in different cultures***[1] (page 15)

In 1992, George Bush visited Australia and, from the window of his limousine, held up his index and middle fingers in the "V" shape. With the palm facing outward, this V means victory in England, or peace in North America. Too bad Bush gestured with his palm facing inward, the nonverbal equivalent of "up yours" in England and Australia.
Displaying your palms is used in North America to say "stop". In Greece, keep your palms to yourself. Holding your palms out towards a person is a highly insulting gesture. This gesture is said to be a remnant of Byzantine times, when people could taunt shackled criminals by smearing their faces with dirt.
Thumbs-up is a gesture of agreement or approval, and an easy reflex when language barriers are at play. Try to avoid it in Thailand, though, where it's a sign of condemnation. It's typically a child's gesture, the Thai equivalent of sticking out your tongue. People will likely be more bemused than hurt if you do it, still, it's a good one to avoid.
Curling your index finger to say "come here" is a no-no in many Asian countries. In the Philippines, this gesture is only used for dogs. To use it with a person is derogatory; suggesting that you see them as a subservient inferior.
An open-palmed pat on the head of a child is a gesture of fondness in Western cultures. If you need to get a child's attention, it's also the easiest place to tap them. In the Buddhist faith, though, the top of the head is the highest point of the body, and it's where the spirit exists. In Sri Lanka, to touch the top of a person's head is highly invasive, for children and adults alike. Avoid this in any country with a predominant Buddhist population.
In the West, people aren't especially mindful of their hands when they offer objects to others. In Japan, though, it is polite and expected for people to make offerings with both hands. If you give someone a document, be sure to pass on the item with both hands. This shows that you are fully attentive and sincere in the offering. A one-handed presentation might be taken as dismissive.

Unit 2: Preparing For Sea/Arrival in Port

2. Section 2, Exercise II(g) ***Port of London Pilot*** (page 33)

1. After boarding, the pilot is usually met by a foreign crew member, a junior officer. What is the phrase he is greeted with? Follow me Mr Pilot.
2. What is the most challenging part of his job? Pilotage in fog.
3. Do pilots nowadays feel the responsibility to get the ship to its berth on time under commercial pressure? Their primary responsibility is the safety of the ship and the environment, but they are aware of commercial pressure, they take it into account.
4. How has the use of advanced radar made the work different? They operate in poorer weather conditions. Whereas in the past the port would close, now ports remain open and work is done to the limits of safety.

3. Section 2, Exercise III(b) ***AMSA on Pilotage*** (page 34)

The Pilot had ordered "hard to port" but the helmsman executed "hard to starboard."
The vessel grounded at 0941. Fortunately, its hull was intact and it was refloated with the rising tide.
Nobody on the bridge was monitoring that the pilot's orders are executed properly and so the errors were not detected in time.
Roles and responsibilities of every member of the bridge team should be clearly defined and agreed.

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1. Adapted from Anne Merritt, "10 Common Gestures easily Misunderstood abroad", Sept. 22, 2010, retrieved 18 July 2014 from http://matadornetwork.com/abroad/10-common-gestures-easily-misunderstood-abroad/.

Unit 3: Safety and Risk On Board

4. Section 3, Exercise B ***A Guide to Risk Assessment***[2] (page 45)

- The identification of hazards is the first and most important step since all that follows depends on it.
- The risks associated with each hazard are evaluated in terms of the likelihood of harm and the potential consequences.
- Risk should be reduced to a level that is as low as is reasonably practicable (ALARP).
- The people chosen to undertake risk assessments should be those most familiar with the area, and who have most experience of the task to be assessed.
- The process must be systematic, and in order to make it so, it may help to categorize areas and activities as in the following example.

Assessment Unit:	***Deck***
Activity:	***Tank cleaning***
Hazard:	***Toxic atmosphere or lack of oxygen***
Risk (before controls):	***Intolerable (likely and extremely harmful)***
Recommended Controls:	***Atmospheric testing, ventilation, use or availability of breathing apparatus***

- The best safeguard against accidents is a genuine safety culture - awareness and constant vigilance on the part of all those involved.

Unit 4: Safe Navigation

5. Section 2, Exercise II(b) ***From "Working on deck in heavy weather", Risk Alert, Steamship Mutual Loss Prevention Bulletin, December 2013*** (page 63)

The Code of Safe Working Practices states that "no seafarer should be on deck during heavy weather unless it is absolutely necessary for the safety of the ship or crew." In winter conditions, on being swept overboard the casualty would almost certainly be affected by cold water shock and hypothermia would soon cause unconsciousness and death. In view of this, wearing proper PPE such as an immersion suit and a lifejacket would significantly increase the seafarer's chances of surviving and being rescued. Be aware that even in a regular wave pattern, 'rogue' waves can exist which can vary in direction and size from the regular wave pattern being experienced. ALWAYS plan for, and expect, the unexpected.

The following pre-work steps are recommended:

1. Work on deck during heavy weather should be authorized by the master only and the bridge watch should be informed.
2. A permit to work and a company checklist for work on deck in heavy weather should be completed.
3. Any person required to go on deck during heavy weather should wear a suitable life-jacket with safety harness, proper PPE, and be equipped with a waterproof portable radio.
4. Seafarers should work in pairs or in teams. All seafarers should be under the command of an experienced senior officer.
5. A risk assessment should be undertaken which should give consideration to the following factors:
   - How necessary is the work? For instance, can it wait until daylight, the next port, do the risks outweigh the benefits?
   - Can vessel's course and speed be adjusted?
   - Can lifelines be rigged?
   - Can visual contact from bridge be maintained?

Let's look at two case studies.

Case study No 1:

On 25 November 2012, two crew members were washed overboard from a general cargo vessel. The accident occurred during heavy weather in the North Sea. Both men lost their lives. The two crew members had proceeded onto the aft mooring deck to secure a coiled mooring rope that had loosened in its stowed position. They were struck by a large wave, which washed them overboard, causing their respective lifelines, which were secured to the vessel, to part.

The investigation concluded that the risk assessment made at the time was not adequate and should have taken into consideration the possibility of waves breaking astern on the poop-deck in the severe following weather.

Case Study No 2:

On 3 January 2012, while an oil and chemical tanker was on passage in heavy weather, a ventilator head on the forecastle became detached. A team of four crew members went on deck and successfully covered the opening left by the ventilator head. The Chief Officer and Second Engineer then attempted to secure the loose ventilator head on the main deck. They were struck by a wave that washed across the deck. The Chief Officer died of his injuries.

The subsequent investigation concluded that the Master and Chief Officer were aware of the hazards on deck, but their perception and approach to the situation did not include a thorough assessment of the risks. No lifejackets or lifelines were worn by the crew on deck except for the Second Engineer, who wore a fire-fighter's lifeline.

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2. A Guide to Risk Assessment in Ship Operations, IACS, (June 2012) www.iacs.org.uk.

6. Section 3, Exercise I(a) ***US Coast Guard's ice-breaker deploys to help shipping industry, 15 January 2014*** (page 64)

Thick ice affects the shipping industry every winter. But this year, sub-zero temperatures came early. To help freighters make their deliveries, the Coast Guard's 3,500 ton Mackinaw chops up ice and creates a path through the Great Lakes waters. Captain Mike Davanzo: (SAYING): "It really impacts the Great Lakes region and really the global economy." It took the Coast Guard 17 hours to free this freighter. Last week was exceptionally tough, as record low temperatures numbed the region: (CAPTAIN, SAYING): "It was a difficult, challenging time for us." Most ice breakers use their weight to break the ice, but the Mackinaw's propulsion system can also churn up the ice like a blender, creating a path wide enough for freighters. (Reuters)

7. Section 3, Exercise I(b) ***Ships trapped in frozen in Azov Sea, 15 February 2012*** (page 64)

Weeks of unusually cold weather in southern Russia have frozen the Azov Sea. Ships like this one have become trapped. Normally the Azov Sea doesn't freeze in winter - but now there's up to half a metre of ice on the surface. Ice-breaker ships have been deployed, but are making slow progress as the ice grows thicker by the day. (TUGBOAT ASSISTANT, SAYING): "It's like we are almost not moving. Three kilometers an hour, two kilometers an hour." Russian media has reported that dozens of ships are now stranded at sea with dwindling food and water supplies. (DEPUTY HEAD OF REGIONAL SEARCH AND RESCUE UNIT, SAYING): "Our ship is not the only one that's left in this situation. No one expected there to be such abnormal weather." Russia's state forecaster has said the country's south would continue to face extreme frosts in the coming days, with temperatures from 12 to 17 degrees Celsius below average. (Travis Brecher, Reuters)

Unit 5: Joining Ship

8. Section 1, Exercise A ***Marie Cooper, for Maersk Line*** (page 76)

Head of crew operations for a shipping company; crew management department of a shipping company; take care of officers and crew joining the company's vessels worldwide, ensuring that the crew operations run smoothly; 3500 officers of all nationalities around the world; they get planned to go on board vessels and to go home as well, so the whole logistics of booking flights, ensuring that they have the right paperwork.

9. Section 2, Exercise H ***Airport PA announcement*** (page 84)

Attention passengers on Olympic Air Flight 242 to Brussels. The flight has been delayed due to bad weather conditions. The departure time has changed. Our new departure time is 10:30 am.

Review 1 (Units 1-5)

10. Section 1, Exercise A ***Foreign Language Learning*** (page 90)

Accept the fact that you are not going to understand everything. Do not translate into your native language. Listen for the gist, the general idea of the conversation. Don't concentrate on detail until you have understood the main ideas. Mother tongue influence in spoken English is quite common. You don't need to sound like a native speaker, your foreign accent in perfectly acceptable as long as it is clear and your delivery has a natural flow. Don't forget, there is no one "English", there is a variety of "Englishes" that are spoken around the world. Try to develop your own style. Practise... Use a journal, a running list of the new words you discover so that you can refer back to the list. And of course, read, read and read. The more you read, especially novels and literary works but also magazines and newspapers, the more words you'll be exposed to.

11. Section 4, Listening ***Occupational accident prevention on board*** (page 94)

The shipowner
An on-board programme should be developed by the shipowner in order to ensure continuous improvement in occupational safety and health. This programme should, among other things,

- include risk evaluation, training and instruction for seafarers
- pay special attention to the health and safety of young seafarers
- ensure that appropriate personal protective equipment is being used

The master
The master should ensure, in compliance with national laws and regulations, that all crew on board have a tolerable workload, reasonable work hours, as well as rest hours, having special regard to work which is strenuous, hazardous or monotonous.
The master should investigate all accidents, record and report them. The master should ensure the availability of operating manuals and vessel plans, and hold regular meetings of the safety committee at intervals of 4-6 weeks and ensure that the reports of the committee are given due consideration. Reports of accidents and near-accidents should be discussed at safety meetings in order to minimize the possibility of recurrences.
The seafarer
Seafarers should be encouraged to express views on working procedures adopted, as they may affect safety and health, without fear of dismissal. Seafarers should have the right to remove themselves from dangerous situations when they

have good reason to believe that there is an imminent and serious danger to their safety and health. Seafarers should take care of personal protective equipment and clothing at their disposal and not misuse it. Seafarers have a duty to be particularly diligent during fire, lifeboat and other drills and emergency training.

Part Two

Audio • CD tracks

1. Unit 6	Section 2, Exercise F (p. 101)	9. Unit 9	Section 2, Exercise C (p. 164)
2. Unit 6	Section 2, Exercise H (p. 102)	10. Unit 9	Section 2, Exercise G (p. 165)
3. Unit 6	Section 3, Exercise B (p. 104)	11. Unit 9	Section 3, Exercise C (p. 168)
4. Unit 7	Section 1, Exercise I(c) (p. 118)	12. Unit 9	Section 4, Exercise A (p. 169)
5. Unit 7	Section 1, Exercise II(e) (p. 122)	13. Unit 10	Section 1, Exercise B (p. 179)
6. Unit 7	Section 2, Exercise II(b) (p. 128)	14. Unit 10	Section 1, Exercise D (Part One) (p. 180)
7. Unit 8	Section 2, Exercise C (p. 139)	15. Unit 10	Section 1, Exercise D (Part Two) (p. 180)
8. Unit 8	Section 4, Exercise A (p. 147)	16. Review 2	Section 4, Exercise A (p. 203)

Unit 6 Maritime Safety

1. Section 2, Exercise F ***BMP Anti-piracy measures*** (page 101)

• Factors to be considered in the Risk Assessment should include the following:

FREEBOARD: Experience suggests that vessels with a minimum freeboard that is greater than 8 metres have a much greater chance of successfully escaping a piracy attempt than those with less.

SPEED: Ships are recommended to proceed at Full Sea Speed, or at least 18 knots, through their transit of the High Risk Area

SEA STATE: Pirates mount their attacks from very small craft (skiffs) even where they are supported by larger vessels or "Mother ships". This limits their operations to moderate sea states. It is likely to be more difficult to operate small craft effectively in sea state 3 and above.

- A proper **lookout** is the single most effective method of ship protection where early warnings of a suspicious approach or attack is assured, and where defenses can be readily deployed.
- Dummies placed at strategic locations around vessel give the impression of greater numbers of people on watch.
- Pirates use RPGs to Intimidate Masters of ships to reduce speed and stop to allow the pirates to board.
- The use of PCASP (Privately Contracted Armed Security Personnel) should not be considered as an alternative to the Best Management Practices (BMP) and other protective measures. BMP4 has been issued by the shipping industry and is disseminated by IMO.

2. Section 2, Exercise H ***"Route of fear: ships take up arms against Somali pirates" from BBC news*** (page 102)

1. The vessel is passing through the Gulf of Aden.
2. They spot suspected pirates dead ahead and activate the ship's water canons to make boarding more difficult, sound the fog horn to tell pirates they have been spotted, and summon the onboard armed security team, who put their weapons in the air.
3. The suspected boats are one mother ship and one skiff. The boats finally moved off and reportedly threatened another ship.
4. When they hijack ships, pirates demand multimillion dollar ransom.
5. The crewmember interviewed, who was on another vessel that was attacked by pirates in the past, says that the pirates fired RPGs and that he feels relieved because of the armed guards now.
6. Naval vessels escort convoys alongside Yemen but pirates have expanded their operations elsewhere in the Indian Ocean.
7. The armed teams fire warning shots near the skiffs, they only use lethal force as a last resort.
8. The company policy in the particular case is to always put armed teams on this route, and so far it has been successful. Yet, maritime piracy will continue to exist in this route until Somalia finds peace.

3. Section 3, Exercise B ***IMO on stowaways*** (page 104)

An international convention relating to stowaways was adopted in Brussels in 1957, but it has not yet entered into force and is unlikely to do so. In recent years, however, the problem of stowaways has increased and it was generally recognized that there is an urgent need for international agreement on the allocation of responsibilities to enable the successful resolution of cases involving stowaways. In 2000, IMO included formalities for dealing with stowaways in the Convention on Facilitation of International Maritime Traffic (FAL Convention) and these were adopted in January 2002, with entry into force on 1 May 2003. They reflect the *Guidelines on the Allocation of Responsibilities to Seek the Successful Resolution of Stowaway Cases*, which were adopted in 1997.

The International Maritime Organisation has launched statistics over stowaway incidents in 2014.

- In total, there were 61 incidents reported involving 120 stowaways.
- Stowaways used 25 container ships and 10 bulk carriers among other types of ships.

- Cape Town and Lagos were the most common ports of embarkation. Africa answers for 81% of the total amount of cases and the most common stowaway nationalities were Nigerian, Ghanaian and Tanzanian.

The Convention on Facilitation of International Maritime Traffic, 1965, as amended, (The FAL Convention), defines stowaway as "A person who is secreted on a ship, or in cargo which is subsequently loaded on the ship, without the consent of the shipowner or the Master and who is detected on board the ship after it has departed from a port, or in the cargo while unloading it in the port of arrival, and is reported as a stowaway by the master to the appropriate authorities".

Unnoticed by the Master, the crew, port and customs authorities, stowaways may gain access to the ship with or without the assistance of port personnel. Once on board the ship stowaways hide in empty containers, cargo holds, tanks, tunnels, behind false panels, stores, accommodation area, engine rooms, void spaces, cranes, chain lockers.

The presence of stowaways on board ships may bring serious consequences for ships and, by extension, to the shipping industry as a whole; the ship could be delayed in port; the repatriation of stowaways can be a very complex and costly procedure involving masters, shipowners, port authorities and agents; and the life of stowaways could be endangered as they may spend several days hidden, with the risk of suffocation and without any water / provisions.

The International Maritime Organization strongly encourages that appropriate measures be taken to reduce risks of unauthorized persons boarding ships. The FAL Convention has clear ship/port "Preventive measures" and recommended practices on the "Treatment of stowaways while on board" and "Disembarkation and return of a stowaway".

Unit 7 Marine Insurance and Chartering

4. Section 1, Exercise I(c) ***A walk around Lloyd's underwriting room*** (page 118)

Lloyd's is not an insurance company; it is a market of insurers established over 300 years ago. The Lloyd's room is the main underwriting area and it works very much like a street market. The daily face to face interaction of underwriters and brokers creates an unparalleled choice of insurance solutions for their clients. The underwriters who work for separate businesses, called syndicates, are specialists in their fields and insure some of the world's toughest risks. Syndicates compete for business, ensuring brokers achieve tailored, flexible solutions.

Risks covered can vary enormously, from insuring against damage and loss caused by natural disasters such as wind storms and earthquakes to protecting offshore drilling platforms and oil refineries or even flying 10 elephants across the Atlantic. Security is paramount and every Lloyd's policy is backed by security ratings that cover the whole market. [*Key*: F-F-T-F]

5. Section 1, Exercise II(e) ***An introduction to LOF of Salvage Agreement*** (page 122)

The international shipping business is vital to world trade. The vessels involved carry in excess of 9 billion tons of cargo annually, completing more than 4,5 million journeys. But what happens if one of these vessels which may be transporting goods with a value of 100 million USD$ or more runs into difficulty?

If you are the ship's captain, your life may be at risk along with the lives of your crewmembers. If you are the ship's owner, there's your property to think of and that of your clients using your ship to transport their goods as well as the risk of damage to the environment. Both of you have one priority. To effect a salvage operation as quickly and efficiently as possible. There's no time to negotiate contracts and settle terms. You just need a professional salvor to assist before the situation deteriorates further and your ship and its cargo are potentially lost.

Now imagine you're a salvor, you have the specialist equipment available. You want to help but you also want to know that you have the agreement in place that will reward you for your efforts. For all parties there's one simple solution that brings clarity, security and the timely resolution to the situation; the Lloyd's Standard Form of Salvage Agreement, better known as LOF (Lloyd's Open Form).

For more than 100 years this simple contract has acted as a standard framework that enables salvage services to be provided without delay. Managed and administered by Lloyd's, the LOF carries authority that is respected around the world. When salvage services are agreed under the LOF the salvor notifies the salvage arbitration branch of Lloyd's (SAB) which in turn ensures that all interested parties are kept informed of developments .

To protect the interests of the salvor and in order to allow the voyage to be completed the Salvage Arbitration Branch (SAB) collects security from the owners of the ship and cargo or their insurers who may be located around the world. The level of security is determined by the salvor. In 75% of cases the property owners and salvors will agree on an appropriate level of reward. If, however, no agreement can be reached, the salvage arbitration branch will appoint an arbitrator, a legal expert in maritime matters, to determine the level of reward which is fair to all parties and encourages salvage operations.

The parties retain solicitors to gather evidence in support of their respective cases and barristers to present them to the arbitrator at a hearing. In making a decision, the arbitrator considers factors such as the amount of time taken to carry out the salvage operation, the risks presented to the salvor and the value of property salved. The salvage arbitration branch then publishes the arbitrator's award and ensures that funds are collected and forwarded to the salvor prior to releasing the security .

All parties have benefited, losses to property interests have been reduced, any delay to the voyage has been kept to a minimum, potential environmental damage has been averted and the salvor has received a fair and appropriate reward. Simple, trusted and efficient, Lloyd's Open Form continues to support all parties involved in global maritime adventures.

Key:

1. When a ship runs into difficulty, a quick and efficient salvage operation is a priority for both the ***captain*** and the owner.
2. The LOF enables salvage services to be provided without ***delay*.**
3. The Salvage Arbitration Branch collects ***security*** from shipowners, cargo owners and their insurers to protect the interests of the ***salvor***.
4. The salvage reward is left open and is determined later by an ***arbitrator***. The level of "reward" is fair to all parties and encourages salvage operations, in other words it encourages others to aid vessels in distress.
5. The factors considered before the award (= arbitration decision) is determined and published are: ***time*** consumed for the salvage operation, risks presented, and ***value*** of property salved.

6. Section 2, Exercise II(b) ***The calculation of laytime*** (page 128)

- The term "Sundays and holidays included", abbreviated as Sierra Hotel India November Charlie, is used when Sundays and holidays count in laytime as normal days. When the opposite is true, and Sundays and holidays do not count in laytime, we say "Sundays and Holidays excluded" and the abbreviation is Sierra Hotel Echo X-ray.
- The term "Even if used", abbreviated Echo India Uniform, means that even if cargo is loaded or discharged during particular days, laytime does not count. So for example, when the agreement is that Sundays and holidays shall not count in laytime even if loading and discharging operation takes place during these days, the term we use is "Sundays and holidays excluded even if used", and the abbreviation is Sierra Hotel Echo X-ray Echo India Uniform.
- On the other hand, the term "Unless used", Uniform Uniform, means that if cargo is loaded or discharged during particular days, they count as normal days for the calculation of laytime. So, the term "Sundays and holidays excluded unless used" abbreviated Sierra Hotel Echo X-ray Uniform Uniform, has the following meaning: "Sundays and holidays do not count in laytime unless used".
- Free on board, Foxtrot Oscar Bravo, means that cargo is to be loaded at no cost to owner. The seller is responsible for delivering cargo to the port, and the seller also pays the loading.
- Free in and out, Foxtrot India Oscar, is when the charterer pays for loading and discharging, and again the cargo is to be loaded and discharged at no cost to the shipowner.
- Dispatch must be paid by the owners to the charterers for any time saved; the full term for this is "Laytime saved" and the abbreviation is Lima Tango Sierra.
- Normal working days are termed "working days", Whisky Delta. "Weather working days", Whisky Whisky Delta, are days during which work can be performed subject to weather conditions.
- Finally, the term "Whether in berth or not", with the abbreviation Whisky India Bravo Oscar November, means that laytime will commence counting whether the vessel is in berth or not.

KEY: Common terms and abbreviations used in CP which are relevant to the calculation of laytime.

	Abbreviation	Full term	Meaning
1	EIU (e.i.u.)	Even if used	If cargo is loaded or discharged during these days, laytime not to count
2	FIO (f.i.o.)	Free in and out	Cargo to be loaded and discharged at no cost to owner / charterer pays for loading/discharging
3	FOB (f.o.b.)	Free on board	Cargo to be loaded at no cost to owner / seller is responsible for delivering cargo to the port, paying also the loading
4	LTS (l.t.s.)	Laytime saved	Dispatch must be paid by owners to charterers for any time saved
5	SHEX (s.h.ex)	Sundays and Holidays excluded/ exepted	Sundays and holidays do not count in laytime
6	SHEXUU (s.h.ex.u.u.)	Sundays and holidays excluded unless used	Sundays and holidays do not count in laytime unless used
7	SHEXEIU (s.h.ex.e.i.u)	Sundays and holidays excluded even if used	Sundays and holidays do not count in laytime even if loading/ discharging operation takes place
8	SHINC (s.h.inc.)	Sundays and holidays included	Sundays and holidays count in laytime as normal days
9	UU (u.u.)	Unless used	If cargo is loaded or discharged during these days, laytime to count as normal days

10	WIBON (w.i.b.o.n.)	Whether in berth or not	Laytime to commence counting whether the vessel is in berth or not
11	WD (w.d.)	Working days	Normal working days
12	WWD (w.w.d.)	Weather working days	Days that work can be performed subject to weather conditions

Unit 8 Marine Correspondence

7. Section 2, Exercise C ***Letters of protest***[3] (page 139)

The first thing to remember is that a letter of protest, strictly speaking, is not a legal document but a declaration about something that went wrong beyond the master's control, such as the interruption of cargo operation from shore side. The master feels himself obliged to bring it to the attention of all parties concerned, either for some immediate action or for future reference, and issues a Letter of Protest.
Sea protests are not a modern invention, they go as far back as the eighteenth century; notes of protest gave an account of the consequences when vessel encountered bad weather, for instance. It was (and in some countries still is) a common practice in English law to draw up Sea Protests and sign them in front of a notary public as a declaration of accidents. But since the courts nowadays do not accept a notarial certificate as evidence of the facts certified, this practice is generally abandoned now.
It is very important to understand that, although it is not a legal document, a letter of protest has a certain legal value because it is treated as admissible evidence in the courts of justice. The letters are admitted, but because all protests are usually signed 'for receipt only', either party in a court case has a right to contend them untrue or of no weight.
A very important role of Letters of Protest is that they usually form part of the documentation submitted by the shipowner in support of a demurrage claim, and actually the charter party includes clauses with special provisions for that. Such letters of protest usually describe delays which happened during cargo operations and so give additional information to ship's time sheet or statement of facts.
For example, in tanker voyage charter parties, owners usually undertake that the vessel shall discharge a full cargo within 24 hours or that the vessel shall maintain a particular average discharge pressure at the vessel's manifold throughout the period of discharge. Letters of protest entitled "Slow Pumping" or "Delays" serve to show the reason of any delay, the restrictions from the terminal side that extended discharging time over 24 hours and whether pumping performance of the vessel was affected by the number and size of manifolds, the length of shore line, etc. To support a demurrage claim certain documents are required, such as an hourly pumping log which shows the pressure at the manifold throughout discharge and is signed by a responsible officer of the Vessel and a representative of the terminal or the Charterers. In the absence of a signature by the terminal, a Letter of Protest is required. If such a letter of protest is missing, the demurrage claim against the charterers becomes unenforceable.
Finally, in the transportation of liquid cargoes with high hydro sulphide content, a letter of protest is required to be issued if the Hydrogen Sulphide readings are not provided by the terminal. This protest can help the owners defend themselves in instances when discharging of the cargo is banned or suspended in an environmentally sensitive port.

8. Section 4, Exercise A ***Writing advice*** (page 147)

Why should you write ***a letter of request***? There are a number of situations that require the use of a letter of request, for example, when asking for an interview, when asking for a letter of recommendation, or when making a request for information. Here are some general tips for writing a letter of request. Keep it simple. In the first paragraph you should tell the recipient why you are writing. Then briefly explain what it is you want the reader to do. I suggest that you give the reader all the information they need in order to comply with your request. And of course, I recommend that you list your contact information, for the reader to contact you if they have any questions about your request. You shouldn't forget to identify any attachments, and finally you should thank the person for their assistance.
When you are writing a ***memo***, on the other hand, you shouldn't use a complimentary close, like a closing salutation, and you shouldn't sign at the bottom, the "from" line eliminates the need. But I would advise you to use headings, bullets or numbered lists so that key points stand out and the document is easy to read.
Creating ***a meeting agenda*** gives a sense of purpose and direction to the meeting; it is like a roadmap for the meeting. All agendas should list the following: meeting start time, meeting end time, meeting location, topic headings, the time each topic is expected to last, and the participants who are expected to introduce each topic.

Unit 9 Standards Of Work and Behaviour

9. Section 2, Exercise C ***Fatigue at Sea: statistics*** (page 164)

Seafarers often work hours that would not be tolerated in any other mode of transport. Safety at sea is seriously compromised by fatigue, with catastrophic consequences. Some high profile examples of casualties in which seafarer

3. From "Legal value of LOP", by Igor Sterxhantov in www.lawandsea.net.

fatigue has been a key causal factor include, the Exxon Valdez, Cita, Jambo and Pasha Bulker, to name a few.
Research carried out with the support of the Trade Union, Nautilus International, claims that:

- A quarter of seafarers say they have fallen asleep while on watch
- Almost half report working 85-hour weeks or more and say that their working hours increased over the last ten years despite regulations being introduced
- Over a third believe that their working hours may pose a danger to the safe operations of their ship

Research also shows how the problems are exacerbated by false record keeping and lack of enforcement of the regulations.
[*Key*: 25%, 50%, 30%]

10. Section 2, Exercise G ***Fatigue research results*** (page 165)

[speaker 1]
When you look at people with long working hours, their performance will often be as bad as people who have consumed a lot of alcohol. Many people on shore would be surprised at the hours and tours of duty that seafarers work. What we found in our initial survey was that nearly 50% of the sample were working 85+ hours a week. Quite often, on shore there's complaints when they get about 35 hours a week.
[speaker 2]
Truck drivers, train drivers, aviation pilots, what have you, they're not allowed to work more than 40 or 48 hours a week. Why are seafarers? Why are they expected to work 70+ hours a week?
[speaker 3]
The reason why fatigue has not been dealt properly is because fatigue is not seen to be important by enough people.
[speaker 4]
Fatigue is a real problem; it does cause deaths, it does cause accidents.
[speaker 5]
It is a complicated issue, not least because any solution will incur additional cost to the industry, at a time when the industry is hard pressed to make a profit.
[speaker 6]
The industry itself is suffering from the effects of fatigue. When you get pollution, when you get loss of life or what have you, when it's caused by fatigue, that is not helping the industry at all.

Key

1. People with long working hours have similar performance to people who have consumed alcohol.
2. People on shore would be surprised at the long working hours of seafarers on board.
3. People on shore often complain when the get about 35 hours per week.
4. People who work in other modes of transportation (trains, buses, airplanes) are not allowed to work more than 40 or 48 hours per week.
5. Not enough people see fatigue as important, that's one reason why it hasn't been dealt with properly.
6. A solution to fatigue requires the industry to pay additional cost, that's why the problem hasn't been dealt with.
7. The shipping industry is suffering from the effects of fatigue, such as pollution or loss of life.

11. Section 3, Exercise C ***Intercultural understanding - training*** (page 168)

Seafarers from around the world are expected to work well together and crew managers are assessing this quality, what we call your "intercultural skills". But, what are the requirements you need to meet as a person in order to be able to work within a multi-national environment? And what if you are not this type of person? Are there any qualities you can "strengthen" in your psychological make-up to acquire such skills?
Of course, your disposition on this subject is closely connected to your overall attitude towards other cultures, which is part of your world view, which is shaped by your education, and this is quite a complicated issue; but here are some simple suggestions on what to do, how to behave, and what to be careful about:
First, respect cultural and religious beliefs; this predisposes your colleagues positively towards you; to them, it proves that you accept their values and it lays the foundations for all of you to work better as a team.
Second, be patient and recognize that people need time to process information when communicating in a foreign language; be prepared to give people the time they need to function in an interaction that does not take place in their mother tongue. Seafarers who are non-native speakers of English report they have to cope with rushed external communications, in English speaking countries, when the VTS operators, for instance, are unwilling to explain or repeat, because they simply expect everyone else to understand English. In this way they display a certain inflexibility, a kind of linguistic "snobbery"/"snobbism" towards those who don't possess the language. Don't make the same mistake. Treat people the way you yourself want to be treated and let them take their time.
Third, try to be sociable and mix with other nationalities; the bonds you develop through social interaction will help you communicate better in emergency situations; also on an operational level, good social interaction, for instance having a drink or spending some of your leisure time in the company of mixed nationalities, is the backbone of smooth team work on board.
Fourth, when people work in a multi-national environment they tend to form ethnic "groups" and resolve problems within their own group using their own language; but this makes people outside the group feel like outsiders, especially when no common language (like English) is used in their presence; don't isolate people like this; feeling isolated makes them assume that all problems can only be solved within the group, so when an emergency arises the team is broken up.

12. Section 4, Exercise A ***Crew Appraisal*** (page 169)

Master: The 2nd Officer has applied for disembarkation, and his replacement is coming in the next port of call. They've asked me, from the crew manager's office, to fill in this appraisal form and also note down whether he is fit to be promoted to the rank of Chief Officer. Have a look. Perhaps you could help me clarify some things, give me your opinion. On a scale from 1 to 5, how reliable do you think he is?

Chief Officer: He's conscientious and trustworthy. You can always count on him. So, that's definitely a 5.

Master: I agree. He's also very precise and systematic in performing his duties. He made a good impression on me as a Safety Officer, he's been very meticulous with all the checklists. I gave him a 5 on planning and organization.

Chief Officer: Yes, but, his use of resources is lacking a bit, he needs to be reminded of what is available, So I think perhaps a 4 would be more fair. There is room for improvement there.

Master: Ok, let's make it a 4 then; and I've given him 4s for the rest of this section, I think he's quite decisive and he can tolerate stress. On to the job-related skills category, now. He has a high level of safety awareness, he is wholeheartedly involved in drills, and he understands the importance of pollution preparedness, waste management, he's into all that. So, it's a 5 for both safety and environmental awareness. Do you think this is too generous?

Chief Officer: No, you are right. I agree. I see here that you've given him a 3 for team spirit, though?

Master: I have, yes. Team work and language skills, these are the areas that I'm concerned about with Orestis. That's why I've given him 3 in both.

Chief Officer: Well, he is a bit isolated because he doesn't possess communication skills, you are right. Especially when working with people from different nationalities. He lacks fluency in English and it's difficult for him to communicate properly. Even though, I have to admit, he felt more self-conscious in the beginning, but he did manage to tune in to the needs of the team as time went by. That shows flexibility, so I agree with the 4 there.

Master: Still, he has difficulty in functioning as a member of a multi-national team. Even though he understands written texts in English, he feels uncertain about listening and speaking.

Chief Officer: This is his weak point, I know. We discussed this with him, remember? He justifies it by saying that he has no natural aptitude for learning languages, and this is what keeps him behind. He told me once he would feel terrified if he had to deal with inspectors, auditors, etc. I explained to him that he has to work on that, though, otherwise, he's not at the right place. I mean, you can't get far in this job without the ability to communicate on a technical level in English.

Master: On the whole, I will recommend him for promotion, he does the job well, but he needs to work on his language skills. That would give him the necessary confidence to go forward in his career. Thanks for your feedback.

Chief Officer: Glad to be of some help.

Unit 10 Navigation Aids and Systems

13. Section 1, Exercise B ***Tour of the bridge on the cruise ship "The Enchantment of the Seas"*** (page 179)

Key:
All the words are mentioned in the 1st officer's description apart from ***compass, echo sounder, speed log, rudder.***

Q 1: How? They see the scattered showers (rain) on the radar and can avoid it. Why? To help passengers enjoy staying on the open decks.
Q 2: The AIS transponder constantly transmits a signal with the vessel's information to other vessels in the area. You can see the vessel's name, type, position, speed, next port of call and ETA in next POC.
Q 3: The paper charts require a lot of storage space in drawers and more time, you look them up in the catalogue and then retrieve them manually.
Q 4: The fin-stabilizers reduce rolling to make the voyage more pleasant for passengers.
Q 5: The GPSs are connected to the electronic charts and the radar to give an updated position.

14. & 15. Section 1, Exercise D ***What is a Nautical Chart?***[4] (page 180)

[Part one]
(INTRO) HOST: Welcome to Diving Deeper where we interview National Ocean Service scientists on the ocean topics and information that are important to you! I'm your host, Kate Nielsen.
Today's question is…What is a Nautical Chart?
Nautical charts contain information about the shape of the coast, the depths of the water and the general configuration of the bottom of the sea floor. Nautical charts also show locations of obstacles to navigation, the rise and fall of the tides, and locations of navigation aids. Nautical charts make safe and efficient marine transportation possible.

4. Source: Podcast "Diving Deeper: Episode 5 (Mar. 23, 2009) — What is a Nautical Chart?", Weekly news of NOAA (US National Oceanic & Atmospheric Administration) National Ocean Service: http://oceanservice.noaa.gov/podcast/supp_mar09.html#charts retrieved on 24 August 2009.

To help us dive a little deeper into this question, we will talk with Tom Loeper about nautical charts – what they are, how they are developed, and why they are so important. Tom is the Chief for the Coast Pilot Branch in the Office of Coast Survey. Hi, Tom, welcome to our show.
TOM LOEPER: Thank you Kate for inviting me here to talk more about nautical charting.
(DEFINING NAUTICAL CHARTS)
HOST: First can you explain to us the difference between a map and a nautical chart?
TOM LOEPER: Kate, that's a good question. There are many differences between a map and a nautical chart. A map is focused more on what is on the land where a nautical chart shows what is under, in, on, and around the water. Nautical charts help mariners travel safely on the water where maps are focused more on helping people travel from place to place on land. Other differences are that nautical charts are working documents. Mariners add course lines, they add turning points and way points. They are legal documents that can be used in a court. Maps can be many sizes and formats like a road atlas for example. The paper charts used on many ships are variable in size and they can be relatively large – some as big as three feet by four feet. Regulated vessels are required to keep charts and publications updated using weekly Local Notice to Mariners.
HOST: Tom, you mentioned the Local Notice to Mariners in your last response. Can you explain to us a little bit more about what this is?
TOM LOEPER: A Local Notice to Mariners are weekly corrections to nautical charts that are published by each Coast Guard District. Mariners apply the corrections to their charts on a regular basis to keep them up-to-date. New chart editions are also announced in the Local Notice to Mariners.
HOST: I think what most of us are familiar with are the little numbers we see on nautical charts. What do these numbers mean?
TOM LOEPER: The numbers you see on a nautical chart represent soundings. Soundings are water depth measurements and they tell the user how deep the water is in that particular area in either feet or fathoms. A fathom is a nautical unit of measurement. There are six feet to a fathom. On a chart, sounding data with the same values are usually connected with a line known as a depth curve, similar to the topographic lines or surface features that you see on a map.
HOST: Tom, besides the depth readings that help with safe navigation, what other information is available on a nautical chart?
TOM LOEPER: Charts include locations of obstacles or dangers to navigation such as coral reefs, rocks, wrecks, and shoals. Other data on nautical charts includes when the document was developed, the edition of the chart, projection and scale of the chart, the compass rose as well as latitudes and longitudes. You may also find pipelines and submerged cables, lighthouses and buoys, and channels and tunnels.

[Part Two]
HOST: Are nautical charts only available in paper format?
TOM LOEPER: Nautical charts are available in two basic formats – paper and electronic. Our two most popular paper products are the traditionally printed charts and print-on-demand product. The print-on-demand chart is a cooperative effort we have with a private printer. We keep our chart images in a state of continual maintenance - the printer downloads our images, they include some additional value-added information, and then they sell them through their sales agents. Commercial mariners like this product since they don't have to update it before they use them – the charts have all the latest information included so mariners save time and money. Over half our charts are sold by print on demand.
On the electronic side, we offer Raster Navigational Charts, or RNCs, which are full-color digital images of our entire suite – basically, they are scans of our paper charts. Electronic Navigation Charts, or ENCs, are the newest and most powerful electronic charting product we offer. Think of an ENC as an image generated from a database file. These charts are available for free download from the Office of Coast Survey Web site and they are updated on a regular basis.
Regulated vessels are also required to have other supporting marine publications on board including tide tables and something near and dear to my heart, the Coast Pilot. The Coast Pilot is a series of nine books arranged geographically and they are a companion document to the nautical chart – it is a text supplement to the chart. The Coast Pilot is available as a hard copy book or they are available for free download in a number of formats from our Web site.
There is much more information on the Office of Coast Survey Web site about all of our products and how to download or purchase the products that I mentioned today.

Review 2 (Units 6-10)

16. Section 4, Exercise A **Financial Times, "Greek shipping may emerge stronger"** (page 203)

Key:
FALSE; The crisis in Greek shipping has started since late 2009.
FALSE; Greek shipowners had not anticipated the crisis and didn't put any money aside to be able to see it through.
TRUE; German shipping depends on small private investors, who are currently reluctant to invest.
FALSE; German investors are likely to put in cash in the future, in order to help German shipowners overcome the crisis.
TRUE; Greek shipping companies have access to more capital than their German counterparts.

Part Three

Audio • CD tracks

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2. Unit 11	Section 5, Exercise A (p. 217)	10. Unit 15	Section 1, Exercise D (p. 278)
3. Unit 11	Section 5, Exercise B (p. 219)	11. Unit 15	Section 4, Exercise A (p. 285)
4. Unit 11	Section 5, Exercise D (p. 220)	12. Review 3	Section 5, Exercise A (p. 299)
5. Unit 12	Section 3, Exercise D (p. 238)	13. Review 3	Section 5, Exercise B (p. 301)
6. Unit 13	Section 1, Exercise B (p. 246)	14. Review 3	Section 5, Exercise C (p. 301)
7. Unit 14	Section 1, Exercise B (p. 258)	15. Appendix I	Part Three, Section 1, Exercise E (p. 360)
8. Unit 14	Section 2, Exercise C (p. 264)		

Unit 11 Marine Pollution

1. Section 2, Exercise B ***Discover IMO's PSSAs***[5] (page 211)

For centuries mankind treated the earth and its resources as if they would never run out and poured waste products away as though they would simply be absorbed and taken care of by nature. Today all that is changing. Today we understand that the planet's resources are limited and that the environment could be damaged forever unless we give it our care and attention. The sea is one of the most precious environmental resources. It covers around 70% of our planet's surface and supports global society in so many different ways. The world's oceans provide raw materials, energy, food, employment, a place to live, a place to relax and the means to transport about 90% of global trade.
But the sea needs protection and in some areas that need is particularly great. Because of the ecological socioeconomic or scientific significance, some sea areas that are vulnerable to damage from international maritime activities require special attention. IMO has established a mechanism by which the so-called **particularly sensitive sea areas**, PSSAs, can be identified and formally designated, together with special protective measures that ships have to follow. So far, 14 PSSAs have been identified and designated. They include some of the world's best known and most iconic maritime locations such as the Great Barrier Reef of the coast of Australia, the seas surrounding the Florida Keys and the Galapagos Islands. In each case special protective measures have also been approved and adopted, often involving the compulsory routeing of ships to avoid altogether these uniquely vulnerable and valuable areas.
[Edward Kleverlaan, Head, Office for the London Convention/Protocol & Ocean Affairs]
IMO's PSSA program is a tremendous valuable tool to help protect the environment and reflects just how important this aspect of the organization's mandate has become. There is no other global mechanism that brings together so many different aspects about international shipping, safety and environmental protection. It allows all stakeholders to have a say to identify the best solution for the environment and for the shipping industry. And in the future we expect other locations to be put forward for consideration as PSSAs, thus extending still further the network of areas that enjoy a special level of environmental protection.
Mankind must continue to develop but what we now understand is that our development in the future must take full account of finite and diminishing resources and our fragile environment. In short, our development must be sustainable. IMO's program to protect PSSAs is an essential element of sustainable development for a better planet and a brighter future.

2. Section 5, Exercise A ***Shipping and the reduction of CO_2 emissions*** (page 217)

The global shipping industry is responsible for the carriage of about 90% of the world trade and is vital to the functioning of the world economy. Without shipping, half the world would starve and the other half would freeze. However, the international shipping industry is committed to playing its part in reducing emissions of carbon dioxide in order to help reduce the impact of climate change.
But what are the facts and what is the shipping industry doing? Although ships may often be out of sight and out of mind, shipping is a very large and important industry. It is also very diverse, with over 50,000 ships carrying almost every kind of cargo. The challenge of reducing the industry CO_2 emissions is especially complicated because shipping is already by far the most carbon efficient mode of commercial transport, especially when compared to aviation, but also when compared to trains and trucks. However, because shipping is such a significant industry, its total CO_2 emissions are also not insignificant. [2,7% of global CO_2 emissions, source IMO]
As well as applying new technology and operational improvements to reduce fuel consumption, which is the main cause of CO_2 emissions, the industry is also deeply engaged in discussion at the UN IMO in London, which is responsible for the environmental regulation of shipping and at the UNF triple C, which is responsible for the UN convention on Climate Change. The industry is confident that solutions can be found and great progress is already being made. Shipping companies themselves also recognize that it is in their self interest to reduce emissions because of the high cost of fuel. The shipping industry is therefore seeking to deliver CO_2 admission reductions at least as ambitious as the targets agreed under any new UN Climate Change Convention.
But how will the industry deliver these reductions? The immediate goal is improved efficiency and reduced fuel

5. IMO 2013, video from https://www.youtube.com/watch?v=HqOQoHXcRrk&list=PLyv2sudQhZoN69timTnIN09ykRhitJwf7.

consumption. Engines are being made more efficient while bigger ships reduce the CO_2 emitted for every ton of cargo carried. The latest container ships transport the same amount of cargo as up to 10,000 trucks. Improvements are being made to hull and propeller design so the ships can move even more efficiently through water and CO_2 abatement technologies also seem to offer great potential. And on the operational side the industry is also making real improvements to speed management and the fuel efficiency of ships throughout the course of the voyage. Improved voyage planning, weather routeing, optimization of engine power and use of different fuel types are all playing their part to deliver significant emission reductions. While the current assumption is that ships will continue to burn fossil fuels for the foreseeable future, nothing has been ruled out. Advances in renewable energy, such as wind and solar power may have their place in helping to meet auxiliary requirements such as lighting on board ships. Third generation bio-fuels may provide a more carbon friendly alternative to oil, and hydrogen fuel cells may also be a possibility in the very long term.
("Shipping, World Trade and the Reduction of CO_2", International Chamber of Shipping, 2010)[6]

3. Section 5, Exercise B ***Shipping goes green*** (page 219)

A cargo ship heads into Nissan's Yokohama wharf. For workers at Japan's second largest automaker this is routine. Lines are secured, the ramp lowers and 6 decks are filled with more than a thousand new cars, all just a few short hours. This is the new Nichio Maru. 281 solar panels lying in the top deck provide power for the crew quarters. Below, an electronically controlled diesel engine uses 13 tons less fuel per its round trips around Japan's coast. "As you can see, we've got 281 panels, they can only generate 50 kilowatts and we store about 10 kilowatts of power. And the remaining 40 are used to power the ship. In 10 to 20 years time I think there are going to be more and more of these ships produced." Throughout the vessel, environmentally conscious design: low friction coating on the hull, a double skinned fuel tank, a high efficiency propeller. Nissan says that while the new ship costs more than a normal car carrier the pay off is worth it. "With these sort of ships we can make more trips with less fuel." And the maker of the world's first mass produced electric car admits this is as much about public image as it is about pushing conservation. "We control 70% of the electric vehicle market and if we increase people's awareness of our brand's environmental efforts, that will only increase." A decision good for business and the environment and for a captain a new ship to call home. CNN Tokyo, 2012.

4. Section 5, Exercise D ***Shipping News: Stena Germanica converts to green methanol fuel*** (page 220)

Stena Line says it will be starting the conversion of its first ferry to run on methanol main engine fuel in January 2015. Stena Germanica, a 240m long ship, with 4,000 lane metres, employed in the Gothenberg-Kiel route will be out of service for around 6 weeks while the engines are converted at a cost of around 22 million euros. The engine conversion will enable the Stena Germanica to use methanol as her main fuel with MGO, that's Marine Gas Oil, as a back-up.
Methanol is a clear, colorless, biodegradable fuel that can be produced from natural gas, coal, biomass, or even CO_2. Methanol plays a key role in the energy sector as a clean and cost-competitive alternative and energy resource. Unlike natural gas as an alternative fuel, methanol is liquid at room temperature, so infrastructure costs are lower than LNG. The current world production of methanol is around 55 million tons a year and SL say that engine conversion to methanol is considerably less expensive than conversion to LNG.
By using methanol the emissions of sulphur will be reduced by about 99%, nitrogen 60%, particles 95%, and carbon dioxide 25% compared with today's fuel. So the overall package looks like a good deal for the environment. SL reports of its running a number of projects that look at other alternative fuels and different techniques for emission purification such as LNG, electric propulsion and scrubbers. But SL CEO Carl Johan Hagman said it is likely we will use some different types of solutions in the coming years. However, based on the results of the methanol project we are intending to convert additional ferries.
We'll bring you more on this subject as we have it.

Unit 12 Emergency Response

5. Section 3, Exercise D ***International Ice Patrol***[7] (page 238)

Interviewer: For the Amver community, for the commercial shipping community, the Ice Patrol is actually pretty important. Specifically folks that are sailing in the North Atlantic. Tell me a little bit about what does the Ice Patrol do?

Commander: Well, we are a single mission unit. Our mission is to monitor iceberg danger near the grand banks of Newfoundland, which is the northwest Atlantic Ocean, and we provide an iceberg limit to the maritime community. So basically provide a line in the ocean that mariners can navigate around and avoid ice.

Interviewer: So you provide maps of ice?

Commander: Essentially yes.

Interviewer: Icebergs and things like that. And why do we...why is there an Ice Patrol?

Commander: Well, like Amver, we can trace our roots back to the Titanic disaster in 1912, that really galvanized the international community to provide an organized service to provide that information. Prior to Titanic, it was pretty ad hoc. Ships would get iceberg locations from other ships.

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6. From http://www.ics-shipping.org/free-resources/ics-films, see also www.shippingandco2.org.
7. From the Quartermaster series podcasts, Episode 12, by Benjamin Strong, Interview with USCG IIP Commander Lisa Mack, www.amver.com/podcasts.asp.

Interviewer: OK.
Commander: So this really organized, in an international cooperative way, the ability to provide that information.
Interviewer: And who else does the U.S. cooperate with, who else is involved in this?
Commander: Well, our main partner is the Canadian Ice Service, with Canada. They do...we have a partnership called the North American Ice Service. So we actually just recently have joined to provide one product between those services, but the International Ice Patrol was actually formed by the IMO (International Maritime Organization) under the SOLAS Convention. So there's obviously several countries signatory to that Convention.

Unit 13 Officer Of the Watch

6. Section 1, Exercise B ***Seven most important factors to be taken into account while taking over a bridge watch***[8] (page 246)

[1. Ship's Position – Speed – Course]
The first thing to be checked after coming upon the bridge is the position and speed of the ship. It is a good practice to browse through the chart and identify the course to be followed till the end of your watch. Check for course alteration waypoints, traffic separation schemes, shallow patches, or any dangers to navigation along the intended track marked on the chart. Compare the course on the chart with the course in the passage plan. Also, make yourself aware of the Engine RPM, Speed and Course steered.

[2. Traffic Density]
Without wasting time, the second thing to do is to look outside the bridge in order to get a clear view of the horizon and check the number of vessels around. It is also advised to take a walk all the way to both the bridge wings to get a view of the stern of the ship. Once you have visually ascertained the situation outside, glance at the Radar screen for the targets around and for more information provided by the Automatic Radar Plotting Aids (ARPA). It is recommended to switch to higher range scales for early detection of the aspect of vessels coming down. If your ship is already in a situation such as overtaking, close-quarters, or a crossing situation, **DO NOT** take over the watch until the situation is over and the vessel is past and quite clear.

[3. Weather Conditions and Night Vision]
Now that you are satisfied with position, course and traffic, the third important factor to check is the weather conditions. Make sure you are aware of wind speed and direction as well as the set and drift of current, as these play an important role in charting a good course. With the available information, try to foresee if restricted visibility is expected during your watch. Also, during hours of darkness or restricted visibility, it is of utmost importance to be fully adjusted to the low lights, as this helps in keeping an effective look-out. Keep in mind that, it takes around 15 minutes for the eyes of an average person to get adjusted to low lights.

[4. Bridge Equipment and Dimmers]
The next thing to do is ensure all bridge equipment is ready and intact. If needed, adjust and configure the required bridge equipment to your settings. It is found that different officers like to use the Radar with different orientation, CPA limits or alarm settings which they are comfortable with. During hours of darkness, all bridge equipment should be dimmed to absolute minimum. Switch the display of equipment to night mode. This will help in effective look-out and prevent back scatter of lights.

[5. Logbooks – Checklists – Daily orders]
We move on to the fifth point now. Make it a habit to check the latest entry of the logbook while taking over the watch. Any unclear entries should be clarified with the OOW immediately. Do not forget to note the gyro-error as well. It is also important to complete and sign the 'change of watch' checklist. It is a common practice onboard to issue Master's daily orders in addition to the existing Master's Standing orders. Such daily orders will contain special guidelines about navigating the present leg of the voyage, and hence should be signed and complied with. If pilot boarding is expected, confirm whether you are supposed to prepare the required pilot cards.

[6. Miscellaneous Activities on Deck or Engine room]
Point number six; If there is any job in progress or ready to commence on deck or in the engine room, such information has to be passed on to the OOW. The miscellaneous activities can be drills, tank cleaning, cargo hold entry, fire watch, hot work, welding on deck, working aloft, working on the monkey island or on the masts.

[7. Inform the Master if Required]
Finally, the relieving officer has the authority to demand any information regarding the navigation of the vessel and to clarify any uncertainty. If there is lack of confidence about the situation, or you are not satisfied with the hand-over, **DO NOT** take over the watch. You have the right to call the Master and wait until the Master is up on the bridge.
Even though it sounds like a long, time consuming process, these points can be efficiently checked in 15 minutes time. It is always a good habit to reach the bridge 15 minutes before your watch. Such an act not only reflects your officer-like-quality but also helps the other OOW get relieved on time. And of course, don't forget to fill your cup with some hot coffee and positively wish yourself a good watch!

8. From www.marineinsight.com.

Unit 14 Dangerous Goods

7. Section 1, Exercise B ***The IMDG Code***[9] (page 258)

Thousands of shipments of dangerous goods are transported in international waters each year. In order to protect crew members and prevent marine pollution, the IMO has developed the IMDG Code, a comprehensive regulatory framework for shipping dangerous goods by vessel.
This mandatory compliance code consists of procedures for *packing, labelling, marking, placarding, segregation, handling and storage* of dangerous goods, safe carriage of dangerous goods by vessel and more.
Those that may require or benefit from the code include the coast guard, mariners, port authority personnel, shore-side personnel, individuals in government and industry involved with shipping dangerous goods by vessel and trainers responsible for training personnel that ship dangerous goods by vessel.

8. Section 2, Exercise C ***Hazmat situation at Ceres container terminal in Halifax*** (page 264)

A potentially dangerous situation unfolding at a container terminal; trouble started at around 10 pm tonight. The container, carrying uranium hexafluoride, fell more than 15 metres from a crane onto the deck of a container ship (that's about 50 ft). Uranium hexafluoride is a compound used in the production of fuel for nuclear reactors and weapons.
Hazmat teams are on the scene along with emergency crews. The Halifax fire was telling CTV news [Canadian Television] just a few moments ago radiation levels around the container are higher than normal. Unconfirmed reports suggest to us that those levels are three times higher.
There is no word what caused the container to drop. We'll have more information for you as it becomes available to us. Again, a potentially dangerous situation at a container terminal in Halifax tonight; a container carrying Uranium Hexafluoride falling more than 15 metres from a crane onto the deck of a container ship. There is a confirmed leak. Hazmat teams are on the scene. Radiation levels are higher than they should be. CTV news will continue to follow this developing story.

Unit 15 Port State Control Inspections

9. Section 1, Exercise C ***Paris MoU Port State Control Officer***[10] (page 278)

As a PSCO we are looking for proof that the vessel is being maintained in a satisfactory condition at all times; that there are no overdue recommendations from port or flag state inspections, and that planned maintenance is being carried out and records kept.
We also need proof that applicable codes and guidelines are being taken into consideration when operating the vessel. The vessel staff must be able to demonstrate that operations are carried out in a controlled manner, utilizing information contained in these codes, guidelines and standards.
Finally, we need evidence that emergency situations have been identified and drills are conducted to ensure the vessel and company are ready to respond to emergency situations.

10. Section 1, Exercise D ***AMSA Introduction to PSC inspection in Australia***[11] (page 278)

More than 5,000 ships visit Australia each year in international trade. They carry 98% of Australia's imports and exports. It is important that these vessels operate safely and not damage our marine environment.
While responsibility for the safety and operation of each vessel lies with shipowners and flag states, Port State Control (PSC) is designed to ensure safety and environmental standards are maintained.
In Australia, the Australian Maritime Safety Authority, AMSA, conducts PSC inspections in accordance with international guidelines. AMSA conducts over 3,000 PSC inspections each year in 70 ports around Australia. Every year around 200 unsafe vessels are detained by AMSA until deficiencies are fixed, an expensive and time-consuming exercise for shipowners.
During a PSC inspection, AMSA inspectors conduct an extensive check of the vessel, its certification and systems. Special attention is paid to areas of the vessel's operations and equipment that account for most vessel deficiencies and detentions.
As human error caused by fatigue has contributed to safety incidents in recent years, inspectors check the records of hours of rest and work and may examine other evidence such as logbooks, including cargo and other operational records and speak with watchkeepers during the inspection. Inspectors check the condition of lifeboats, liferafts, davits, launching and embarkation arrangements, including the hook release system for this craft.
It is very important that vessels have operational fire-fighting equipment and systems. During a PSC inspection, AMSA inspectors examine fire dampers, fire pumps, fire mains and isolating valves. The vessel's environmental systems are checked from the engine room equipment to its arrangements for garbage disposal.

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9. IMDG Code: A Guide to Ocean Dangerous Goods and Hazmat Shipping, 12 October 1012, by Labelmaster, retrieved from https://www.youtube.com/watch?v=0Xoh_B9CCqU.
10. Paris MoU PSCO, 12 Jan 2011, retrieved from https://www.youtube.com/watch?v=ZJbEB0wXaaI.
11. AMSA 2014, Ship Safety Division, "Introduction to Port State Control in Australia" (5-minute video), retrieved 3 Oct 2015 from https://www.amsa.gov.au/vessels/ship-safety/port-state-control/index.asp, also available from AMSA Port State Control, 8 Oct 2014 at https://www.youtube.com/watch?v=TC0y3BmmFg0.

Inspectors check the on-board communication equipment as it is vital for the vessel's safety. It allows the vessel to communicate in an emergency and receive navigational and safety messages or other vessels' calls of distress.
Crew accommodation, catering, sanitary, hospital and recreational spaces are inspected to verify that they meet international standards for the health of the crew. In the galley, inspectors look for cleanliness of food preparation areas and equipment, garbage disposal arrangements and the absence of vermin.
By working together, AMSA, shipowners and flag states can ensure the safety of vessels and seafarers operating in Australian waters and help to protect our precious marine environment. For more information on any aspect of PSC in Australia, please visit amsa.gov.au.

11. Section 4, Exercise A ***The MUNIN project***[12] (page 285)

A multi-country group in the European Union, that includes engineers from Rolls Royce, is working on a project called the Maritime Unmanned Navigation through Intelligence Networks, or MUNIN, that is trying to develop autonomous ships that can be remotely controlled from the shore.Stirring up the debate, representatives from Rolls Royce, a giant aerospace and marine corporation, have reportedly called for a "public debate on the switch from crewed cargo vessels to autonomous ships as part of a wider drive by industry to use advanced automation technology."
There are several potential benefits to having an unmanned vessel, like a reduction in operating costs for food and living quarters for the crew, and fewer accidents caused by human error.
The technology to make this possible is still in development, but the other obstacles that the MUNIN project faces are legal.
The United States hasn't ratified the United Nations Convention on the Law of the Sea, that most of the rest of the world operates under, so there are complications regarding international and territorial waters when there is no one physically aboard a ship making transit.
Laws regarding seafaring are complicated and making a major change in the modes of operation would also call for a change in the laws.

Review 3 (Units 11-15)

12. Section 5, Exercise A ***An AMSA Marine Surveyor talks about the things AMSA inspectors look at and the typical stages of an inspection***[13] (page 299)

My name is N.O, I work for the AMSA office, I'm a marine surveyor. I do inspections on board to make sure that the vessel meets the requirements of the international conventions, like SOLAS, MARPOL. We also check whether the ships comply with our legislation, the Navigation Act, and the Marine Orders.
The first thing we would do is we see whether all the vessel certifications are in order; so we would be checking all the vessel certificates, whether they are valid, all the required surveys have been done regularly.
Then, once we finish that, we start the physical inspections; everybody's different, like, I start from the bridge, I look at whether they have done the chart work properly, the radio equipment is working, they have done the proper radio testing and various other equipment.
Once I'm out of the bridge, I look at the battery room, I look at the various dampers; I want to see whether the navigation lights are in order; to me more specific actually we look into dampers, ventilators, emergency generators, lifeboat, lifeboat engines and all those LSA; fire-fighting appliances, load-line appliances, if the ship is properly secured or not, so we check these kinds of aspects.
Then, once I finish with the deck, we go to the engine room, we check the engine room equipment, like the pollution equipment, the MARPOL equipment, the oily water separator, the sewage treatment plant, and also we see whether all machinery in the engine room is in working condition.
We also look at the accommodation to make sure that the accommodation is neat and tidy and complies with the ILO requirements. We see the provisions ,whether the vessel has enough provisions or not, that the seafarers are treated well, they are being paid properly, we look at all these kind of aspects.
Once we do all these things, if we're happy we just give the captain a report but if we have any issues we write deficiencies, we can even detain the ship until the deficiencies have been rectified.
Well, it's important for us, for Australians, we have got a huge Australian coast, so any ships coming to our ports we don't want them to pollute our coast, number one; number two, we don't want to see any seafarers, any human beings having any kind of injury or death or that kind of thing. So, it's personal safety, the property safety and, of course, and most importantly for Australia it's the environment, so we want to ensure that all ships coming to Australia do comply with all the relevant conventions and requirements.

13. Section 5, Exercise B ***What a ship can expect from USCG when sailing into a US port***[14] (page 301)

[*Benjamin Strong from amver.com is in New Haven and is talking to Commander Beach from Sector Long Island Sound about the resources available to mariners coming to a US port and undergoing PSC inspection*]
BS: Let's talk a little bit about when a - if I'm on a 900-foot tanker and I'm coming into the Port of New Haven,

12. "Rolls Royce wants to build giant autonomous cargo ships", 13 Jan 2014, by GeoBeat News, retrieved from https://www.youtube.com/watch?v=_3Qf1d3uE5w.
13. AMSA – "Ship inspections help protect life, property and the environment", 11 Nov 2013, retrieved from https://www.youtube.com/watch?v=6CbzmVbTNsY&index=3&list=PLkfpRsbroC4X8BZ3M2q-lh-PvmPKKZOHt.
14. Amver Quarterdeck Podcast, episode 4, http://www.amver.com/podcast/quarterdeck-episode-4.mp3.

what kind of things can I expect from the U.S. Coastguard?

Commander: Sure. Well, first of all, vessels that are going to be reporting to the U.S. need to make 96-hour advanced notice to the National Vessel Movement Center. They can do that various ways. The preferred method is, and probably the easiest for most people, is to do it online. And that information will be transmitted to the port where the vessel is going to be going. So, we'll log in every morning into, it's a database called "Missile" and we'll get a download of what vessels are scheduled to come here. And that information that the vessel coming to our port will provide, will be a list of crew members, what type of cargo they're going to have onboard, information about their certificates. Have they expired, when do they expire, that type of information. And that helps us build our package as far as what we're going to go onboard the vessel and look at. So, once we've gotten all the information from the vessel, we'll go through, again, "Missile" and we'll look at the vessel's boarding history. When was the last time they were in the U.S.? Were there any deficiencies that were noted the last time that needed to be cleared this time that they're in there in our port? And we can even access some of the overseas port state control inspections and see if there were any issues in the other countries where they visited. So, then we'll go onboard. The first thing we'll do is we'll walk onboard and, usually, a security member of the crew will meet us.

BS: About how many folks come onboard?

Commander: Well, it depends partly on the type of vessel, how large. But no more than four people unless we're doing training, because what we try to do to make it easier and quicker for the vessels so that they can get on to what they want to do which is offloading the vessel or loading the vessel, is we'll try and break it up into teams. We'll have a team that'll do the deck and a team that'll go down and do the engine room and a lot of the mechanical stuff. So, they'll get onboard. They'll go up, they'll meet the master, they'll sit down. They should explain exactly what it is they're going to be looking for, what documents they're going to need. And they'll say, "I'll need your Chief Engineer or First Engineer and I'll need your First Mate, whoever," and they'll break off into teams. You'll have a team that'll start going through the crewmembers' passports or identification, checking licensing to make sure what has been submitted to the National Vessel Movement Center matches what's actually there onboard, that type of thing. So, it'll be a lot of administrative paperwork type stuff that'll start it off. While that team is doing that, the other team will usually break off and go down and start doing tests of emergency steering. And they'll check to make sure that there's proper communication between the bridge and emergency steering, that they'll make sure engine rooms are relatively clean. I mean, we're not looking to be able to eat off the floors, but you can't have excessive oil, fire hazards, things like that. So, we're focusing, primarily, on the safety aspect of and really to the benefit of the crew members that are onboard that have to sail these vessels to make sure that what they're going on is seaworthy and we'll get them to the next port and the port, thereafter. And then we'll go on, we'll check navigation. Usually, it's the same team that went and checked the licenses and the passport information. They'll go up, they'll do checks of the navigation, again, check steering, check alarms to make sure that the alarms are working and things along those lines. So, it's, primarily, focused on safety. Of course, since 9/11, security has also started to play a role in that. So, we'll usually go through and ask to meet with the vessel's Security Officer and ask a few questions to – it shouldn't be a kind of stump the chump, if you will, type of thing. But, just to say, "Do they seem to know their procedures, their processes?" We are not -- unless we have major concerns, we should not be looking at the vessel's security plan. That is security information. So, if they're asked to provide it, they shouldn't feel bad to say "no" to the Coastguard team that asked them. There should be a specific reason and, frankly, the Coastguard team has to get authority from the flag state to look at those sections, and then it has to be a specific, "Well, I need to look at this section because we just did a bomb drill," and it doesn't seem like they really knew what their procedures were supposed to be. So, we want to see what it was they were supposed to do according to the plan and it doesn't match. We'll do fire drills, lifesaving drills. Some ports, we don't do it here, but some ports will go to the point of having fog machines so that these mariners, who hopefully are never going to have to be in a situation of fighting a fire onboard, see what it's like to not be able to see your hand in front of your face because there's so much smoke in an area and try to make those drills realistic. But, it's all to make sure that not only the vessels but the mariners out there are safe and make it to their next destination.

BS: It sounds like a much more collaborative process than it is an adversarial process, really?

Commander: It should be. Again, our whole point is to make sure that the mariners are safe and that they're getting what they need from their companies be it materials to repair problems that they have onboard. And that's not unusual for us to go onboard a ship, have a boarding and have a crew member say, "You know, we've been trying to get this part and we can't get this part. Could you put that down on your deficiency list?" And so we try to help out as much as we can. And I certainly expect and I think any port that you go to, if you were to talk to my counterpart, would expect that the teams going on are professional, and that they're treating the mariners with respect, the respect that they deserve.

BS: And these boarding procedures, whether it be here in New Haven, where we are today, or in Houston or L.A. Long Beach or New York, pretty standard across the board for the U.S. Coastguard, aren't they?

Commander: They should be very standard and I can provide a link. We have what are called 840 books and they kind of go through a general outline of what material inspections we should be doing, equipment inspections, things along those lines. Certainly, there can be different interpretations on how a policy should be implemented, so you're going to see differences occasionally in different ports. But, overall, if you pass an inspection in one port, you should be able to, if you were to go and have an inspection,

not that you would cause you only get inspected the one time, but that it would be carried out in the same manner in the next port. And I know at the headquarters level, they strive to have that, to have it be, it doesn't matter what port you go to whether it's East Coast, West Coast, that it be very, very similar because there have been some, I don't want to say complaints, but concerns that have been expressed over the years that I can go to Houston and they do it this way and I go to New York and they do it another way. So, headquarters will go through and look at inspection reports and things like that and try and clarify policy and say, "Hey, this is what we meant when we put out this navig," and things along those lines. So, yes, it should be very similar regardless of what port you're in.

BS: Now, you mentioned the 840 book?

Commander: Yes.

BS: These inspection criteria, these aren't secret. Mariners can look this up and prepare before they come into port and we'll include links in the show notes for the podcast. But, you aren't doing secret things here. These are things that I, if I'm a mariner, if I'm the Master of a ship, I can have these checklists in a binder on my, in the ward room and we can be prepared long before we ever come into port.

Commander: Absolutely. And they're in compliance with the International Maritime Organization of – we signed an agreement of how a Port State Control program would work. And it won't be exact but there are certain guidelines that every country who has signed on to SOLAS and other things say, "These are the things we're going to look at and this is the level that we're going to hold you to." And our 840 book, basically, makes sure that our inspectors are going through and the same in every port, looking at the same types of things and interpreting IMO requirements as well as U.S. domestic laws on all these vessels.

BS: Great. Well, we've discussed a little bit about what a mariner can expect when the Coastguard comes onboard. But, if I'm a mariner, what kind of things should I, perhaps, already have prepared or what should you expect from me as a commercial shipper coming into your port? What kind of things – what can I do besides, perhaps, being prepared using the 840 book and some of the checklists and things that are available online or even through the podcasting we can provide? But, what kind of things can I do to make the process smoother, safer, faster?

Commander: Well, I think one is making sure that the appropriate crew members are made available to us. Again, we know that they're in the business of getting in, offloading and getting out of port. But...

BS: Everybody's in a hurry.

Commander: Exactly, but if we need the Chief Officer or Chief Engineer, provide that because the longer we have to wait for those things, the longer it's going to take us to be able to say, "You know what, your ship is good to go," and you can do those things. So, making sure that the crews are available is good. I would also say be honest and upfront. If you know that there's an issue with your vessel, don't wait and see if we find it. It doesn't make them look good. It doesn't make us – it is a partnership. Tell us, hey, you have this problem and we're going to work with – Basically, the Coastguard at that point will do whatever it can to work with the crew to make sure that those issues are addressed and done in as timely a manner as possible. It shouldn't be kind of a *gotcha* session. And so as long as they're upfront, they have their documents. Again, that's listed in the 840 book, what type of documents we'd need to see. You know, if those things are there and waiting for us when we come up, it just makes the whole process run a lot more smoothly.

14. Section 5, Exercise C **Nautical terms in general use**[15] (page 301)

AA: I'm Avi Arditti, with Rosanne Skirble, and this week on Wordmaster -- the catch of the day, terms from the sea.

Lots of nautical expressions have washed ashore into everyday English. Alan Hartley researches them for the Oxford English Dictionary -- that is, when he's not supervising the loading of grain onto foreign ships in the Great Lakes. We called him at his office in Minnesota, and immediately made headway.

HARTLEY: When you make 'headway,' you're making progress forward. 'Way' is usually the forward motion of a ship. It could also be rearward motion, and that was called 'sternway.' But there are a lot of analogous terms in English that never made it into the general vocabulary. 'Headway' and 'sternway' are a good example of a pair, one of which made it and the other didn't.'

AA: Maritime metaphors lend themselves to all kinds of situations on land. Let's say you're making headway on that big project at work, going "full steam ahead". It's all "smooth sailing" toward that big promotion. Or so it seems.

All of a sudden you're "weathering a storm". You reach the "end of your rope" (anchor rope, that is). You look for "safe harbor". You "go overboard" to make things better. The last thing you want is to "scuttle" your career and wind up "on the rocks", all because you've "run afoul" of the boss.

HARTLEY: If you encountered another ship accidentally, you got too close to it, maybe you got tangled in its anchor cable, in that case you have 'run afoul' of the other ship and had an accident, essentially.

AA: And today we might talk about to 'run afoul of the law.'

HARTLEY: Sure, exactly. It's a very typical case of the extension into everyday English. And it shows that, you know, the word would be kicking around in nautical use for a few decades and gradually it would be picked up in general use.

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15. "From Voice of America - Learning English, http://learningenglish.voanews.com/audio/1978164.html, "Language from the sea and still fresh after all these years" 30/08/2005, retrieved 28/09/2015.

RS: Some of these words I find interesting because I didn't even know that they were maritime words.

HARTLEY: Same for me. 'High and dry,' for instance, is something you say all the time. A ship got stuck on the mud flats or on a reef, the tide went out and the ship was left high and dry.

RS: Well, here's an expression I never associated with the seas, usually associated with my doctor. When I go to the doctor I really like to come out with a 'clean bill of health.'

HARTLEY: Everybody does. And the crew of an old sailing ship would have felt the same way. It didn't mean quite the same thing then, but a ship on arriving at a port would have to be cleared by the local port authorities as having no communicable disease on board. And once they were cleared they got a 'clean bill of health.' Sometimes that took a long time. They would be in quarantine, which was a forty-day period. That's where the 'quarant' comes from.

RS: Do you have a favorite maritime expression?

HARTLEY: The one that's maybe most striking to me is that phrase we use nowadays, the phrase 'to be taken aback.' A person is taken aback if he is surprised in a negative way, and that derives from an old sailing term in which if the ship were headed too close to the direction of the wind, the wind would strike the sails on the forward surface instead of the after -- or rear -- surface.

So if the wind got around too much toward the bow, toward the front of the ship, it could stop you in your tracks. But also, if you were taken aback hard enough, you could break the entire mast that the sail was suspended from. So it was a very dangerous and startling situation.

AA: Nowadays, don't look to the sea for many new expressions. Alan Hartley points out that we're still using mostly terms from the days of sailing ships.

HARTLEY: A lot of the vocabulary that's developed since then is very technical, very specific to modern ships. It has very little application in everyday life.

AA: Alan Hartley is a ship-loading superintendent in Minnesota and a researcher for the Oxford English Dictionary. He's put together a list of nautical language for our Web site. That address is voanews.com/wordmaster. And our e-mail address is word@voanews.com.

Time to set sail! With Rosanne Skirble, I'm Avi Arditti.

MUSIC: "Across the Sea"/Bobby Darin

Appendix I

15. Part Three, Section 1, Exercise E ***Cold corrosion insights***[16] (page 360)

Acid corrosion is an inevitable part of the Diesel Engine combustion. At low levels, it aids lubrication and is easily managed. The latest generation of low speed engines combine lower emission rates and better fuel economy by running effectively at part or even very low loads – but, at a cost.

Cold running and higher pressure means temperatures at the cylinder walls fall well below the dew point of the combustion gases, which means increased acid and water condensation. Result: sulphuric acid, the basis of cold corrosion. Sulphuric acid causes increased wear of the piston rings and scours and pits the cylinder lining, dramatically reducing its life span by as much as 90%. And it's not only the combustion area that is at risk; some engines suffer cold corrosion around the scavenge inlet ports.

To combat corrosion for all 2-stroke engines identifying the optimum lubricating oil and feed rate is paramount through regular sweep testing.

(*Steve Walker, Field Engineer Services Manager*) Sweep testing is extremely important for an operator to fully understand cylinder lubricant demands. Stepwise, you start at a high feed rate with constant engine load and after 24 hours take samples and then analyse those samples on board, dropping the feed rate down by a step of point two grams per kilowatt hour, repeating the test for another 24 hours, continuing down to the minimum feed rate that is allowable by the engine manufacturer.

For highly corrosive engines, a 100BN cylinder oil is recommended. For moderately corrosive engines, a 70BN cylinder oil should be sufficient, depending on the outcome of the sweep test.

As a further step, regular onboard oil analysis is crucial. Engine monitoring involves 3 onboard tests that analyze the 2 key parameters, the iron content and BN (Base Number) in the oil.

(*Ray MacDonald, Marine Technical Manager*) It is important to understand both the corrosive iron as well as the abrasive iron because they come from two different wearing mechanisms in the engine. The corrosive iron is an iron that's wore off the engine due to corrosion and the acids present and the abrasive iron is from the wearing out of the cylinder liner surface, and you really need to understand how much total iron there is, coming from both sources to accurately dictate the level of lubrication or the type of lubrication that you need.

The 3rd test determines the residual BN level which indicates if the engines' liners are being protected from the effects of the acidic products.

Combating cold corrosion requires rigorous engine room management. Key activities include:

- sweep testing, to define the appropriate cylinder oil and feed rate, 100BN for highly corrosive engines, 70BN for moderately corrosive ones.
- regular onboard cylinder oil analysis, as recommended by leading engine manufacturers.
- engineering support from your lube oil supplier for cold corrosion diagnosis and mitigation.

16. You can watch the educational video for cold corrosion on https://www.exxonmobil.com/MarineLubes-En/your-industry_hot-topics_clo-cold-corrosion.aspx, or on youtube, https://www.youtube.com/watch?v=GfQmyU0k39I.

APPENDIX IV
Grammar

1. Passive Voice

Study this example:

The ship **was inspected** by PSC in Dover.

"was inspected" is passive. Compare:

PSC **inspected** **the ship** in Dover.
subject *object*

The ship **was inspected** by PSC in Dover.
subject

We use an active verb (*inspected*) to say what the subject does. We use a passive verb (*was inspected*) to say what happens to the subject. When we use the passive, the focus is on the action; who or what causes the action is unimportant or unknown. For example:

Valuable cargo **was stolen**.

The passive is **be** (is/was/have been etc.) **+ the past participle** (given/cleaned/written/stolen/kept etc.)
Look at the active and passive forms of different tenses:

Passive	**Active**
Present simple *am/is/are given/cleaned etc.* Accidents ***are discussed*** in the safety meeting on board.	*give(s)/clean(s)* etc. The crew ***discusses*** accidents in the safety meeting on board.
Past simple *was/were given/cleaned etc.* The pilot ***was informed*** about the CPP malfunction.	*gave/cleaned etc.* They ***informed*** the pilot about the CPP malfunction.
must / can / should / will etc. must be given/cleaned etc. Special measures ***must be taken*** against pirate boarding.	*must give/clean* The crew ***must take*** special measures against pirate boarding.
Present Perfect *have/has been given/cleaned etc.* The tanks ***have been inspected*** by the 2nd Engineer.	*have/has given/cleaned etc.* The 2nd Engineer ***has inspected*** the tanks.
Present continuous *am/is/are being cleaned/given etc.* The cause of the accident ***is*** still ***being investigated.***	*am/is/are giving/cleaning* They ***are*** still ***investigating*** the cause of the accident.

2. Conditionals

Conditional sentences have two parts: the ***if-clause*** and the ***main clause***.
The if-clause introduces a ***condition***. The main clause is the ***result*** of that condition.
What happens in the main clause is conditional to what happens in the if-clause.
In other words the main clause only happens when the events in the if-clause happen.

Zero and First conditionals.
Look at the following summary chart:

	CONDITION	+	RESULT
ZERO CONDITIONAL	If you heat ice,		it melts.
	Present Simple	+	Present Simple
USE:	Facts which are generally true or scientific facts. The condition always has the same result.		
FIRST CONDITIONAL	If you use low-sulphur fuel,		you will reduce CO_2 emissions.
	Present Simple	+	will/won't (also may, can, should)
USE:	A possible situation in the future; Predicting a likely result or giving a warning (if the condition happens)		

Note:

- It is possible to change the order of the two clauses without changing the meaning. There is no comma when the if-clause is in second position.
  I will cancel the STS operation if the storm continues.
- It is possible to use ***when*** instead of ***if*** to talk about facts.
  When warm air blows over cool sea water, fog occurs.
- Other conditional words: ***unless, as long as, provided that***
  Conditional clauses can begin with ***unless***, it has a meaning similar to *if…not / except if*
  Unless + Present Simple → will, can, may, should, etc.
  Unless it rains, we will wash the decks tomorrow.
  Sometimes we need to impose specific conditions or set limits on a situation. In these cases, conditional sentences can begin with phrases such as ***as long as, so long as, provided that*** or, more informal, ***providing (that)***
  The whistleblower gets 50% of the fine as long as there is a conviction of the person responsible for oily water dumping.
  You may discharge food waste provided that it is ground.

Second conditional.

	CONDITION	+	RESULT
SECOND CONDITIONAL	***If I caught someone stealing from a cabin,***		***I would tell the Master immediately.***
	Past Simple	+	would + verb
USE:	Hypothetical or unlikely situation Unreal or improbable situation now or in the future		

Note:

- We use the second conditional to talk about the possible result of an imaginary situation in the present or future. We say what the conditions must be for the present or future situation to be different.
  If I became Minister, I would help all the Academies get bridge and engine room simulators. (though it is unlikely I will become Minister)
- "could" can be used instead of "would" to make the hypothetical present or future more likely:
  If she passed all her exams this semester, she could get a job as a deck cadet with this company in July.
  If I had a little more free time, I could attend a part time course on Ship Management.
- We can reverse the order and use: would + verb + if + Past simple:
  There would be less collisions if all navigators followed the ColRegs carefully.
  I would be happy if they offered me a job in the office instead of working on board.
  Notice how the comma is not necessary with this word order.
- We use "were" instead of "was" with the verb "to be": if + I/he/she/it + were
  If I were not in debt, I would quit my job. (I am in debt, so I cannot quit my job)
  Some people say "If I was..." in informal English.
- Compare to the *"third conditional"* where we imagine a different past, where something did or did not happen, and we imagine a different result:

THIRD CONDITIONAL	***If you had followed the appropriate procedures,***		***the fire wouldn't have broken out.***
	Past Perfect	+	would have + past participle
USE:	Imaginary situation that didn't happen. The person is imagining a different past.		

3. Relative Clauses

We use relative pronouns to introduce relative clauses, which tell us more about people and things. The relative pronouns are:

who and ***whom*** for people
which for things
that for people and things
whose (the possessive form)

Relative clauses are used for:

- *Making clear which person or thing we are talking about:*
  Is that the officer who talked to you earlier?
  The toxic leak which took place yesterday is not under control yet.
  I met a man whose brother works in Singapore.
  I'm looking for a secretary who can use a computer well.
- *Giving additional information:*
  Capt. Alexiou, who works for Celebrity Cruises, gave an interview about women seafarers.
  My uncle, who was born in Australia, lived most of his life in Canada.
  I have just read the accident report, which is full of inconsistencies.
  I am going back to Port Elizabeth, which I first visited 15 years ago.

Relative clauses: *defining and non-defining*

We use *defining relative causes* to give information about someone or something that is essential and that we need in order to understand what or who is being referred to.

person/thing being referred to ***relative clause***

They **are the insurers** **who want to insure our vessel.**
Here are **some containers** **which have been destroyed by the fire.**

Note:

- Spoken English, informal: In defining relative clauses we often use "that" instead of "who", "whom" or "which".
  They are the insurers that want to insure our vessel.
  Here are some containers that have been destroyed by the fire.
- We often leave out the relative pronoun when it is the object of the verb.
  Here are some signs of corrosion the surveyor has identified.
- In writing, we don't use commas in defining relative clauses:
  This is the DPA who takes his responsibilities seriously.
  Not: ~~This is the DPA, who takes his responsibilities seriously.~~

We use *non-defining relative clauses* to give extra information about the person or thing. It is not essential information and we don't need it to understand who or what is being referred to.

person/thing being referred to ***relative clause***

The Master, **who has resigned for family reasons**, will be replaced soon.
John Brown, **who I work with**, is going away for a two-month seminar.
Passengers attended **an evacuation drill**, **which must take place within 24 hours from leaving port.**

Note:

- We do not use "that" to introduce a non-defining relative clause.
  The pirates, who had asked for ransom, were captured by the international naval force.
  Not: ~~The pirates, that had asked for ransom, were captured by the international naval force~~.
- In writing, we use commas around non-defining relative clauses:
  The Electrician, who is from the Ukraine, will help the Chief Officer examine the reefer plugs.

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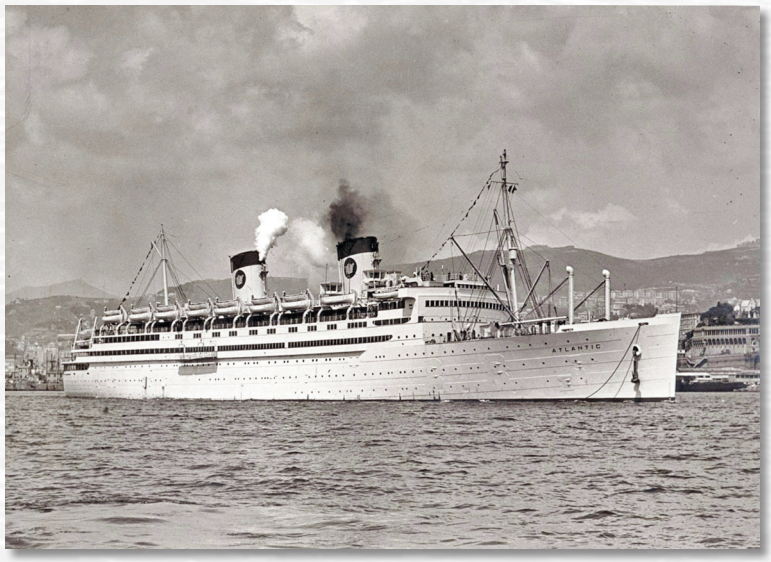

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