RIGHTSHIP

RightShip Inspection Ship Questionnaire (RISQ)

February 2021

Contents

Revision history table

Version Number	Section	Question	Revision Description	Revision Date

Glossary Of Terms

Best Practices:
Are approaches, procedures or tools that ship managers use to operate their vessels more safely, greener, smarter and above minimum compliance.

Broken Stowage:
Broken stowage is lost cargo space in the holds of a vessel due to the contour of the hull and / or the shape of the cargo. Dunnage, ladders, and stanchions are example of broken stowage. Broken stowage is shown as a percentage figure, which is an estimation of the space that will be lost.

Capesize:
Bulk carriers with deadweight of above 90,000 tonnes.

Cargo Unit:
Cargo unit means a vehicle, container, flat, pallet, portable tank, packaged unit, or any other entity, etc., and loading equipment, or any part thereof, which belongs to the ship but is not fixed to the ship (Assembly resolution A.489 (XII)).

Company:
The company means the owner of the ship, or any other organisation such as a ship manager or bareboat charterer who has assumed the responsibility for operation of the ship from the owner of the ship, including the duties and responsibilities imposed by the International Safety management (ISM) Code. This company would normally be the name recorded on the ship's Document of Compliance. May also referred to as vessel's manager (SOLAS) Chapter IX/1, 2014

Competent Authority:
A minister, government department or other authority empowered to issue regulations, orders or other instructions having the force of law.

Competent Person:
A person possessing the knowledge and experience required for the performance of thorough examinations and tests of lifting appliances and loose gear and who is acceptable to the competent authority.

Dunnage:
Materials of various types, often timber or matting, placed among the cargo for separation, to increase the friction between the base of the cargo unit and the deck. This spreads the load of cargo unit across the deck, and hence provides ventilation; protection from damage and, with certain cargoes, provides space in which the fork lift's tynes truck may be inserted.

Ex- Rated Equipment:
Equipment that has been classified as safe for use in hazardous areas.

Flag Administration:
The maritime administration of a vessel's country of registry.

Flag State:
The Government of the nation whose flag a vessel is entitled to fly.

Fumigator-In-Charge:
A person designated by a fumigation company, government agency or appropriate authority.

Gravity-Based Self-Unloading Vessel:
A bulk carrier equipped with a self-Unloading system that includes hoppered hold, gravity gate, belt conveyor, elevating system and discharge boom. This type of vessel delivers free-flowing dry bulk commodities. This system has the ability to discharge on shore or to an offshore facility.

Handymax:
Bulk carriers with a deadweight of up to 60,000 tonnes.

Heavy-Lift:
There is no standard definition of a heavy lift in weight terms, although the cargo insurance policy may set a weight figure as part of the critical item criteria. However, for the purpose of this inspection assessment and questionnaire the term 'heavy lift' means a cargo that weighs more than 50 tonnes.

High Modulus Synthetic Fibre:
Manmade, continuous filament synthetic fibre with modulus in the range of 50-150 GPa.

Hybrid Self-Unloading Vessel:
A bulk carrier equipped with both deck cranes and belt conveyor on-board. The hybrid self-unloading system includes conventional cargo hold, deck crane, hopper, belt conveyor and discharge boom. This system has the ability to discharge on-shore or to an off-shore facility.

Industry Recommendations:
RightShip supports and endorses particular methods of working or procedure.

Line Design Break Force (LDBF):
Is the minimum force that a new, dry, spliced mooring line will break at when tested according to appendix B of Mooring Equipment Guidelines (MEG4). This is for all mooring line and tail materials, except those manufactured from nylon which are tested wet and spliced. This value is declared by the manufacturer on each line's mooring line certificate and is stated on a manufacturer's line data sheet.

Loose Gear:
An item of equipment that can be used to attach a load to a lifting appliance but does not form an integral part of the appliance or load. This includes a block, shackle, hook, swivel, connecting plate, ring, chain block or hoist, chain or overhauling weight.

Mental Health:
According to the World Health Organization, mental health is "a state of well-being in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community."

Mental Disorders:
Mental disorders comprise a broad range of problems, with different symptoms. However, they are generally characterized by some combination of abnormal thoughts, emotions, behaviour and relationships with others. Examples are schizophrenia, depression, intellectual disabilities and disorders due to drug abuse. Most of these disorders can be successfully treated.

Out of Gauge:
The term out-of-gauge refers to any cargo that has dimensions that exceed the normal dimensions of a standard shipping container.

Panamax:
Bulk carriers of between 60,000 to 90,000 deadweight tonnes.

Planned Maintenance System (PMS):
The parts(s) of the company's Safety Management System (SMS) that address inspection, maintenance and repair of the ship.

Ro-Ro Ship:
A ship which has one or more decks (either closed or open), not normally subdivided in any way and generally running the entire length of the ship in which goods (packaged or in bulk; in / on road vehicles – including road tank vehicles – trailers, containers, pallets, demountable or portable tanks; or in / on similar cargo transport units or other receptacles) can be loaded or unloaded normally in a horizontal direction.

Safety Management System (SMS):
The Company's documented quality management system provided on board the vessel and in the office which addresses the requirements of the IMO ISM Code.

Ship Design Minimum Breaking Load (Ship design MBL):
Is the stated value around which a ship's mooring system is designed and established at the ship design stage.

Statutory Requirements:
Statutory requirements are those that are required by law. These requirements are non-negotiable and must be complied with.
The following are agreed definitions for terms used within this questionnaire.
The minimum breaking load of new, dry mooring lines for which a ship's mooring system is designed, to meet IACS standard environmental criteria restraint requirements. The ship design MBL is the core parameter against which all the other components of a ship's mooring system are sized and designed with defined tolerances.

Sub-Freezing Temperature:
Colder than the temperature at which water freezes (i.e. colder than 32°F or 0°C)

Working Load Limit:
The maximum load that a mooring line should be subjected to in operational service, calculated from the standard environmental criteria. The WLL is expressed as a percentage of ship design MBL and should be used as a limiting value in both ship design and operational mooring analyses. During operation, the WLL should not be exceeded.

In the same way that SWL is a limit for fixed equipment, the WLL value is used as a limit with the standard environmental criteria and mooring layout when establishing mooring system designs. Steel wire ropes have a WLL of 55% of the ship design MBL and all other cordage (synthetic) have a WLL of 50% of the ship design MBL.

Abbreviations

ABS:	American Bureau of Shipping
AIS:	Automatic Identification System
AMSA:	Australian Maritime Safety Authority
BAC:	Blood Alcohol Concentration
BFO:	Bunkering Facility Organisation
BLU Code:	The Code of Practice for the Safe Loading and Unloading of Bulk Carriers
BNWAS:	Bridge Navigational Watch Alarm System
BWM:	Ballast Water Management
BYOD:	Bring Your Own Device
CAP:	Condition Assessment Program
CATZOC:	Category Zone of Confidence
CBA:	Collective Bargaining Agreements
CBO:	Condition Based Overhaul
CBT:	Computer Based Training
CCTV:	Closed-Circuit Television
CMS:	Continuous Machinery Survey
CoP:	Certificate of Proficiency
CPA:	Closest Point of Approach
CPP:	Controllable Pitch Propeller
CRA:	Certificate of Receipt of Application
CSM:	Cargo Securing Manual
CSO:	Company's Security Officer
CSS Code:	Cargo Stowage and Securing Code
CTF:	Coating Technical File
DBMS:	Dry Bulk Management System
DG:	Dangerous Good
DGNSS:	Differential Global Navigation Satellite System
DRI:	Direct Reduced Iron
DSC:	Digital Selective Calling
DUKC:	Dynamic Under Keel Clearance
ECA:	Emission Control Area
ECDIS:	Electronic Chart Display and Information System
EEBD:	Emergency Escape Breathing Devices
EGTS:	Exhaust Gas Treatment System
ENC:	Electronic Navigational Charts
EPIRB:	Emergency Position Indicating Radio Beacon
ESD:	Emergency shutdown
ERS:	Emergency Release System
ERC:	Emergency Release Coupling
ETB:	Emergency Towing Booklet
FML:	Flow Moisture Limit
FOSFA:	Federation of Oils, Seeds and Fat Associations
GAFTA:	Grain and Feed Trade Association
GMDSS:	Global Maritime Distress and Safety System
GNSS:	Global Navigation Satellite System
GPS:	Global Positioning System
GRB:	Garbage Record Book
HAZOP:	Hazard and Operability Analysis
HDOP:	Horizontal Dilution of Precision
HIMP:	Hull Inspection and Maintenance Program
HLS:	Helicopter Landing Site
HME:	Harmful to the Marine Environment
HMSF:	High Modulus Synthetic Fibre
IACS:	International Association of Classification Societies
IAMSAR:	International Aeronautical and Maritime Search and Rescue
IAPH:	International Association of Ports and Harbors
ICS:	International Chamber of Shipping
IEC:	International Electro- technical Commission.
IEE:	International Energy Efficiency
IGF Code:	The International Code of Safety for Ships using Gases or other Low-flashpoint Fuels
IHO:	International Hydrographic Organization
ILO:	International Labour Organization
IMDG Code:	International Maritime Dangerous Goods Code

IMFO:	International Maritime Fumigation Organisation
IMO:	International Maritime Organisation
IMSBC:	International Maritime Solid Bulk Cargoes
IOPPC:	International Oil Pollution Prevention Certificate
IS Code:	International Code on Intact Stability
ISM:	International Safety Management
ISPS:	International Ship and Port Facility Security
LDBF:	Line Design Break Force
LMP:	Line Management Plan
LNG:	Liquefied Natural Gas
LOTO:	Lock Out, Tag Out
LSA:	International Life-Saving Appliance
MARPOL:	The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
MBL:	Minimum Breaking Load
MEG4:	Mooring Equipment Guidelines Edition 4
MFAG:	Medical First Aid Guide for Use in Accidents Involving Dangerous Goods
MHB:	Material Hazardous only in Bulk
MLC:	Maritime Labour Convention
MMSI:	Maritime Mobile Service Identity
MPX:	Master Pilot exchange
MSDS:	Material Safety Data Sheets
NATO:	North Atlantic Treaty Organization
NOx:	Nitrogen Oxides
OCIMF:	Oil Companies International Maritime Forum
OCM:	Oil Content Monitor
OHS:	Occupational Health and Safety
OMM:	Operating and Maintenance Manual
OOG:	Out of Gauge
OOW:	Officer of Watch
OWS:	Oily Water Separator
P&I Club:	Protection and Indemnity Club
PFSOs:	Port Facility Security Officers
PIC:	Person in Charge
PMS:	Planned Maintenance System
PPE:	Personal Protective Equipment
PRVs:	Pressure Relief Valves
PPU:	Power Pack Unit
PWOM:	Polar Water Operation Manual
RCDS:	Raster Chart Display System
RPE:	Respiratory Protective Equipment
SART:	Search and Rescue Transponder
SCAMIN:	Scale Minimum
SCBA:	Self-Contained Breathing Apparatus
SCR:	Selective Catalytic Reduction
SDS:	Safety Data Sheet
SEA:	Seafarers' Employment Agreements
SEEMP:	Ship Energy Efficiency Management Plan
SMS:	Safety Management System
SOLAS:	Safety of Life at Sea
SOPEP:	Shipboard Oil Pollution Emergency Plan
SOx:	Sulphur Oxides
SRIM:	Security Related Information to Mariners
SSO:	Ship Security Officer
SSP:	Ship Security Plan
STCW:	Standards of Training, Certification and Watch keeping
SWBM:	Still Water Bending Moment
SWL:	Safe Working Load
SWSF:	Still Water Shear Forces
T&P NMs:	Temporary and Preliminary Notices to Mariners
TCPA:	Time to Closest Point of Approach
TDBF:	Tail Design Break Force
TMC:	Transmitting Magnetic Compass
TML:	Transportable Moisture Limit
UKC:	Under Keel Clearance
UKHO:	United Kingdom Hydrographic Office
UMS:	Unmanned Machinery Space
V/V:	Volume of fumigant per total volume of gas
VDR:	Voyage Data Recorder
VGM:	Verified Gross Mass
WF:	Solids that evolve flammable gas when wet
WIDS:	Water Ingress Detector Systems
WLL:	Working Load Limit

Objective of the RightShip dry inspection

The objective of the RightShip inspection is to assess the quality of ships, verify the familiarity and compliance of ship's crew with the safety, statutory requirements, industry recommendations, best practices and required items within the RightShip Inspection Ship Questionnaire. The outcome of the RightShip Dry Inspection will reflect the actual condition and standard of operation of the vessel at the time of inspection.

The RightShip Dry Inspection allows the identification and assessment of risk that the use of vessel may transfer to our clients and external stakeholders.

RightShip inspection ship questionnaire

The RightShip Inspection Ship Questionnaire covers a series of questions related to safety, environmental protection, maintenance, industry recommendations and good practices. For inspection purposes the vessels covered in RightShip inspection are grouped into five categories:

1. Bulk carriers that are carrying solid bulk cargoes other than grain
2. Bulk carriers that are carrying grain cargoes
3. General cargo ships that are carrying general and/or container cargoes
4. Container ships that are carrying container cargoes
5. Livestock carriers that are carrying live export of sheep, cattle, and goats (TBC)

There are two options for the completion of an inspection using the Rightship Ship Inspection Questionnaire. The first is in the traditional approach where all questions are answered during a physical inspection. The second is a hybrid approach where those questions denoted with the letter (M) can be completed on review of documentation provided by the vessel managers in advance of a physical inspection, with the remaining questions denoted with a letter (V) completed during a subsequent shortened physical inspection of the vessel. For either approach all questions must be answered.

How to answer the RightShip ship inspection questionnaire

The questions in each section may be accompanied by a “Guide to Inspection”. The Guide to Inspection assists the ship's manager in preparing the vessel for inspection and the inspector in answering the questions and completing the inspection report.

The questions in each section must be answered by the inspector. The inspector must answer the question on the basis of the “Guide to Inspection” and any reference sources.

The inspector has an option to select one of four (4) responses for each question:

- YES: The “Yes” box should be checked when inspector, on the basis of the “Guide to Inspection” and other industry references, conclude that the answer to the question is “Yes”.
- NO: The “No” box should be checked when inspector, on the basis of the “Guide to Inspection” and other industry references concludes that the answer to question is “No”.
- N/A (Not Applicable): The “N/A” box should be checked when the subject matter in question does not apply to the vessel. If the inspector selects N/A on the basis of his / her judgment, supplementary comment should be added, and they should state the reasons the “N/A” box was selected.
- N/V (Not Viewed): The “Not Viewed” box should be checked if the subject matter in question was not checked by the inspector. Supplementary comment should be added, and they should state the reasons the N/O box was selected.

Non-conformity (N/C): A N/C is a failure to meet a requirement which is a need, expectation, or obligation. It can be a deficiency in characteristic, documentation, or procedure, (including work practice) through finding physical defects, test failures, incorrect or inadequate documentation and maintenance, a deviation from testing and inspection, or non-compliance with the industry good practices and recommendations. A N/C means an observed situation where objective evidence indicates the non-fulfilment of a specified requirement.

- The inspector must record a non-conformity (N/C) in the "N/C" box (the "Action" box in the inspection template) when the answer "No" is checked. The Non-conformity (N/C) must specify and explain the reason the negative response is made. The inspector must not include the solution for fixing the non-conformity.
- The inspector shall make supplementary comments in the "Comments" section, when required by the "Guideline to Inspection" or when an additional clarification is required to understand the matter related to a specific question.
- The inspector must not check the "Yes" box when the inspector's comments contain negative elements. When comments contain negative elements, the "No" box must be checked. The inspector must respond to all questions and each question must have one of its check boxes marked. The inspection report will be rejected and returned if all questions have not been answered. When the "Yes" box is checked, the inspector may amplify the answer to the question by adding positive comments in the comments box. Objective evidence must be used by the inspector when answering the question. The word of ship staff alone shall not be considered as sufficient evidence when answering a question. Crew's familiarity with a task and ability to demonstrate a task is considered an objective evidence. For uniformity, when assessing coating condition, the assessment should be based on the ABS Guideline "Inspection Grading Criteria for the ABS Hull Inspection and Maintenance Program (HIMP)". The inspector shall download the guideline prior to inspection and use the guideline when assessing the coating condition on board the vessel. Please download the guideline via this link: **click here**
- In the "Supplementary Comments" section at the end of each section, the inspector may add comments related to the section or a subject related to the section that has not been covered by the question. All dates should be entered in the format DD/MMM/YYYY.

Inspection procedure

The inspector must conduct the RightShip Dry Inspection as per the following mandatory requirements.

Boarding the vessel and opening meeting

The Inspector must show a valid identification card upon boarding the vessel.

The inspector must always wear appropriate personal protective equipment and must set a good example in all respects by maintaining the highest standard of ethical behaviour throughout the inspection.

The inspector must have an opening meeting with the master or master's representative. The inspector is required to introduce themselves and outline the objectives, requirements, and plan for the inspection. The inspector and the master or master's representative should agree on the sequence for the inspection.

The sequence of inspection must not affect the safe operation of the ship or effect the rest hours of the ship's personnel.

The minimum PPE for Rightship inspectors includes, safety shoes, overalls, safety helmet, hearing protection, gloves, safety glasses and the Rightship Hi Vis vest.

During inspection

The inspector must always be accompanied by a qualified and responsible officer.

The actual tank and hold access for physical assessment of the condition of ballast tanks, void spaces and cargo holds can be made only with the authority of the master and provided that port and terminal regulations allow. In all cases, the enclosed space entry procedures set out in Resolution A.1050 (27) (Revised Recommendations for Entering Enclosed Spaces Aboard Ships) must be strictly observed.

The inspector must be an observer throughout the inspection and must not be involved or interfere with the operation and/or operate any items on board the ship. However, the inspector must notify the ship's staff when observing any unsafe conditions or operations being carried out.

The inspection shall not take place at night unless it has been authorised by RightShip and agreed by the vessel's manager. If the inspector notes any N/C, then they must be pointed out and discussed at the time and the location, with the person accompanying the inspector. In this way, the nature of the N/C can be more easily understood by the ship's staff and this will reduce the duration of the closing meeting.

Closing meeting

The inspector must not provide any advice or suggestion on how to fix any non-conformities. The inspector must not give any verbal indication about the overall inspection result.

A copy of the list of non-conformities must be provided to the Master. The inspector must record any non-conformity, on which action was taken to rectify while he or she was on board.

Scope and guide to timing of inspection

The inspector is expected to manage and complete the inspection within 14 hours.

The inspector is NOT required to enter the ballast tanks, void spaces, duck keel or cofferdam. The inspector shall sight and assess the physical condition of ballast tanks, void space, and cofferdam from the deck only, where the access hatches or manhole plates can be removed. In any event, actual entry should only made following specific written instruction from RightShip.

The inspector is required to complete a Hull Structural Supplement Questionnaire following a specific instruction from Rightship.

The inspector is required to enter a cargo hold and sight the physical condition of bulkhead, tank top, condition of bilge, outfitting inside the cargo hold (handrails, vertical ladders), coating condition and test the water ingress system.

The sequence of RightShip inspection will be dependent on the availability of personnel and operational status of the vessel but will include the following components:

- A review of the vessel's documentation
- Inspection of the wheelhouse and navigation, communications
- General external areas (including mooring, main deck, hatch covers, one cargo hold and physical assessment of at least two ballast tanks from deck level, machinery of cargo cranes and one operator's crane cab), ship's office / ballast control room
- Machinery space and
- Accommodation (Up to14 hours).

In addition to his/her own hours of work, the inspector must consider the rest periods of the ship's crew when planning for the inspection.

Completion of the list of non-conformities and inspection report

On completion of the inspection, the list of non-conformities shall be submitted to RightShip immediately after the inspection. The inspector must then complete the inspection report and send the completed ship inspection report to the RightShip within 72 hours of departing the vessel. If for any reason the 72 hours deadline cannot be achieved, the inspector must advise RightShip of the reason why and when the report can be expected to be sent.

The inspector must avoid subjective comments and non-conformities which are based on assumptions, beliefs and opinions or influenced by emotions or personal feelings. The inspector's non-conformities and comments must be based on facts, observations, and valid references within the industry.

If the inspector made any subjective comments or expressed an opinion, they must give the factual basis and specific reasons why such a comment / opinion was recorded.

Vessel's manager

The vessel's manager is responsible for ensuring the records relating to the officers on board the vessel (Deck and Engineers Matrix) is up-to-date and send them to RightShip prior to inspection.

The time taken for inspection can be greatly reduced by the state of preparedness of the ship. The latest edition of the RightShip Inspection Ship Questionnaire should be on board and, as applicable, the RightShip Questionnaire should have been completed. To expedite the inspection, the ship's Manager may consider having a representative on board during the inspection. However, any representative shall not interfere with the inspection unless there are safety concerns.

Electronic certificates

Where the vessel is issued with electronic certificates, Rightship recommends the vessel's manager provide Inspectors a temporary access to their online electronic certificate system at least two(2) days before the inspection. This will facilitate the inspectors to minimise the time of inspection on board the vessel.

Remote review of digital documentation

Rightship may ask for remote review of digital documentation to minimise the time of inspection on board the vessel. If agreeable by the vessel's manager, the additional digital documents must be securely sent to the appointed inspector 72 hours prior to inspection.

The vessel's manager may send written comments relating to the report, to RightShip.

The vessel's manager is required to provide a meaningful root-cause analysis including, corrective actions and sustainable long term preventative actions for each non-conformity within 15 days of physical inspection of the vessel.

Please note that the inspection process cannot be completed until a satisfactory response has been received. If a satisfactory response is not received within 15 days, the inspection will be invalid.

Assessment of the vessel's management begins when the physical inspection of the ship is completed. The quality of the vessel's management system will be evaluated by the quality of the replies that the vessel's manager makes to the non-conformities recorded during the RightShip inspection. The inspection outcome will be determined by the RightShip Dry inspections team.

The vessel, crew and manager / owner are part of a team of resources that must "fit" together to maximise the requirements of our clients and external stakeholders. Maintaining a safe and high-quality fleet of vessels that not only complies with the statutory requirements but also complies with industry good practices, is operated by well-trained ship's crew and has an effective management system, creates a distinctive competitive advantage for the ship owner.

Section 1: General Information

1.1 **Vessel's name as it appears on the Certificate of Registry: (M)**

1.2 **Vessel's IMO Number: (M)**

1.3 **Flag: (M)**

1.4 **Date the vessel was delivered: (M)**

Guide to Inspection
Date of delivery can be found either in form A of the International Oil Pollution Prevention (IOPP) Certificate or Safety Construction Certificate.

1.5 **Date of layup, if any greater than three months since vessel's delivery:** **N/A** ☐

Guide to Inspection
If the vessel is out of service for 3 months or more, record the date, otherwise this question should be answered N/A

1.6 **Maximum assigned deadweight (metric tonnes):**

1.7 **Vessel type: (M)**

- ☐ Bulk carrier - carrying solid bulk cargos other than grain
- ☐ Bulk carrier - carrying grain cargos
- ☐ General cargo ship - carrying general and/or container cargos
- ☐ Container ship - carrying container cargos
- ☐ Other (Please specify)

1.8 **Hull type: (M)**

- ☐ Double Bottom-Single Hull
- ☐ Double Hull

1.9 **Vessel's operation at the time of inspection:**

- ☐ Loading
- ☐ Discharging
- ☐ Bunkering
- ☐ At anchor
- ☐ Idle
- ☐ In dry dock / shipyard
- ☐ At sea/river transit
- ☐ Repairs afloat

1.10 **Name of cargo being handled:** **N/A** ☐

Guide to Inspection
This question should be answered N/A when vessel is in ballast condition. Refer to shipper declaration and/or dangerous goods declaration to determine the correct name of the cargo.

1.11 **Details of Port State Control inspection history for the last 12 months: (M)** **N/A** ☐

Guide to Inspection
Inspector shall record the summary of significant deficiencies and, if the vessel was detained, detainable deficiencies. The records of Port State inspection should be retained on board for at least two years. If the vessel's name and/or the vessel's manager changed after the inspection, record the name of vessel and/or vessel's manager at the time of inspection.

1.12 **Name of classification society: (M)**

- ☐ IACS- Classification Society
- ☐ Non-IACS- Classification Society

1.13 **Expiry date of class certificate: (M)**

1.14 **Date the last Special Survey was completed: (M)** **N/A** ☐

1.15 **Date of last routine dry dock: (M)** **N/A** ☐

1.16 **Date of unscheduled repair / and or dry dock: (M)** **N/A** ☐

Guide to Inspection
Record the reason for unscheduled repair and/or dry dock.

1.17 **EEDI: (M)** **N/A** ☐

Guide to Inspection
Inspector shall record the EEDI from the IEEC.

1.18 **Date of last Flag inspection: (M)** **N/A** ☐

Guide to Inspection
Inspector shall record the summary of significant deficiencies. Not all flag states require an annual inspection to be performed on the vessel.

1.19 **Name of the vessel's manager: (M)**

Guide to Inspection
The name of the vessel's manager is recorded in the vessel's Document of Compliance.

1.20 **Date the current vessel's manager took over the vessel:**

Guide to Inspection
The date of the vessel's manager taking over the vessel is recorded in the Continuous Synopsis Record.

1.21 **Dates of last two visits of the ship's manager: (M)**

1st Visit: ☐ **N/A** ☐
2nd Visit: ☐ **N/A** ☐

Guide to Inspection
Record the position of ship's manager attending i.e. Marine Superintendent, Engineer Superintendent or Naval Architect.

1.22 **Name of the Rightship inspector:**

1.23 **Port of inspection: (V)**

1.24 **Date and time Rightship Inspector arrived at the vessel: (V)**

1.25 **Date and time Rightship inspector left the vessel: (V)**

Guide to Inspection
Record the arrival and departure time/dates for each session of the inspection (when the inspection was carried out in more than one session) or when the inspection was carried out by more than one inspector.

1.26 **Total time taken for inspection: (V)**

1.27 **Date the inspection was completed: (V)**

Guide to Inspection
Record the actual time of inspection and exclude suspension of inspection for any reason i.e., meals, PSC inspection etc.

1.28 **Name of the ship's P&I club:(M)**

☐ International Group of P&I
☐ Non-International Group of P&I

Guide to Inspection
Full list of Principal Clubs, Affiliated Associations and reinsured subsidiary: > American Steamship Owners Mutual Protection and Indemnity Association, Inc > Assuranceforeningen Skuld > Skuld Mutual Protection and Indemnity Association (Bermuda) Ltd > Gard P&I (Bermuda) Ltd > Assuranceforeningen Gard > The Britannia Steam Ship Insurance Association Limited > The Japan Ship Owners' Mutual Protection & Indemnity Association > The London Steam-Ship Owners' Mutual Insurance Association Limited > The North of England Protecting & Indemnity Association Limited (now called North P&I) > The Shipowners' Mutual Protection & Indemnity Association (Luxembourg) > The Standard Club Ltd > The Standard Club Europe Ltd. > The Standard Club Asia Ltd. > The Steamship Mutual Underwriting Association (Bermuda) Limited > The Steamship Mutual Underwriting Association Ltd > Sveriges Ångfartygs Assurans Förening / The Swedish Club > United Kingdom Mutual Steam Ship Assurance Association (Bermuda) Limited > United Kingdom Mutual Steam Ship Assurance Association (Europe) Ltd. > The West of England > Ship Owners Mutual Insurance Association (Luxembourg)

Section 2: Certification and personnel management

2.1 **Is the latest Class Survey Status available and are all statutory certificates listed in the Class Survey Status valid, and is the vessel free of condition of class or significant recommendations? (M)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection
Record in comment if the vessel has any condition of class, significant recommendation, and memorandum. The class survey status shall be available on board and should be dated not more than 14 days prior to the date of the inspection. Record a non-conformity if an up-to-date class survey status was not available on board. The Inspector should accept electronic certificates containing the features below: 1. Validity and consistency with the format and content required by the relevant international convention or instrument, as applicable 2. Protected from edits, modifications, or revisions other than those authorised by the issuer or the Administration 3. A unique tracking number, and 4. A printable and visible symbol that confirms the source of issuance (GUIDELINES FOR THE USE OF ELECTRONIC CERTIFICATES, 2016) The inspector may request the master to demonstrate the validity of the electronic certificate following the instructions available on board the ship. If the master fails to demonstrate, to the satisfaction of the inspector, that an electronic certificate meets the requirements, the inspector shall record a non-conformity. The IMSBC Code fitness certificate in accordance with IMSBC Code (2020 Edition) may be issued upon request from owners/ shipbuilders on voluntary basis from 1 January 2020. For cargoes listed in Table G1 (Cargo newly added and requirements on construction/equipment (IMSBC Code-4th amendment) as 'Group A and B' or 'Group B', IMSBC Code (2020 Edition) a fitness certificate will be issued in cases where ships comply with requirements in Table G1.

2.2 **Has the vessel been provided with certificates of financial security for seafarers? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
From 18 January 2017, all ships which are subject to MLC have been required to carry and display on board two certificates confirming that financial security is in place for: (a) shipowners' liabilities for repatriation of crew, essential needs such as food, accommodation, medical care and up to four months' outstanding contractual wages and entitlements in the event of abandonment (Regulation 2.5, Standard A2.5.2 Paragraph 9) (b) contractual payments for death or long-term disability due to an occupational injury, illness or hazard set out in the employment agreement or collective agreement (Regulation 4.2, Standard A4.2.1 paragraph 1(b)) (FAQs: Maritime Labour Convention 2006 As Amended Financial Security Requirements - The Shipowners' Club, 2020)

2.3 **Can all crew communicate effectively in the working language of the ship? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record the common language and the level of English proficiency of the crew on board the vessel. On all ships, to ensure effective crew performance in safety matters, a working language shall be established and recorded in the ship's logbook. The company, as defined in regulation IX/1, or the master, as appropriate, shall determine the appropriate working language. Each seafarer shall be required to understand and, where appropriate, give orders and instructions and to report back in that language. If the working language is not an official language of the State whose Flag the ship is entitled to fly, all plans and lists required to be posted shall include a translation into the working language. On ships to which SOLAS chapter I applies, English must be used on the bridge as the working language for bridge-to-bridge and bridge-to-shore safety communications as well as for communications on board between the pilot and bridge watchkeeping personnel, unless those directly involved in the communication speak a common language other than English. (SOLAS 74, 2014)

2.4 **Is the vessel's manning in compliance with the Safe Manning Certificate? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record in comments the actual and required manning of the vessel. Minimum safe manning is the level of manning that will ensure that a ship is sufficiently, effectively, and efficiently manned to provide safety and security of the ship, safe navigation and operations at sea, safe operations in port, prevention of human injury or loss of life, the avoidance of damage to the marine environment and property, and to ensure the welfare and health of seafarers through the avoidance of fatigue. Except in ships of limited size or propulsion power (which are not quantified), the determination of the minimum safe manning level should also consider the provision of qualified officers to ensure that it is not necessary for the master or chief engineer to keep regular watches by adopting a three-watch system. (PRINCIPLES OF SAFE MANNING, IMO resolution 1047(27) , 2000) Inspectors should review the crew list and, considering the level of operation at sea and port, assess if there are enough personnel on board to fulfil the following principles of safe manning: > Maintain safe navigation by adequate manning of bridge throughout the passage. > Mooring, tending mooring at port and unmooring the ship safely. > Effective performance of cargo operation to ensure safe carriage of cargo during transit. > Performance of on-board functions such as drills, ship security issues, equipment maintenance. > Manning levels should be such as to ensure that the time and place available for taking rest periods are appropriate for achieving a good quality of rest. If it is suspected that the manning levels are low, attention should be paid when answering the following questions where necessary (record N/C under the relevant questions): > Navigation bridge, Q 3.8 and Q 3.9 > Moorings Q 10.7 > Engine Control Room Q 13.2, Q 13.5

2.5 **Do all personnel maintain rest period/work hours and are the rest hours in compliance with STCW or MLC requirements? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a N/C if:

> **There are two or more consecutive violations by any seafarer on-board.**
> **The vessel's manager has not been informed at least monthly of compliance levels on board.**
> **The work hour records are not to ILO format - Inspector should refer to the IMO/ILO guideline "Guidelines for the Development of Tables of Seafarers' Shipboard Working Arrangements and Formats of Records of Seafarers' Hours of Work or Hours of Rest".**

"Hours of rest" means time outside hours of work and does not include short breaks. The minimum requirement for hours of rest provided should be:

> Minimum 10 hours in any 24-hour period, which may be divided into no more than 2 periods, one of which shall be at least 6 hours in length, and no more than 14 hours between any consecutive periods; and
> Minimum 77 hours in any 7-day period.

A record must be kept of the seafarers' daily hours of rest, the principal purpose for the record being to allow monitoring and provide documentary evidence of compliance with the minimum hours of rest requirements, and to record any deviations from the requirements.

Musters, firefighting and lifeboat drills, and drills prescribed by national laws and regulations and by international instruments shall be conducted in a manner that minimizes the disturbance of rest periods and does not induce fatigue.

In respect of situations when a seafarer is on call, such as when a machinery space is unattended, the seafarer shall have an adequate compensatory rest period if the normal period of rest is disturbed by callouts to work.

(Article 5- Seafarers' Hours of Work and the Manning of Ships Convention, 1996 (No. 180))

The standard format for the record of daily hours of rest should comply with the ILO Guideline of Rest.

Shipowners may develop, or purchase, electronic systems that record the hours of rest for seafarers on their vessels and these systems should be as follows:

1. The format must be based on the ILO guidelines.
2. The electronic records must be accessible to all seafarers be secure from unauthorized alterations after entering.
3. There must be a means for the records to be endorsed by the seafarer and the master.
4. There must be a means for the seafarer to receive a copy of their hour of rest records.

(IMO/ILO guidelines for the development of tables of seafarers' shipboard working arrangements and formats of records of seafarers' hours of work or hours of rest, 1999)

2.6 **Has the Master been provided with relevant ship handling training? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A master with less than 5 years sea time in rank must have attended a ship handling course.

It is important that masters and chief mates should have had relevant experience and training before assuming the duties of master or chief mate of large ships or ships having unusual manoeuvring and handling characteristics significantly different from those in which they have recently served. Such characteristics will generally be found in ships which are of considerable deadweight or length or of special design or of high speed.

(Section B-V/a, STCW 2010)

The master should have attended an approved ship-handling simulator course on an installation capable of simulating the manoeuvring characteristics of such a ship as per IMO Model course 1.22.

2.7 **Are those officers who have immediate responsibility for carrying and care of dangerous and hazardous substances in solid form in bulk, in possession of specialised training as appropriate to the type of cargo being carried? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Guidance regarding training of officers and ratings responsible for cargo handling on ships carrying dangerous and hazardous substances in solid form in bulk. Training should be divided into two parts, a general section on the principles involved and a section on the application of such principles to ship operation. All training and instruction should be given by properly qualified and suitably experienced personnel and cover at least the subjects given in paragraphs 2 to 14 of section B/V b of STCW. Shipboard application: **Class 4.1** - Flammable solids **Class 4.2** - Substances liable to spontaneous combustion **Class 4.3** - Substances which, in contact with water, emit flammable gases **Class 5.1** - Oxidizing substances **Class 6.1** - Toxic substances **Class 7** – Radioactive **Class 8** - Corrosives **Class 9** - Miscellaneous dangerous substances and articles Rightship recommends that all officers who have immediate responsibility for carrying and care of dangerous and hazardous substances in solid form in bulk, including Material Hazardous only in Bulk (MHB) shall have undertaken appropriate shore-based training, meeting the competence requirements of the 2010 Manila Amendments to the STCW Convention and Code.

2.8 **Are those officers who have immediate responsibility for carrying and care of dangerous and hazardous substances in packaged form, in possession of specialised training as appropriate to the type of cargo being carried? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
This question should be answered N/A if the vessel isn't a general cargo ship, a roll on roll off (Ro-Ro) ship, or a non-cellular ship fitted for the carriage of containers. Training should be divided into two parts, a general section on the principles involved and a section on the application of such principles to ship operation. All training and instruction should be given by properly qualified and suitably experienced personnel and cover at least the subjects given in paragraphs 2 to 19 of section B-V/c of STCW. (Section B-V/c, STCW 2010) Rightship recommends that all masters and deck officers who have immediate responsibility for carrying and care of dangerous and hazardous substances in package form shall have undertaken appropriate shore-based training, meeting the competence requirements of the 2010 Manila Amendments to the STCW Convention and Code.

2.9 **Has an SMS policy and procedure been established to enforce the STCW Convention and Code requirements for the purpose of preventing drug and alcohol abuse? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Companies should consider the implementation of a clearly written policy of drug and alcohol abuse prevention, including prohibition to consume alcohol within four hours prior to serving as a member of a watch either by inclusion in the company's quality-management system or by means of providing adequate information and education to the seafarers. Those involved in establishing drug and alcohol abuse-prevention programmes should take into account the guidance contained in the ILO publication Drug and Alcohol Prevention Programmes in the Maritime Industry (A Manual for Planners), as may be amended. (Section B-VIII/1, Guidance regarding fitness for duty, STCW 2010)

2.10 **Are the limits of blood and breath alcohol contents in the drug and alcohol policy equal to, or less than the STCW mandatory alcohol limit? (V&M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Each Administration shall establish, for the purpose of preventing alcohol abuse, a limit of not greater than 0.05% blood alcohol concentration (BAC) or 0.25 mg/l alcohol in the breath or a quantity of alcohol leading to such alcohol concentration for masters, officers and other seafarers while performing designated safety, security, and marine environmental duties. (Section B-VIII/1, Guidance regarding fitness for duty, STCW 2010)

2.11 **When was the date of the last recorded unannounced on-board group alcohol test? (M)**
Record the date: **N/A**

2.12 **When was the date of the last unannounced drug test undertaken by an external agency? (M)**
Record the date: **N/A**

2.13 **Is the officer matrix accurately completed and does it reflect the information on officers and engineers on board the vessel at the time of inspection? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Inspector must not record a non-conformity when crew change(s) took place within seven days from the date of the inspection. **The vessel's manager shall provide sufficient overlap for master / chief officer and chief engineer / second engineer to ensure that they are familiar with the vessel's operation before taking charge, and both senior officers and senior engineers are not changed at the same time.** The vessel's manager is responsible to maintain up-to-date records relating to the officers and engineers on board the vessel at the time of inspection. The inspector should have a copy of the updated officer matrix and check the tour on board, qualifications and experience of officers and engineers against the crew list and seaman books. The actual details of Master, Chief Engineer, Chief Officer and Second Engineer / First Engineer must be checked against the data contained in the matrix and a non- conformity shall be recorded for inaccurate updates. Random checks must be made of the actual records applicable to junior officers and junior engineers. A seafarer may hold a Certificate of Receipt of Application (CRA) and a valid national STCW Certificate, for a period not exceeding three (3) months while an application for the STCW Endorsement Certificate is being processed. The inspector shall check the validity of CRAs.

2.14 **If ECDIS was fitted on board, have the Master and Deck Officers completed Generic training and type-specific familiarisation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Inspector to record how the familiarisation training was carried out. **ECDIS familiarisation should be provided to all on-signing deck officers before they take an independent navigation watch, and each time they join any vessel. (Recommendations on Usage of ECDIS and Preventing Incident, 2020)** The STCW Code contains requirements for approved training on ECDIS. In cases where the approved training has not been completed, a limitation shall be included on the certificate and endorsements issued to the seafarer. Where such a limitation is not specified, the certificate and endorsements are evidence of having successfully completed the required approved training and that the standard of competence has been achieved. No requirement exists for the approved training on ECDIS equipment to be type specific. The knowledge, understanding and proficiency required to be demonstrated is generalized to ensure seafarers have the necessary skills for basic operation of all types of equipment. In accordance with regulation, I/14, companies are responsible for ensuring that seafarers employed on their ships are familiarized with the installed equipment, including ECDIS. It is agreed that seafarers required to have training in the use of ECDIS: 1. Should not be required to provide documentation of training in ECDIS that is specific to the installed equipment; and 2. Are required to be familiarised with the ECDIS equipment installed on board. (STCW.7/Circ.24/Rev.1, 2017)

Deck officers who hold a Certificate of Competency with validity over 01 January 2017, in accordance to regulations II/1 and II/2 of the annex to the STCW-Convention and without an ECDIS limitation, fulfil the requirement of generic ECDIS-training.

The vessel's manager can consider a wide variety of options for achieving familiarisation both on-board and ashore. These include but are not limited to:

- Shore based manufacturer training followed by installation-specific training.
- Familiarisation on-board.
- Independent training on specific systems followed by installation specific familiarisation.
- Computer Based Training (CBT), followed by installation-specific familiarisation on-board.
- Internet / Intranet Based Training (eLearning) followed by installation specific Familiarisation on-board.
- On-board training by appropriately trained crew or training personnel.
- Manufacturer provided training mode on the ECDIS, followed by installation-specific familiarisation on-board.
- Company bridge procedures and manuals.

Regardless of the method(s) used, it is essential that all watch keeping officers are competent in the use of the on-board ECDIS prior to taking charge of a navigational watch and remain so thereafter.

(Industry Recommendations for ECDIS Familiarisation, 2012)

2.15 **Does the ship's manager provide value-added training courses beyond the STCW to its on-board engineers? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record any recent additional training conducted.

Training could be either ashore or on board through CBT modules / by the chief engineer and second engineer. Examples of additional training could include items such as - operation and maintenance of the engine specific types, injectors, exhaust vales, electronic fuel valves, care and maintenance of electronic governors, dual fuel systems, maintenance of fuel pumps, boiler automation, and hydraulic machinery.

2.16 **Does the Air Handling Unit (AHU) maintain a comfortable temperature and is there recorded evidence of regular maintenance and cleaning of AHU available? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The components of the air-conditioning system must be kept in good condition. A procedure for cleaning and disinfection of the air conditioning system must be provided.

The capitation inlets for external air should be protected from possible sources of pollution, by providing them with filters.

The record of the maintenance, operation, cleaning, and disinfection of the air-conditioning system shall be available on board.

Humans generally feel comfortable between temperatures of 22 °C to 27 °C and a relative humidity of 40% to 60%.

Section 3: Navigation

3.1 **Is practical guidance on navigational safety incorporated in the vessel manager's navigation instruction / procedures and are officer's familiar with the company's navigation procedures? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The practical guidance on navigational safety shall include the following:

- Allocation of bridge watch keeping duties and responsibilities.
- Procedures for passage planning and navigation, including departures from the passage plan.
- Chart and nautical publication update and correction procedures.
- ECDIS procedure (including chart and software updates).
- Procedures to ensure that all essential navigation equipment and main and auxiliary machinery are available and fully operational.
- Ship position reporting procedures.
- Accident and near miss reporting procedures.
- Recording of relevant events and Voyage Data Recorder (VDR) policy.
- Use of Bridge Navigational Watch Alarm System (BNWAS) modes (automatic, manual, on and off) and procedures for ensuring correct operation.

- Bridge access and distraction prevention procedures.
- Procedures for familiarisation and effective handover when crew changes occur.
- Training and drill requirements.
- A system for identifying particular training needs.

(Bridge Procedure Guide, 2016)

The ECDIS procedure should include the following:

- Voyage planning and execution
- Watch-keeping with ECDIS
- Ensuring against over-reliance on ECDIS
- Chart Maintenance
- Departure and Arrival checks
- ECDIS failure and backup system
- Safety settings
- The use and reliability of CATZOC
- ECDIS display layers for various navigation conditions.
- Managing manual layers to ensure current important information is available and out-of-date material is archived or removed.
- Display T&Ps NMs and use of AIO function.
- Where there is no appropriate safety contour available on the ENC
- Depth contour shading: two shade versus four-shade
- Define the XTC for various sea area, such as pilotage water, confined waters, coastal waters, and open water, for each leg of voyage.
- Post voyage review, so that any hazards or useful information discovered can be incorporated into future passage plans.
- The route validation
- A protocol for naming and identifying saved routes to avoid selecting and incorrect route.
- The frequency of, and preferred method for, position verification while using ECDIS.

Where ECDIS is being used as the primary means of navigation it must be clearly stated as such by the company and a policy in the SMS.(Admiralty guide to ECDIS implementation, policy, and procedures, 2016)

A checklist should be established with clear instructions on how to deal with sensory input failure of ECDIS and how it may affect safe navigation. This checklist should be kept in bridge.

(ECDIS LTD, 2019)

Anchoring procedures must be incorporated in the navigation procedure and shall provide guidance on the following:

- How to select a good anchorage location, planning the anchoring position and approach in different weathers and visibility condition; bridge team management; traffic density, negotiating overcrowded anchorages with additional risks of collision; safety of swing room, under keel clearance
- Keeping a safe anchor watch, including position-keeping, proper use of radar and GPS guard rings/alarms. OOW use of main engine.
- The minimum requirement for the master's Bridge Orders.
- When to have the engineers on stand-by, the engine room manned, and the main engines on standby or ready for immediate use.
- Amount of cable, scope, holding ground, anchor holding power, proximity of shoreline, dangers of dragging anchor, and risk of collision and grounding.
- When the vessel is in ballast condition, the use of additional ballast.
- The use of two anchors
- The limitations on the anchoring equipment under heavy stress
- The use of anchors in an emergency
- Deep water anchoring
- Recognising when a dangerous situation is developing when at anchor and when to move
- Taking early and effective action
- Factors affecting a vessel when at anchor in heavy weather, including yawing and snatching
- Putting to sea in the advent of adverse and severe weather

(Standard Safety Bulletin on Safe Anchoring, 2008)

Special consideration should be taken to create a backup of ECDIS data on a regular basis so any part of the passage could be reviewed. The company SMS should include frequency and arrangement of ECDIS data backup.

(Recommendations on Usage of ECDIS and Preventing Incident, 2020)

3.2 **Are the requirements of the master's standing orders explained to the deck officers? and are bridge order books (Night Order) being completed by the master and countersigned by the officers? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record a N/C if the detail of visibility criteria, calling the master, minimum CPA and TCPA, ECDIS display layers for various navigation conditions was not incorporated in the master's standing order. The Master shall clearly highlight the potential safety risks involved in VHF radio communication between vessels and reliance on AIS communication information, for the purpose of collision avoidance. The VHF or AIS text facility should not be used for collision avoidance purpose. Master shall be called if the vessel is needed to exit the XTC. The master should explain particular requirements to the Bridge team in the Master's Standing Orders. These orders should be drafted to support the SMS. Company and Masters' Standing Orders should be read by all Bridge Team members upon joining the ship, signed, and dated. A copy of the orders should be available on the bridge for reference. In addition to master's Standing Orders, specific instructions will be needed. At least at daily intervals, the master should write in the bridge order book what is expected of the OOW for that period. These orders should be signed by each OOW when taking over a watch, to confirm that they have read, understood, and will comply with the orders. The OOW should brief other members of the Bridge Team, as appropriate, on any activities or requirements for the forthcoming watch. (Bridge Procedure Guide, 2016) There is an expectation that bridge order book entries are made by the Master at least daily when the vessel is at sea. AIS information overlaid on ECDIS should be used as an identification tool and not as a collision avoidance tool. (Recommendations on Usage of ECDIS and Preventing Incident, 2020)

3.3 **Is the manoeuvring information for the vessel displayed on the bridge and are bridge logbooks, bell book, radar performance book, and Change of Watch at Sea check list being correctly maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
For all ships of 100 metres in length and over and all chemical tankers and gas carriers regardless of size, a pilot card, wheelhouse poster and manoeuvring booklet should be provided. (Provision and display of manoeuvring information on board ships, 2011) The OOW should be familiar with the handling characteristics and stopping distances of the ship. In addition, the OOW should know how these characteristics are affected by the current and anticipated machinery status. Information regarding the manoeuvring characteristics should be recorded on the Pilot Card and on the Wheelhouse Poster and the manoeuvring booklet. (Bridge Procedure Guide, 2016) All ships engaged on international voyages shall keep on board a record of navigational activities and incidents including drills and pre-departure tests. When such information is not maintained in the ship's logbook, it shall be maintained in another form approved by the Administration. (SOLAS 1974, regulations V/26 and V/28.1) The quality of the radar picture needs to be checked regularly. This may be done automatically using a performance monitor. (Bridge Procedure Guide, 2016) The following should be recorded in the bridge logbook: > Navigational information including positions at regular intervals and method of position fixing, courses steered, allowances made for compass error, leeway and set. > Record of course, distance and speed made good, and course and distance to go should be completed daily. > Full set of routine weather observations, with a report of sea and swell conditions, should be entered at the end of each watch. > Details of severe weather met during the voyage, and the action taken should be recorded. > Full details of any matters which might affect the cargo and its condition. RightShip recommends that the performance of the radar(s) when operational should be checked and recorded by the OOW at the end of each watch unless this contradicts the makers recommendations. A numeric, percentage, graphical, or other measurement value should be recorded.

Before taking over a navigation watch, the incoming officer should positively confirm the ECDIS configuration against the passage plan requirement. The outgoing officer should highlight any changes to the ECDIS configuration outside the passage plan parameters.

If an ECDIS alarm must be disabled for any reason, this should be recorded on a formal tracking form to be handed over to subsequent watches and approved by the master.

(Recommendations on Usage of ECDIS and Preventing Incident, 2020)

The communicated ECDIS configuration by the officer of watch should be documented.

Change of Watch at Sea checklist should be used as per section B (Checklist B16) of the Bridge Procedure Guide and at any other time required by the SMS.

Rightship recommends that the ECDIS display setting should be incorporated into the Change of Watch at Sea checklist.

3.4 **Have operational checks on navigational equipment been done and are checklists being effectively completed when preparing for sea and prior to port entry? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Operational checks on navigational equipment should be undertaken when preparing for sea and prior to port entry as per section B (Checklists B1, B6 & B7) of the Bridge Procedure Guide and at any other time required by the SMS.

Before entering restricted or coastal waters, it is important also to check that full control of engine and steering function is available.

(Bridge Procedure Guide, 2016)

3.5 **Are there records indicating that routine tests and checks of bridge equipment are being undertaken regularly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Daily tests and checks of bridge equipment should be undertaken, including the following:

- Manual steering should be tested at least once per watch (as per Checklist B1 of BPG).
- Gyro and magnetic compass errors should be checked and recorded at least once a watch when this is possible.
- The synchronisation of all compass repeaters, including repeaters at the emergency steering position, should be regularly checked.
- To ensure adequate performance, information from electronic equipment should always be compared and verified against information from different independent sources; and
- All available positioning systems and sources (GNSS, DGNSS, satellite communications terminals with integrated GNSS, and terrestrial radio navigation aids) should be cross checked.

Checks should confirm that the equipment is functioning properly and that it is successfully communicating with any other bridge system to which it is connected:

- Built-in test facilities should be used frequently, including alarm self-test functions.
- Configuration settings should be checked and confirmed to be in accordance with the SMS and the passage plan; and
- Operational settings and alarms should be correctly set and checked on the equipment and/or the BNWAS.

(Bridge Procedure Guide, 2016)

3.6 **Has the master/pilot information exchange been taking place effectively and is the standard pilot card being completed as required? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The pilot and the master should exchange information regarding the pilot's intentions, the ship's characteristics, and operational factor as soon as practicable after the pilot has boarded the ship.

For an effective master/pilot information exchange, use should be made of the MPX checklist (Checklist A1 of Bridge Procedure Guide). It is essential that the MPX result in clear and effective communication and should cover:

- Presentation of a completed standard Pilot Card (Checklist A2 of Bridge Procedure Guide);
- The pilotage plan and the circumstances when deviation from the plan may be required.
- Any amendments to the plan should be agreed, and any changes in individual Bridge Team responsibilities made before pilotage commences.
- Updates on local conditions such as weather, depth of water, tides and tidal streams.
- An update on traffic conditions.
- Ship's dimensions and manoeuvring information should be provided in the form of the Wheelhouse Poster (Checklist A3 of Bridge Procedure Guide). A manoeuvring booklet containing more detailed information should also be available on the bridge.
- Any unusual ship handling characteristics and machinery, navigational equipment and crew limitations that could affect the safe conduct of pilotage and berthing.
- Information on berthing arrangements including the use, characteristics and number of tugs, mooring boats, mooring arrangements and other external facilities.
- Contingency plans should also be considered. These should identify possible abort points in the event of a malfunction or a shipboard emergency; and
- Formal confirmation of the working language.

(Bridge Procedure Guide, 2016)

3.7 **Does the vessel's manager produce a guideline for under keel clearance and air draft clearance? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Inspector should verify the accuracy of the UKC calculation.

The UKC policy should incorporate the minimum allowed under-keel clearance for both coastal, river navigation and while alongside, including guidance on the action to be taken in shallow water to ensure the minimum clearance is maintained. The required minimum air draft for passing under bridges or overhead cables must be defined by the vessel's manager. The vessel's manager's guidelines shall cover the calculation of Dynamic Under Keel Clearance (DUKC) and air draft. The UKC Calculation on board shall take CATZOC information in the account.

3.8 **Are the fire and safety rounds being conducted at the end of each watch? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

No other activity or duties should be allowed to interfere with keeping a proper look-out. The officer of watch should not be the sole look-out during hours of darkness.

(Bridge Procedure Guide, 2016)

3.9 **Does the manning level in the bridge at all stages of the voyage and anchor meet or exceed that required by the Bridge Manning Matrix and are lookout arrangements adequate? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The recommended form and example of the Bridge Manning Matrix is contained in the Bridge Procedures Guide. The Bridge Manning Matrix shall be posted in the Bridge.

Under the STCW Code, the Officer of the Watch (OOW) may, in certain circumstances, be the sole look-out in daylight conditions. Clear guidance on the conduct of sole look-out should be included in the SMS.

(Bridge Procedure Guide, 2016)

3.10 **Is navigation equipment in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record a N/C if the magnetron of radar was not changed as per manufacturer recommendation. The ship-borne navigational systems and equipment shall comply with SOLAS Chapter V Regulation 19. The navigation equipment when fitted in the bridge, regardless of whether a vessel is required by legislation to carry such equipment, should be operational. Random checks should be made to ensure that equipment is operational. (Bridge Procedure Guide, 2016)

3.11 **Are navigation lights, emergency navigation lights, shapes and signalling equipment in working order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The OOW is responsible for ensuring that the navigation lights, emergency navigation lights and signalling equipment are in working order and are ready for immediate use at all times. The condition of lights, flags and shapes should be checked at regular intervals. Sound signalling equipment should be checked daily and maintained in an operational condition. (Bridge Procedure Guide, 2016) A procedure for testing of the navigation light failure alarm should be posted on the bridge. The signalling lamp should have 3 spare bulbs and a portable battery pack. (PERFORMANCE STANDARDS FOR DAYLIGHT SIGNALLING LAMPS, 2000)

3.12 **Was the Bridge Navigational Watch Alarm System operational when the ship was underway and at anchor, and required tests conducted and recorded accordingly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Use of Bridge Navigational Watch Alarm System (BNWAS) modes (automatic, manual, on and off) and procedures for ensuring correct operation should be incorporated in the company navigation procedure. (Bridge Procedure Guide, 2016) If a failure (e.g., internal communication failure) of, or power supply failure to, the BNWAS is detected, it is to be indicated by visual and audible alarms. Means are to be provided to allow the repeat of this indication on a central alarm panel, if fitted. The means of selecting the Operational Mode and the duration of the Dormant Period should be security protected so that access to these controls should be restricted to the master only. The BNWAS should be powered from the ship's main power supply. The malfunction indication, and all elements of the Emergency Call facility, if incorporated, should be powered from a battery-maintained supply. If a malfunction of, or power supply failure to, the BNWAS is detected, this should be indicated. Means shall be provided to allow the repeat of this indication on a central alarm panel if fitted. **First stage bridge audible alarm:** The first stage audible alarm which sounds on the bridge at the end of the visual indication period should have its own characteristic tone or modulation intended to alert, but not to startle, the OOW. This alarm should be audible from all operational positions on the bridge where the OOW may reasonably be expected to be stationed. This function may be engineered using one or more sounding devices. Tone/modulation characteristics and volume level should be selectable during commissioning of the system. **Second and third stage remote audible alarm:** The remote audible alarm which sounds in the locations of the Master, officers, and further crew members capable of taking corrective action at the end of the bridge audible alarm period should be easily identifiable by its sound and should indicate urgency. The volume of this alarm should be sufficient for it to be heard throughout the locations above and to wake sleeping persons. (Resolution MSC.128 (75) Performance Standard For a BNWAS, 2002)

3.13 **Where fitted are the standard magnetic compass, gyro compass and Global Navigation Satellite System compass, operational, adjusted and properly maintained? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a N/C if the gyro compass was not serviced as per manufacturer recommendation.
The magnetic compass is generally fitted above the navigating bridge on the centreline and fitted with a periscope so that the compass is readable from the helmsman's position. Where the magnetic compass is needed to provide heading outputs to other bridge systems, a transmitting magnetic compass (TMC) is fitted. TMC outputs should be corrected for compass error and the TMC should be tested once a week.

A compass deviation card should be maintained on the bridge. The deviation will need to be determined and the compass adjusted at intervals during the ship's life, particularly after any major steel conversion work to the ship. Caution should be observed when using the magnetic compass on ships that carry or have recently carried magnetic cargoes such as iron ore and steel.

Compass safe distances are specified on all electrical bridge equipment and provide the minimum distances from the magnetic compass that equipment can be installed.

A TMC may have variation automatically applied. However, this correction will not include deviation. When correcting TMC outputs for compass error, care should be taken to ensure that the correct values for variation and deviation are applied.

The gyro compass should be run continuously. Should a gyro compass stop for any reason, it should be restarted and subsequently regularly checked and only relied on again when it has “settled” and the error is known.
Where the gyro has no direct speed log or position input, manual corrections should be made as required.
The gyro will support a number of repeaters, including a required repeater at the emergency steering position. Gyro repeaters on the bridge should be checked against the main gyro at least once per watch and after significant manoeuvring. Other repeaters should be checked frequently.

A Global Navigation Satellite System (GNSS) compass provides an alternative to a gyro compass as a non-magnetic transmitting heading device able to provide heading data to AIS, radar and automatic plotting aids. A GNSS compass or equivalent is required on ships navigating in polar waters at latitudes above 80 degrees. (Bridge Procedure Guide, 2016)

If the observations for a magnetic compass on a vessel show a deviation of the compass on any heading of more than 5 degrees, the compass must be adjusted by a qualified compass adjuster or the master of the vessel to correct the deviation. If the compass is adjusted by the master, RightShip recommends that the compass adjustment be checked by a qualified compass adjuster at the next available opportunity.

All magnetic compasses shall be swung and adjusted at least:
> Every two years.
- after dry docking; or
- after significant structural work.

(BS ISO 25862:2019, 2019)

3.14 **Where manual steering is engaged, is the change over from auto steering, and vice versa, recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Times and locations of engaging hand steering should be recorded in the deck logbook or bell book. Manual steering should be used whenever appropriate including in:
> Areas of high traffic density.
> Conditions of restricted visibility; and
> Any other potentially hazardous situations and particularly when an automatic steering system may provide insufficient control.

(Bridge Procedure Guide, 2016)

Examples of other potentially hazardous situations are river transits and when navigating through restricted waters.

3.15 **Are deck officers familiar with the procedure to preserve the VDR data in the event of an incident and is there a company policy within the SMS relating to the playback of VDR data? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Watch-keeping officers should understand and be familiar with the procedures for preserving records as required by the SMS. Company policy relating to the playback of VDR data should be contained within the SMS. Playback of VDR data may provide a tool for analysing the performance of the Bridge Team. Testing is required annually and should always be carried out following repair or maintenance work to the VDR or to any source providing data to the VDR. (Bridge Procedure Guide, 2016)

3.16 **Is a chart and publication management system being implemented to ensure that all charts, nautical publications, and other publications on board are current, maintained and up to date? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
RightShip recommends that a shore-based company be engaged to provide navigation support services including ENC's, paper charts and marine publications, so as to ensure that those on board are up to date with the latest edition available. Use of a chart and publication management system will help to ensure that charts and publications are effectively maintained. A management system should record the charts, publications and licences/ permits carried, and when the charts and other publications were last corrected. (Bridge Procedure Guide, 2016) The Weekly Notice to Mariners Section VIII and the README file contains important safety information relating to ENCs and ECDIS. The file is included on all ENC media but some ECDIS may not be able to display it; it can however be read on any standalone PC. The vessel's officers should all be aware of the recent content of the file and be able to demonstrate the practical application of the information. (Admiralty Guide to ECDIS Implementation, Policy and Procedures, 2016) The chart and publication management system shall cover the ENC management and correction process, including safety measures, to avoid viruses. NP133C Admiralty ENC Maintenance Record book should be available on board. An effective ENC management system should be in place on board to record ECDIS identification numbers and when licences/permits were received on board and should include a record of when the ENCs were last updated. This is generally part of ECDI software logging. (Recommendations on Usage of ECDIS and Preventing Incident, 2020)

3.17 **Were appropriate charts and publication used for the previous voyage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Vessel should obtain licences for and use the largest scale of ENCs available for all stages of each passage. (Recommendations on Usage of ECDIS and Preventing Incident, 2020) Only up-to-date official charts and publications should be used for the appraisal, planning, execution, and monitoring of a passage plan. For coastal and pilotage planning and for plotting each course alteration point, large scale charts should be used. Any additional charts and publications needed for the intended passage should be identified and obtained before departure. For ocean passage planning and open water legs, the largest scale charts that are appropriate should be used (Sections 2.3.1 Bridge Procedure Guide, 2016) Photocopied/scanned copies of official paper charts (whether subsequently corrected to latest notices to mariner or not) are NOT regarded as satisfying the SOLAS chart carriage requirement. The following publications shall be available on board and referred to when the primary means of navigation is ECDIS: > NP 231 Admiralty Guide to the Practical Use of ENC's. > NP 5012 Admiralty Guide to ENC Symbols Used in ECDIS The Seafarers Handbook for Australian Waters (AHP20) is an official nautical publication providing mariners with important maritime information from various Australian government agencies, under the cover of one combined reference. It is expected that all commercial vessels operating in Australian waters carry and refer to the publication.

3.18 **Can the master and watch-keeping officer demonstrate a familiarity with the use of ECDIS? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The master and watch keepers should be able to demonstrate their competency with the operation of ECDIS. This can be established by requesting use of basic functionality of the ECDIS in the presence of the inspector. These functions may include: > Safety setting > Setting voyage plan > Checking voyage plan > Interrogating chart updates > ENC symbol identification > Manual position fixing (NP5012/NP232) > AIS and or Radar overlay if fitted > Understanding the limitations of operating in RCDS mode > Knowledge of SCAMIN and how it is displayed > Knowledge of CATZOCs > Familiarity of deck officers with contingency action in case of ECDIS failure. > Setting of safety frame/safety cone > Creating parallel index lines > Route checking and management of alarms > Handling unresolved ENC update errors

3.19 **Is the ECDIS of an approved type and does it meet the SOLAS requirement? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Where an ECDIS is being used to meet the chart carriage requirements of SOLAS, it must: > Be type approved. > Use up-to-date electronic nautical charts (ENC); > Be maintained so as to be compatible with the latest applicable International Hydrographic Organisation (IHO) standards; and > Have adequate, independent back-up arrangements in place. According to SOLAS regulation V/18, ECDIS units on board ships must be type approved. Type approval is the certification process that ECDIS equipment must undergo before it can be considered as complying with IMO performance standards. The process is carried out by flag Administration-accredited type-approval organisations or marine classification societies in accordance with the relevant test standards developed by, inter alia, the International Electro- technical Commission (IEC) (e.g., IEC 61174). (MSC.1/Circ.1503/Rev.1, ECDIS – GUIDANCE FOR GOOD PRACTICE, 2017) Information related to current standards and latest software related to ENC and ECDIS are available on the IHO web site. The IHO has issued a new version of the ECDIS presentation library edition 4.0. There will be no need to run the IHO ENC/ ECDIS data presentation and performance checks on the ECDIS. The inspector should check the version of the IHO Standards installed on the ECDIS to confirm it is current.

3.20 **Are T&P NMs and navigation warnings being used correctly in voyage planning and monitoring? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Some ECDIS have a feature to automatically import navigational warning from Sat-C or NAVTEX terminals. Navigation Officers should verify that navigation warning information is currently displayed. Specific details of a critical navigational warning should be plotted and made alarmable by using the look-ahead feature to highlight the navigational hazard for the Officer of the Watch. (Recommendations on Usage of ECDIS and Preventing Incident, 2020) Ensure the vessel has access to all necessary T&P NM information and that this is documented. Where relevant to the voyage plan, T&P corrections should be inserted on the ECDIS display using manual corrections. The ADMIRALTY Information overlay (AIO) provides easy reference to T&P information; this can be displayed on a range of ECDIS or on back of bridge systems such as ADMIRALTY e-Navigator. (Admiralty Guide to ECDIS Implementation, Policy and Procedures, 2016)

Inspectors should check if the system is installed and verify if relevant notices are effectively managed.

The overlay is displayed as a single layer on top of the basic ENC. This ensures that users have the most up to date T&P information available regardless of where they are in the world.

T&P NMs are delivered on a weekly basis on the update DVD or with the online/email updates, depending on requirements.

The information contained in the Overlay is important navigational information that should be used when planning a voyage and may be referred to when navigating. The Admiralty Information Overlay contains all Admiralty T&P NMs in force worldwide and additional ENC P (EP) NMs, which relate specifically to ENCs. (Admiralty Guide to ECDIS Implementation, Policy and Procedures, 2016)

Navigation officer should not entirely rely on AIO as they may not be updated, and applicable T&P notices should be verified against weekly notices to mariners.

(Recommendations on Usage of ECDIS and Preventing Incident, 2020)

3.21 **Has the vessel been safely navigated in compliance with international and inland regulations? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

ENC's/Charts of the last voyage should be checked by the inspector to assess whether the vessel has been safely navigated. The inspector shall consider followings when assessing the last voyage charts:

> Largest scale charts to be available with route plotted.
> Record of weather forecast.
> Appropriate measures to be taken to comply with environmental requirements and regulations.
> Safety and alarm setting of ECDIS.
> Maintenance of safe distance off the coast, from prohibited area and dangerous wrecks.
> Adequate bridge manning to ensure a proper look-out.
> Ship's position confirmation at appropriate intervals.
> Weather monitoring by making regular barometer observations.
> NAVAREA navigational warning broadcasts where applicable checked.
> Participation in area reporting systems; and
> Gyro and magnetic compass errors and radar performance checked properly.
> Correct minimum layers of ECDIS according to the company SMS.

If an appropriate safety contour is not available on the ENC, a manual alarmable contour should be drawn as a manual layer on the ENC that should always be selected and displayed during the passage.

(Recommendations on Usage of ECDIS and Preventing Incident, 2020)

3.22 **Are records available to show that the echo-sounder recorder is being switched on prior to each approach to shallow water, port entry and departure and has the echo sounder remained in operation while the vessel has been transiting in shallow waters? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

The echo sounder should always be used when making a landfall and kept switched on in coastal and pilotage waters. If the echo sounder is fitted with a shallow water alarm, the alarm should be set to an appropriate safe depth to warn of approaching shallow water. (Bridge Procedure Guide, 2016)

The date and time of switching on should be marked on the recorder chart.

The echo sounders may have an internal memory and record data from the past 24 hours, in which case the recorder is not required.

3.23 **Was the berth-to-berth passage plan of the previous voyage comprehensive and approved by the master? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

Route validation is a critical aspect of a passage plan. The route validation involves the following stages:

> Visual checks
> Manual and auto-validation features
> Cross-checks by the bridge team
> Final validation and authorisation by the Master
> Re-validation along the route.

The master should only authorise the plan once all stages of visual check and route validation have been completed.

(Recommendations on Usage of ECDIS and Preventing Incident, 2020)

The route validation check of previous voyage should be documented and reviewed by inspector.

The following should be marked on the paper chart and/or ENCs:
> No-go areas
> Course alterations and wheel over points
> Parallel Indexing
> Aborts and contingencies
> Change in engine status
> Minimum UKC
> Use of echo sounder
> Safe speed
> Air draft
> Reporting points
> Considerations relating to the protection of the marine environment
> Strong tide and current
> Look-ahead zone.

Anchoring operation is part of a passage plan, which must be carefully planned, executed, and monitored. An effective anchoring plan can prevent anchor accidents and avoid any operational failure.

A detailed risk assessment of the anchoring operation should be carried out to formulate an effective plan and to make prudent decisions when facing emergencies. If you expect wind force to increase, the possibilities of anchor dragging must be part of the risk assessment. An alternative anchorage should also be prepared if the initial selected anchoring position is unavailable.

(Good anchoring practice, 2019)

A list of ENCs used for the intended voyage should be part of passage plan. The parameters for the look-ahead zone should be planned so that the size of the zone is appropriate for the vessel's speed and manoeuvring characteristics. They should be set for each leg of the passage and should consider conditions such as proceeding from ocean to coastal waters, pilotage areas or speed. The look-ahead zone should be reassessed in CATZOC area that have reduced position accuracy (such as B, C, D, U) to ensure the vessel has a sufficient safety margin.

Amendment to the passage plan should be officially documented and specific changes recorded on the passage plan form, according to company SMS.
Alarm-setting parameters should be agreed by the master and bridge team at the passage planning stage and captured in the relevant passage plan form.

(Recommendations on Usage of ECDIS and Preventing Incident, 2020)

3.24 **Have the parallel index techniques been used when monitoring the passage in coastal and pilotage waters, particularly in conditions of restricted visibility or at night? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The following techniques should be used when monitoring the passage in coastal and pilotage waters, particularly in conditions of restricted visibility or at night:
> Parallel indexing, which is recommended to ensure the ship's track is maintained.
> Radar bearings; and
> Radar ranges.

(Bridge Procedure Guide, 2016)

3.25 **Was the track of the ship monitored at sea and during the pilotage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Radar overlays should be used for position verification at regular interval, as defined by company SMS requirements, and for various navigation conditions such as in open waters, confined waters, fairways/channels, or pilotage waters.

Position plotting should also be undertaken using traditional techniques, using lines of position to plot visual /radar fixes. This will act as a cross check and will be recorded on the ECDIS data log. (Recommendations on Usage of ECDIS and Preventing Incident, 2020)

The ship's progress should be monitored against the pilotage plan by conducting track monitoring and regular fixing of the position of the ship, particularly after each course alteration and monitoring under keel clearance (UKC).

(Bridge Procedure Guide, 2016)

3.26 **Has the GPS been adjusted to the correct Geodetic Datum and are officers aware of the value of HDOP and is it posted next to the GPS? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
ENCs use WGS 84 as the geodetic datum, which is compatible with GPS systems without the need for correction. (Bridge Procedure Guide, 2016) The value of HDOP should be regularly checked during sea passage.

3.27 **Does the vessel utilise a weather routeing service? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
It is important to plan the most efficient route to avoid heavy weather and ensure that the vessel arrives safely at the discharge port. It is essential that the crew are aware of the weather for the upcoming voyage. This is best achieved by professional weather routeing services, which provide weather forecasts for the intended route and recommendations on the ocean crossing. Weather routeing not only provides vessels with the options for avoiding heavy weather, but also ensures that vessels get a new and updated ETA to the discharge port.

3.28 **Are procedures in place controlling the use of mobile phone, internet, and email services on the bridge? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A quiet bridge to allow VHF radio calls and sound signals to be heard. The company should have a written policy requiring that mobile phones or other personal electronic devices should only be used on the bridge in circumstances approved by the master. Notwithstanding occasions when use of mobile phones or personal electronic devices may be permitted, the company policy should minimise the distraction resulting from such devices by, in general, limiting their use to operationally necessary circumstances. Where internet and email services are available on the bridge, the Company should have a policy to manage their use. Access to internet and email use by bridge watch keepers should generally be limited to those circumstances where it is necessary for the safe navigation of the ship, in order to minimise distraction that might be caused to the Bridge Team. Internet access and email on the bridge should usually be restricted to: > Updates for nautical charts and publications, licences and permits. > Weather information. > Navigational warnings; and > Information relevant to the ship's operations and passage plan. (Bridge Procedure Guide, 2016)

Section 4: ISM System

4.1 **Has the vessel's manager established a documented system for personnel to effectively implement the ISM Code? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The latest revision of ISM manuals, procedure and instructions should be available. The inspector shall examine the compliance of the vessel with the procedures and instruction during the course of inspection The company should define and document the responsibility, authority, and interrelation of all personnel who manager, perform and verify work relating to and affecting safety and pollution prevention. The company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations concerning the safety of the personnel and, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel. (ISM code and guidelines on the implementation of the ISM code, 2018) The documents used to define and implement the SMS may be described as the Safety Management Manual. It may be more than one manual and may take the form that the company considers most appropriate. Policies, practices, and procedures are to be followed in order to ensure safe functioning of ships at sea.

4.2 **Has a safety officer been appointed and trained, and is the safety officer familiar with the principles and practice of risk assessment? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The safety officer is the safety adviser aboard the ship and shall provide valuable assistance to the company and to individual employers in meeting the statutory responsibilities for health and safety. Some training may be provided on board, but the safety officer should have attended a suitable safety officer's training course. The safety officer should be familiar with the principles and practice of risk assessment and should be available to advise those preparing and reviewing risk assessments. (Code of Safe Working Practices for Merchant Seafarer's, 2019)

4.3 **Are records of the latest shipboard internal and external audits available and are actions being initiated to correct any non-conformities? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Internal audits should be held as required by the management system, at intervals not exceeding twelve months. Reports should be available on board. The interval of internal audit may be exceeded by not more than three months in exceptional circumstances. RightShip recommends audits in addition to those required by the ISM Code should also be considered, such as navigation assessments. A Guide to Best Practice for Navigational Assessments and Audits, first edition 2018, from OCIMF provides further guidance on how to conduct a navigation assessment.

4.4 **Does the master periodically review the effectiveness of the onboard Safety Management System, report the findings to shore based management and receive feedback from them? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Effective master reviews should be carried out at least once every 12 months and evidence of the company's response to the master's review should be available on board.

4.5 **Are enclosed space entry procedures defined, up to date and accurate in the safety management system, and is a specific list of enclosed spaces clearly defined on board ,and are the ship's personnel familiar with the enclosed space entry procedures? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Rightship recommends that if the ballast treatment system is installed in an independent enclosed compartment, such compartment shall be identified as an enclosed space. "The safety strategy to be adopted to prevent accidents on entry to enclosed spaces should be approached in a comprehensive manner by the company. The company should ensure that the procedures for entering enclosed spaces are included among the key shipboard operations concerning the safety of the personnel and the ship, in accordance with paragraph 7 of the International Safety Management (ISM) Code. The company should elaborate a procedural implementation scheme which provides for training in the use of atmospheric testing equipment in such spaces and a schedule of regular on-board drills for crews. Competent and responsible persons should be trained in enclosed space hazard recognition, evaluation, measurement control and elimination, using standards acceptable to the Administration.

Crew members should be trained, as appropriate, on enclosed space safety, including familiarisation with on-board procedures for recognizing, evaluating, and controlling hazards associated with entry into enclosed spaces.

An "Attendant" is defined as "a person who is suitably trained within the safety management system, maintains a watch over those entering the enclosed space, maintains communications with those inside the space and initiates the emergency procedures in the event of an incident occurring".

The company shall identify all enclosed spaces on board the ship.

The definition includes, but is not limited to, the following compartments:
> Cargo spaces
> Double bottoms
> Fuel tanks
> Ballast tanks
> Cofferdams
> Chain lockers
> Void spaces
> Duct keels
> Inter-barrier spaces
> Boilers
> Engine crankcases
> Engine scavenge air receivers
> Sewage tanks

An enclosed space entry permit relates to entry into any enclosed space and should be completed by the master or responsible person and by any persons entering the space, e.g., competent person and attendant.

The permit should contain a clear indication as to its maximum period of validity.

On ships carrying solid bulk cargoes, dangerous atmospheres may develop in cargo spaces and adjacent spaces. The dangers may include flammability, toxicity, oxygen depletion or self-heating, as identified in the shipper's declaration. For additional information, reference should be made to the International Maritime Solid Bulk Cargoes (IMSBC) Code.

(Revised Recommendation for Entering Enclosed Spaces Aboard Ships, 2011)

4.6 **Is entry into and rescue from enclosed space training undertaken and are regular drills conducted? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

Enclosed space entry and rescue drills should be planned and conducted in a safe manner, considering, as appropriate, the guidance provided in the recommendations developed by the IMO as adopted by Resolution.

Crew members with enclosed space entry or rescue responsibilities shall participate in an enclosed space entry and rescue drill to be held on board the ship at least once every two months.

Each enclosed space entry and rescue drill shall include:
> checking and use of personal protective equipment required for entry.
> checking and use of communication equipment and procedures.
> checking and use of instruments for measuring the atmosphere in enclosed spaces.
> checking and use of rescue equipment and procedures; and
> Instructions in first aid and resuscitation techniques.

(Regulation 19 – Emergency training and drills /Amendments to SOLAS 74 as amended, 2013)
(Revised Recommendation for Entering Enclosed Spaces Aboard Ships, 2011)

4.7 **Are procedures in place for the control of hot work, are they incorporated in the safety management system and is there documented evidence of compliance? (M)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

Hot work means any work requiring the use of electric arc or gas welding equipment, cutting burner equipment or other forms of naked flame, as well as heating or spark generating tools, regardless of where it is carried out on board a ship. The safety management system (SMS) on board should include adequate guidance on control of hot work and should be robust enough to ensure compliance. Absence of guidance should be regarded as prohibition, rather than approval.

Whenever possible, a space such as a workshop where conditions are deemed safe, should be designated for hot work to be performed and first consideration given to performing any hot work in that space.

> Hot work performed outside that space should be subject to the following considerations.
> Hot work outside the designated space:
> The master or designated safety officer should be responsible for deciding whether hot work is justified and whether it can be conducted safely.
> A permit-to-work system should be employed.
> Hot work procedures should take account of national laws or regulations or other national safety and health rules.
> A responsible officer, not involved in the hot work, should be designated to ensure that safe procedures are followed.
> A written plan for the operation should be agreed by all who will have responsibilities in connection with the hot work.
> The work area should be carefully prepared and isolated before hot work commences.
> Fire safety precautions should be reviewed, including fire equipment preparations, setting a fire watch in adjacent compartments and areas, and fire-extinguishing measures.
> Isolation of the work area and fire precautions should be continued until the risk of fire no longer exists.

(Principles for Hot Work on Board all Types of Ships, 2003)

Hot work in places other than the workshop should be the subject of a permit to work.

(Code of Safe Working Practices for Merchant Seafarer's, 2019)

4.8 **Has a specific permit to work and effective Lock-Out/Tag-Out (LOTO) system been introduced for high-risk duties and are the permits being used effectively? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The vessel's manager should identify the High-risk tasks on board and create a specific permit and risk assessment system for the ship.

The safety management system for individual ships will determine when permit to work systems should be used, and the form of the permit to work. (Code of Safe Working Practices for Merchant Seafarer's, 2019)

Wherever there is a high-risk job taking place, a written permit to work procedure should always be used. Jobs considered to be high risk should include:

> Entry into enclosed or confined spaces.
> Working on machinery or equipment which can start automatically or requires isolation.
> Hot work including welding.
> Working aloft or overside.
> General electrical work (Under 1000 Volts);
> Electrical high voltage work (Over 1000 Volts); and
> Working on lift machinery.

Additional Permits to Work may be required depending on the trade of the ship and the work carried out. Permits can be individual or cover a number of work types.

(Permits to work: a seafarer's friend, 2016)

Working aloft or overside:

> The ship's manager shall specify a height above a deck or tank top that is considered to be "working aloft or from height,
> Define the meaning of working over or near the side.
> Identify shipboard tasks that may require a seafarer to work from height or over the side and the need for the risk assessments for those tasks to identify and address the associated hazards.
> Identify practical alternatives for completing routine-routine tasks without a seafarer needing to work from height or over the side;
> Articulate the need for all seafarers to remain vigilant-vigilant and exercise care whenever they move about the ship.

Plant is a general name for equipment, machinery, appliances, tools and implements. Every year, seafarers at work are injured, sometimes fatally, when plant inadvertently activates or stored energy including electricity, heat, steam, and fluids released during inspection, repair, maintenance, or cleaning. The vessel's manager shall implement an effective isolation procedure into the ship's SMS.

A procedure for working over the side to rig combination pilot ladders should be incorporated into the company's SMS. The work permit and risk assessment forms should specially identify this task taking account of vessel's movement and weather conditions.

The use of a short brow gangway attached to the bottom platform of an accommodation ladder, should be identified as a high-risk task and specific permit and risk assessment for such task should be available onboard.

Lock Out/Tag Out system are used to prevent contact with a hazard while performing tasks that require the removal, by-passing, or deactivation of safeguarding devices, and the unintended release of hazardous energy (stored energy), or the unintended start-up or motion of machinery, equipment, or processes.

Lock Out is the control of hazardous energy by the placement of a lock or tag on an energy-isolating device, indicating that the energy-isolating device is not to be operated until removal of the lock or tag. In practice, lockout is the isolation of energy from the system (a machine, equipment, or process) which physically locks the system in a safe mode. The energy-isolating device may be a manually operated disconnect switch, a circuit breaker, a line valve, or a block. Push buttons, selection switches and other circuit control switches are not considered energy-isolating devices.

Tag Out is a labelling process that is always used when lockout is required. The process of tagging out a system involves attaching or using a standardised label that includes the following information:

> Why the lockout or tag out is required (repair, maintenance, etc.).
> Time of Application of the lock or tag; and
> The name of the authorised person who attached the tag and lock to the system

Only the authorised individual who placed the lock and tag onto the system is the one who is permitted to remove them. This procedure helps make sure the system cannot be started up without the authorised individual's knowledge. The following standards can be referred to for safe guidelines: AS/NZS 4836:2011, AS 4024.1603-2006.

4.9 **Is there a schedule of drills and exercises to address potential emergency shipboard situations and is it being conducted effectively? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The vessel's manager should identify the High-risk tasks on board and create a specific permit and risk assessment system for the ship.

ISM requirement:
"The company should identify potential emergency shipboard situations and establish procedures to respond to them. The company should establish programs for drills and exercises to prepare for emergency actions".
(ISM Code and Guidelines on the Implementation of the ISM Code, 2010)

Emergency procedures should at least include collision, grounding, flooding, heavy weather damage, cargo damage, shift of cargo, loss of cargo, structural failure as per MSC Circ. 1143, fire (on deck and in cargo hold, the engine room and accommodation), damage to fixed and floating objects, explosion, pollution by harmful substances in packaged form, critical machinery failure, rescue from enclosed spaces, serious personal injury, emergency towing equipment, helicopter operations and pollution clean-up and emergency operation of hatch cover.

SOLAS requirement:
On-board training in the use of the ship's fire-extinguishing systems and appliances shall be planned and conducted in accordance with the provisions of regulation SOLAS III/19.4.1. 2.2.5

Fire drills shall be conducted and recorded in accordance with the provisions of regulations SOLAS III/19.3 and III/19.5.

Abandon ship drill: Each lifeboat shall be launched with its assigned operating crew aboard and manoeuvred in the water at least once every three months during an abandon ship drill.

Free fall lifeboat: In the case of a lifeboat arranged for free-fall launching, at least once every three months during an abandon ship drill the crew shall board the lifeboat, properly secure themselves in their seats and commence launch procedures up to but not including the actual release of the lifeboat (i.e., the release hook shall not be released). The lifeboat shall then either be free-fall launched with only the required operating crew on board or lowered into the water by means of the secondary means of launching with or without the operating crew on board. In both cases the lifeboat shall thereafter be manoeuvred in the water by the operating crew. At intervals of not more than six months, the lifeboat shall either be launched by free-fall with only the operating crew on board, or simulated launching shall be carried out in accordance with the guidelines developed by the Organization.

Rescue boat drill: As far as is reasonable and practicable, rescue boats other than lifeboats which are also rescue boats, shall be launched each month with their assigned crew aboard and manoeuvred in the water. In all cases this requirement shall be complied with at least once every three months.

On-board training in the use of davit-launched life rafts shall take place at intervals of not more than four months on every ship fitted with such appliances. Whenever practicable this shall include the inflation and lowering of a life raft. This life raft may be a special life raft intended for training purposes only, which is not part of the ship's life-saving equipment; such a special life raft shall be conspicuously marked.

Steering gear testing and drills: 1- Within 12 hours before departure, the ship's steering gear shall be checked and tested by the ship's crew. 2- All ships' officers concerned with the operation and/or maintenance of steering gear shall be familiar with the operation of the steering systems fitted on the ship and with the procedures for changing from one system to another.3- Emergency steering drill shall take place at least every once every three months in order to practice emergency steering procedure.
(SOLAS, 2014)

4.10 **Are there procedures for reporting, investigation and close-out of non-conformities, accidents, and hazardous situations available and are they being followed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record any incidents in the last 12 months in comments. The SMS 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 pollution prevention. (ISM Code and Guidelines on the Implementation of the ISM code, 2010)

4.11 **Has a PPE Matrix for use of personal protective equipment been provided and is it being worn as required? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
"The company must ensure that seafarers are provided with suitable PPE where it is needed. The company should assess the equipment required to ensure that it is suitable and effective for the task in question and meets the appropriate standards of design and manufacture." (Code of Safe Working Practices for Merchant Seafarer's, 2020) **IMSBC requirements:** Many bulk cargoes are dusty. The effects of breathing dust can never be beneficial and are probably harmful in some cases at least. Where possible it is always best to avoid exposure to cargo dust and employers and their representatives have a duty to minimise dust. When exposure to hazardous solids, liquids or gases cannot be avoided respiratory protective equipment (RPE) and safety goggles must be worn. The selection and use of the appropriate PPE is complex and extremely important. It should be part of the risk assessment process. For general shipboard use a simple respirator with a disposable filter where the wearer's lungs are used to draw air through the filter should be suitable for cargoes which are not stated to be hazardous. Filters should be renewed according to manufacturers' instructions or, in the absence of instructions, when soiled. When a chemical product and/or other specialist equipment is used during cargo hold cleaning process, full and correct PPE, suitable for the nature of the task must be available and worn at all times throughout the cargo hold cleaning. (Guidance on Preparing Cargo Holds and Loading of Solid Bulk Cargoes, 2014) The minimum PPE requirement when rigging a combination pilot ladder overside shall be incorporated into the guideline.

4.12 **Are on-board safety meetings held regularly and, are they reviewed by the vessel's manager and feedback provided where necessary? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Company is required to appoint a safety committee on every ship with five or more seafarers. The committee must be chaired by the master, and members will include, as a minimum, the safety officer and any elected safety representatives. Where safety meetings do not require all off duty personnel to attend then there shall be an effective channel for the crew to report any concerns to the safety committee via the safety representatives and be kept advised of the committee's activities. Safety Committee Meetings are intended to permit discussion among the vessel's officers and ratings where these relate to safety. Safety meetings should not be used for the purposes of instruction or training. The frequency of meetings will be determined by circumstances, but the committee should meet regularly, considering the pattern of operation of the ship and the arrangement for manning and with sufficient frequency to ensure continuous improvement in safety. A meeting should also be held after any serious incident or accident on the ship, if the normal meeting is not due within a week. Safety meetings should be documented with minutes and the reports distributed and acted upon where appropriate. No safety representative may have fewer than two years' consecutive sea service since attaining the age of 18. (Code of Safe Working Practices for Merchant Seafarer's, 2020)

4.13 **Is a completed IMSBC/BLU Code ship/shore safety checklist for loading and unloading dry bulk carriers available and are the requirements of the checklist complied with? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Incomplete ship/shore safety checklist and/or non-compliance with the checklist should be recorded as a non-conformity.

The purpose of the ship/shore safety checklist is to improve working relationships between ship and terminal, and thereby to improve the safety of operations. Misunderstandings occur and mistakes can be made when ships' officers do not understand the intentions of the terminal personnel, and the same applies when terminal personnel do not understand what the ship can and cannot safely do.

(BLU Code, 2011)

For vessel fitted with gantry cranes following should be discussed during the meeting and documented in the ship/shore safety check list:

1. The time required for preparation before operations and securing after completion of cargo operation considered in the ship shore safety checks and information exchanged.
2. Operations limits of gantry as per makers manual established (including maximum weather conditions & visibility and ships list/trim) and this information made available to the operator.
3. Blind areas for operator, if any, identified and measures in place for supervision and signalling arranged. Special consideration when operating within shore structures / obstructions or in tandem with shore cranes.

4.14 **Are Water Ingress Detector System(WIDS) and alarms maintained in good condition and are the records of tests being maintained? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

- Bulk carriers shall be fitted with water level detector
- In each cargo hold, giving audible and visual alarms, one when the water level above the inner bottom in any hold reaches a height of 0.5m and another at a height not less than 15% of the depth of the cargo hold but not more than 2.0 m. On bulk carriers to which regulation 9.2 applies, only the latter alarm need be installed. The water level detectors shall be fitted in the aft end of the cargo holds. For cargo holds which are used for water ballast, an alarm overriding device may be installed. The visual alarms shall clearly discriminate between the two different level detectors in each hold.
- In any ballast tank forward of the collision bulkhead required by regulation II-1/11, giving an audible and visual alarm when the liquid in the tank reaches a level not exceeding 10% of the tank capacity. An alarm overriding device may be installed to be activated when the tank is in use; and
- In any dry or void space other than a chain cable locker, any part of which extends forward of the foremost cargo hold, giving an audible and visual alarm at a water level of 0.1 m above the deck. Such alarms need not be provided in enclosed spaces the volume of which does not exceed 0.1% of the ship's maximum displacement volume.
- The audible and visual alarms specified in paragraph 1 shall be located on the navigation bridge.
- The record of testing of alarm systems should be retained on board.

(SOLAS, 2014)
(Resolution MSC. 188 (79)/Performance Standard for Water Level Detectors 2004)

4.15 **Has a smoking policy been implemented; is it being followed and are designated smoking areas adequately identified? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

'No Smoking' policies vary from ship to ship and are dependent on a number of factors. However, there is no valid circumstance in which smoking should be permitted in the cargo areas of a vessel. It is the master's responsibility to ensure smoking does not take place in cargo areas and, in the vast majority of cases, ships staff are well aware of, and abide by, the vessel's policy. However, it is not only crew who are obliged to follow such procedures, with vessels regularly being visited by third parties such as surveyors, by the authorities, and by stevedores, many of whom may not understand the potential consequences of discarding smoking materials and who may be unaware of vessel policy

On-board smoking policies should be strictly adhered to at all times. Smoking should only be allowed in designated smoking areas. Proper documentation of the smoking policy should be available in the vessel's manager procedure manuals.

Signboards and posters need to be posted at designated positions that ensure that individuals coming on-board are told of the ship's strict non-smoking policy. Written and verbal notice should be given to stevedores about the smoking policy that includes requiring a signature that shows the stevedoring company(s) accept the policy.

(North of England P&I, 2014)

4.16 **Are portable gas detectors suitable for atmosphere testing of enclosed spaces provided; in good condition; calibrated in accordance with the manufacturer's instructions, and are officers trained and competent with their operation? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The SOLAS XI-1/7 regulation requires portable gas detectors to be dedicated 4-gas (oxygen, flammable gases, or vapours (% of LFL), carbon monoxide; and hydrogen sulphides), capable of 10 hours continuous operation, waterproof and dustproof to Ingress Protection rating IP67, and capable of remote detection (using a pump with a sample hose) suitable to test the atmosphere in an enclosed space before entry. Calibration is also a requirement, as prescribed by the manufacturers' instructions. (SOLAS, 2014) RightShip recommends vessels to carry at least two portable gas detectors with a built-in sample pump, and as best practice to bump test and/or calibrate as frequently as is practical on-board the vessel. The danger with hand pumps is that operators may not pump them enough times to sample the bottom of the space. In any event, there must be clear instruction about the number of manual aspiration pumps is required, or how long the built-in pump needs to run, to clear the entire sample hose in use. A personal gas detector/alarm intended to be carried by an individual whilst inside an enclosed space is not considered suitable. The instruments (including bump test station) should be provided with a manual that describes its features and alarms and explains how to calibrate, operate, and maintain it. The information in this manual should be available in the working language of the ship.

4.17 **Is welding and gas burning equipment in good order and properly stored? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
On deck, gas cylinders must be correctly stowed in separate lockers (one for oxygen cylinders and one for acetylene cylinders) with valves and flashback arrestors fitted to those in use. In the engine room, class approved hard piping together with a gas welding cabinet should be fitted in the workshop, again with the required valves and flashback arrestors. Portable equipment on trolleys should also be fitted with the necessary valves and flashback arrestors. Regular inspection, thorough examination, and testing of all components to ensure that all the oxy/ acetylene equipment in use on board is in a safe operational condition. This should be undertaken at least annually by a competent engineer from the manufacturer of the equipment and should also include pressure testing of on-board piping systems. An appropriate certificate should be issued. When not in use, oxygen and acetylene should always be segregated on board in suitably constructed lockers. After use the gas cylinder isolation valves must be shut, and the cylinders should be disconnected from the piping. Storage of mixed cylinders in an enclosed locker should be avoided. The oxygen and acetylene cylinders should be segregated and in well-marked lockers on deck. Proper PPE for welding should be available on board. Mark or label empty cylinders as "Empty cylinder" and store them away from full cylinders. Remove regulators when not in use and store these away from grease and oil. Put protective caps on the fittings when in storage. Keep cylinders and fittings from becoming contaminated with oil, grease, salt, or dust. Do not use a cylinder that is not identified or if the label is not legible. (UK P&I club, Technical Bulletin-Oxy/Acetylene equipment, 2008) > Acetylene distribution piping and pipe fittings must be seamless steel. Copper alloys containing less than 65 percent copper may be used in connection with valves, regulators, gages, and other equipment used with acetylene. > Oxygen distribution piping and pipe fittings must be seamless steel or copper. > When more than two cylinders are connected to a manifold, the supply pipe between each cylinder and manifold shall be fitted with a non-return valve. (LII / Legal Information Institute, 2018) The hard piping must be colour coded blue for oxygen and red for acetylene. The pressure regulator shall be replaced at 5 years interval or to the manufacturer's recommendation. (CODE OF PRACTICE 7 THE SAFE USE OF OXY-FUEL GAS EQUIPMENT, 2018)

4.18 **Are the lifeboats, rescue boat and davit-launched life raft; their equipment and launching arrangements being serviced periodically; in good condition, and are the crew familiar with the launching procedure and operation? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
When the vessel is equipped with a davit-launched life raft, the Inspector shall quiz the familiarity of crew with operation of the davit and test operation the davit. Each survival craft shall be stowed in a state of continuous readiness so that two crew members can carry out preparations for embarkation and launching in less than five minutes. (SOLAS, 2014) Falls used in launching shall be inspected periodically with special regard for areas passing through sheaves and renewed when necessary due to deterioration of the falls or at intervals of not more than five years – whichever is the earlier. (Measures to Prevent Accidents with Lifeboats, 2006) Each free-fall lifeboat shall be fitted with a release system which shall be designed to test the release system without launching the lifeboat. Each lifeboat shall be clearly marked with the number of persons for which the lifeboat is approved and the name and port of registry. Means of identifying the ship to which the lifeboat belongs, and the number of the lifeboat shall be marked in such a way that they are visible from above. (Life-saving appliances including LSA Code, 2017) The release system of lifeboats, rescue boats, free-fall lifeboat including davit-launched life rafts shall be: > Maintained in accordance with instructions for on-board maintenance as required by regulation 36. > Subjected to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8 by properly trained personnel familiar with the system; and > Operationally tested under a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of person and equipment whenever the release gear is overhauled. Such over-hauling and testing shall be carried out at least once every five years. (SOLAS 74, 2014) Davit-launched life raft automatic release hooks shall be: > Maintained in accordance with instructions for on-board maintenance as required by regulation 36. > Subjected to a thorough examination and operational test during the annual surveys required by regulations I/7 and I/8 by properly trained personnel familiar with the system; and > Operationally tested under a load of 1.1 times the total mass of the lifeboat when loaded with its full complement of person and equipment whenever the release gear is overhauled. Such over-hauling and test shall be carried out at least once every five years. Note: Of particular importance in the checking of lifeboats is the on-load release system fitted to enclosed lifeboats and the maintenance routines for them. A high percentage of accidents at sea are attributed to lifeboats and their release systems. (Measure to Prevent Accident with Lifeboats, 2006) SOLAS Regulation III/1.5 requires all ships subject to SOLAS, regardless of build date, to identify existing on-load release mechanisms that do not comply with paragraphs 4.4.7.6.4 to 4.4.7.6.6 of the International Life-Saving Appliance (LSA) Code, as amended by IMO Resolution MSC.320 (89); and replace them with compliant release mechanisms no later than the next scheduled dry-docking after July 1, 2014 (but in any case, before July 1, 2019). SOLAS Regulation III/1.5 does not apply to the release mechanisms on free-fall lifeboats. (IMO Circular MSC.1/Circ.1392, Guidelines for Evaluation and Replacement of Lifeboat Release and Retrieval Systems) Wire rope grips can be one of the most dangerous fitting if not used correctly. At least three wire rope grips should be used, with the saddles on the live part of the rope, and the U-bolt pressing on the less heavily loaded tail of the rope. They should be spaced at least six wire diameters apart.

4.19 **Are life rafts in good order and are hydrostatic release units maintained and installed correctly? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

4.20 **Are life jackets in good condition, allocated as per the plan and donning instructions clearly displayed? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The vessel must carry: (a) a lifejacket for each person that the vessel is certified to carry, including a suitable lifejacket for each person aboard the vessel who weighs less than 32 kg; and (b) a sufficient number of lifejackets stowed in working spaces for the use of seafarers who may be required to remain on duty in those spaces. (2) A lifejacket for an adult must: (a) be designed to fit a person weighing up to 140 kg and with a chest measurement of at least 1 750 mm; or (b) have available suitable accessories to enable its use by that person. Lifejackets selected for free-fall lifeboats and the manner in which they are carried or worn, shall not interfere with entry into the lifeboat, occupant safety or operation of the lifeboat. (SOLAS 74, 2014) For ships having keel laying on or after 01 July 2010, the method of securing the lifejacket to the wearer has quick and positive means of closure that do not require tying of knots.

4.21 **Are immersion suits in good condition, allocated as per the fire and safety plan and donning instructions clearly displayed? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Guidelines for monthly shipboard inspection of immersion suits and anti-exposure suits (MSC/Circ.1047) are very helpful in identifying obvious problems with a suit, but do not adequately address deterioration of seams and closures (zippers, etc.) which may not be readily apparent by visual inspection. Such deterioration can be detected by pressurisation of the suit with air and testing the seams and closures for leaks with a soapy water solution. To ensure the maintenance of adequate strength and watertightness of seams and closures of immersion suits and anti-exposure suits with age, it is recommended that each suit be subjected to an air pressure test such as the following, at intervals not exceeding three years, or more frequently for suits over ten years of age: > A suitable head piece, fitted with a means to inject air into the suit, should be inserted into the face orifice of the suit and secured so as to minimize leakage around the face seal. A low-pressure monitoring device, either integral to the fitting for air injection or as a separate device, should also be inserted. If the suit is fitted with detachable gloves and/or boots, the wrists and/or cuffs should be sealed by inserting a short length of suitable diameter plastic pipe and securing the gloves and/or boots with suitable wire ties or hose clamps. The zipper should be fully zipped, and any face flap closed. The suit should then be inflated to a pressure of 0.7 to 1.4 kPa (0.1 to 0.2 psi). If an auxiliary inflatable means of buoyancy is provided, it should be inflated through the oral valve to a pressure of 0.7 kPa (0.1 psi) or until firm to the touch. > Each seam and closure of the suit and each seam, oral tube and attachment points and joint or valve of any auxiliary inflatable means of buoyancy should then be covered with a soapy water solution containing enough soap to produce bubbles (if leakage is noted at a foot valve to the extent that air pressure cannot be maintained, the valves should be sealed for the test). > If leaks are revealed by the propagation of bubbles at seams or closures, the leaking areas should be marked and, after cleaning the suit thoroughly with fresh water and drying it, repaired in accordance with the suit manufacturer's recommendations. (MSC/Circ.1114 –Guidelines for Periodic Testing of Immersion Suit and Anti-Exposure Suit Seams and Closures, 2004)

4.22 **Are IMO symbols to identify the location of life saving equipment, firefighting equipment and hazardous area displayed appropriately and in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
SOLAS, Chapter III, Regulation 20.10 requires signs to identify the locations of life saving equipment in accordance with recommendations of IMO. Reference should be made to the symbols related to Life Saving Appliances and arrangements adopted by IMO by resolution A.760 (18), MSC82 (70) and A.952 (23). (SOLAS 74, 2014)

4.23 **Has a sample of foam compound, applicable to both fixed and portable systems, been sent for regular testing and is evidence of satisfactory results available? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Protein-based alcohol-resistant foam concentrates should be subjected to a stability test with acetone. The first periodical control of foam concentrates should be performed not more than three years after being supplied to the ship, and after that, every year. The tests should be performed prior to delivery to the ship and annually thereafter (MSC.1/Circ.1312).

4.24 **Are fire mains and associated isolation valves, fire boxes, hoses, nozzles, applicators, and spanners regularly inspected and maintained and found to be in a satisfactory operating condition? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

4.25 **Are the International Shore Connection fitting arrangements clearly marked and well maintained and are the crew aware of their location? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
There should be at least one shore connection for ship greater than 500GRT. The international shore connection is a standard sized flange with nuts, bolts and washers and a coupling for ship's fittings. The fitting and joining must be suitable for a working pressure of 10.5 bar. Four bolts are required of 16mm diameter and 50mm length, also eight washers and a gasket of any suitable material. (SOLAS 74, 2014)

4.26 **Are records available to show that fixed fire detection and alarm systems have been tested at regular intervals and maintained in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Fixed fire detectors shall be periodically tested as per manufacturer recommendation, using equipment suitable for the types of fires to which the detector is designed to respond. The test procedure and specific test equipment, if recommended by the manufacturer, should be followed, and used. Spaces not covered by a fire detection system should be covered by regular fire patrols.

4.27 **Are the fixed fire extinguishing systems (where fitted) inspected, tested and in good order? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Fixed hold fire extinguishing systems, such as CO lines, should be blown through with compressed air and checked to ensure they are free of dust and debris. Paint lockers shall be protected by: > A carbon dioxide system, designed to give a minimum volume of free gas equal to 40 % of the gross volume of the protected space; or > A dry-powder system, designed for at least 0.5 kg powder/m³; or > A water-spraying or sprinkler system, designed for 5 l/m² min. Water spraying systems may be connected to the fire main of the ship: or > A system providing equivalent protection, as determined by the Administration. In any case, the system shall be operable from outside the protected space. Flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Administration. For lockers of a deck area of less than 4 m², which do not give access to accommodation spaces, a carbon dioxide portable fire extinguisher sized to provide a minimum volume of free gas equal to 40 % of the gross volume of the space may be accepted in lieu of a fixed system. A discharge port shall be arranged in the locker to allow the discharge of the extinguisher without having to enter into the protected space. The required portable fire extinguisher shall be stowed adjacent to the port. Alternatively, a port or hose connection may be provided to facilitate the use of fire main water. (SOLAS 74, 2014) The foam pump shall be maintained as per manufacturer recommendation and the inspector shall witness the free movement of the foam pump when possible.

4.28 **Is the emergency fire pump being regularly tested, in good operational condition and are starting instructions clearly posted? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
When agreeable by the chief engineer and safe to do so, the inspector shall witness the starting and operation of the emergency fire pump and check the following: > Fire pumps should operate satisfactorily and be able to maintain proper pressure > Pressure gauges should be in good order > The operating condition of the priming system and/or non-return valve should be in good order > The operating condition of the isolating valves and cocks should be in good order > Witness delivered flow from hose with nozzle.

4.29 **Are portable fire extinguishers being maintained in good order, and ready for immediate use in an emergency? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Although there is no clear requirement concerning the validity date of powder in the FSS Code, it is generally considered necessary to refill the powder every 5 or 6 years, in principle. It is highly recommended that spare charges should also be replaced at the same time considering age deterioration, even though the expiration date of the charges is not specified by the manufacturer. In light of the above situation, crew shall consider replacing the spare charges of powder fire extinguishers at the same intervals as the refilling intervals specified by the manufacturer (Class NK Bulletin 20, 2020). **Periodic inspections and maintenance of portable fire extinguisher.** Extinguishers should be subject to periodical inspections in accordance with the manufacturer's instructions and serviced at intervals not exceeding one year. > At least one extinguisher of each type manufactured in the same year and kept on board a ship should be test discharged at five yearly intervals (as part of a fire drill). > All extinguishers together with propellant cartridges should be hydraulically tested in accordance with the recognized standard or the manufacturer's instruction at intervals not exceeding ten years. > Service and inspection should only be undertaken by, or under the supervision of, a person with demonstrable competence, based on the inspection guide in table 9.1.3 in Resolution A.951 (23). > Records of inspections should be maintained. The records should show the date of inspection, the type of maintenance carried out and whether a pressure test was performed. > Extinguishers should be provided with a visual indication of discharge. > Instructions for recharging extinguishers should be supplied by the manufacturer and be available for use on board. (Resolution A.951 (23)/Improved Guidelines for Marine Portable Fire Extinguishers, 2004) Spare charges shall be provided for 100% of the first ten extinguishers and 50% of the remaining fire extinguishers capable of being recharged on board. Not more than sixty total spare charges are required. For fire extinguishers which cannot be recharged on board additional portable fire extinguishers of the same quantity, type, capacity, and number as determined in paragraph above shall be provided in lieu of spare charges. (SOLAS 74, 2004)

4.30 **Are firemen's outfits including their equipment and breathing apparatus in good condition and available for instant use? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
One complete fireman's outfit should include following items: > SCBA (self-contained breathing apparatus) > Fireman's suit > Fireman's helmet > Fireman's rubber boots > Explosion proof light Fireproof lifeline combination rope of wire and nylon or hemp rope, complete with safety snap hook. Available in 30, 40 and 50 metre lengths. > Fire axe > Fireman safety belt

"Compressed air breathing apparatus shall be fitted with an audible alarm and a visual or other device which will alert the user before the volume of the air in the cylinder has been reduced to no less than 200 litres." This applies to ship's constructed (keel laid) on or after 1 July 2014. Ships constructed (keel laid) before 1 July 2014 must comply no later than 1 July 2019.

"An on-board means of recharging breathing apparatus cylinders used during drills shall be provided or a suitable number of spare cylinders shall be carried on board to replace those used." This applies to all ships on or after 1 July 2014.

"For ships constructed on or after 1 July 2014, a minimum of two two-way portable radiotelephone apparatus for each fire party for fire-fighter's communication shall be carried on board. These two-way portable radiotelephone apparatuses shall be of an explosion-proof type or intrinsically safe. Ships constructed before 1 July 2014 shall comply with the requirements of this paragraph not later than the first safety equipment survey after 1 July 2018."

(SOLAS 74, 2014)

4.31 **Is the operation and maintenance of the breathing apparatus air recharging system (where fitted) incorporated in the ship's safety management manual, and has the annual air quality check for breathing apparatus air recharging systems been carried out? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Annual testing should be carried out to ensure the air quality of breathing apparatus air recharging systems.

(MSC/Circ.850, Guidelines for the Maintenance and Inspection of Fire-Protection Systems and Appliances, 1998)

4.32 **Are records available to show that emergency escape breathing devices (EEBDs) in the accommodation and engine room are being inspected, in good condition and are available for instant use? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The minimum number of EEBDs to be kept within accommodation spaces should be:

For cargo ships: two (2) EEBDs and one (1) spare EEBD.

In machinery spaces for category A containing internal combustion machinery used for main propulsion, EEBDs should be positioned as follows:
1. One (1) EEBD in the engine control room, if located within the machinery space.
2. One (1) EEBD in workshop areas. If there is, however, a direct access to an escape way from the workshop, an EEBD is not required; and
3. one (1) EEBD on each deck or platform level near the escape ladder constituting the second means of escape from the machinery space (the other means being an enclosed escape trunk or watertight door at the lower level of the space).

Alternatively, different number or location may be determined by the Administration taking into consideration the layout and dimensions or the normal manning of the space.

For machinery spaces of category A other than those containing internal combustion machinery used for main propulsion, one (1) EEBD should, as a minimum, be provided on each deck or platform level near the escape ladder constituting the second means of escape from the space (the other means being an enclosed escape trunk or watertight door at the lower level of the space).

For other machinery spaces, the number and location of EEBDs are to be determined by the Administration.

(MSC/Circ.1081, Unified Interpretations of SOLAS Regulations II-2/13.3.4 and II-1/13.4.3, 2003)

The EEBD should be maintained in accordance with the manufacturer's instructions.

Spare EEBDs should be kept on board.

Maintenance requirements, manufacturer's trademark and serial number, shelf life with accompanying manufacture date and name of approving authority should be printed on each EEBD.

Training in the use of the EEBD should be considered as a part of basic safety training.

All EEBD training units should be clearly marked.

Personnel should be trained to immediately don an EEBD prior to exiting a space when the atmosphere becomes life threatening. This is necessary due to the possibility of encountering smoke during escape. Such training should be accomplished by scheduling routine escape drills for crew members working in the engineering or machinery spaces.

(MSC/Circ.849, Guidelines for The Performance, Location, Use and Care of Emergency Escape Breathing Devices (EEBDs), 1998)

4.33 **Are ventilation fire dampers clearly marked with open/close positions and space served and is there evidence of regular testing and maintenance? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

4.34 **Are Material Safety Data Sheets (MSDS) for all bunkers, chemicals, paint, corrosive, and toxic materials available, and are all crew familiar with their contents? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

It is essential before use of any hazardous substance that the manufacturer's safety data sheet (SDS) is referred to, to select appropriate personal protective equipment (PPE) and working methods.
(Code of Safe Working Practices for Merchant Seafarer's, 2020)

4.35 **Is a safe means of access to the vessel being provided? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Inspector shall check if the bottom step securing pins of the accommodation ladder are in place and in good condition.

Where practicable, accommodation ladders should not be used at a greater angle to the horizontal than 55 degrees.

Any gap between the dockside and the ship, whereby a person on the ship's means of access might fall into the water, should be protected by a safety net, of suitable size, mesh, and construction, secured to the ship and dockside, as appropriate.
(Accident prevention on board ship at sea and in port, 1997)

Location:
As far as is practical, the means of embarkation and disembarkation should be sited clear of potentially hazardous areas and should not be placed where suspended loads may pass overhead.

Lighting:
Adequate lighting should be provided to illuminate the means of embarkation and disembarkation, the position on deck where persons embark or disembark and the controls of the arrangement.

Lifebuoy:
A lifebuoy equipped with a self-igniting light and a buoyant lifeline should be available for immediate use in the vicinity of the embarkation and disembarkation arrangement when in use.

Positioning:
Gangways should not be used at an angle of inclination greater than 30° from the horizontal and accommodation ladders should not be used at an angle greater than 55° from the horizontal, unless designed and constructed for use at angles greater than the above.

Gangways should never be secured to a ship's guardrails unless they have been designed for that purpose. If positioned through an open section of bulwark or railings, any remaining gaps should be adequately fenced.

Rigging (safety net):
A safety net should be mounted beneath accommodation ladders and gangways where it is possible that a person may fall from the means of embarkation and disembarkation or between the ship and quayside. (MSC.1/Circ.1331, Guidelines for Construction, Installation, Maintenance and Inspection/Survey of Means of Embarkation and Disembarkation, 2009)

The RightShip best practice & lessons learned for Safe Means of Access must be taken in to account when rigging a safe means of access. Please click here

4.36 **Are accommodation ladders and gangways maintained in good condition, marked clearly, and inspected regularly (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Accommodation ladders and gangways, including associate winches and fittings, should be properly maintained, and inspected at appropriate intervals as required by SOLAS regulation III/20.7.2, in accordance with manufacturers' instructions. Additional checks should be made each time an accommodation ladder or gangway is rigged, looking out for signs of distortion, cracks, and corrosion. Close examination for possible corrosion should be carried out, especially when an aluminium accommodation ladder/gangway has fittings made of mild steel.

Bent stanchions should be replaced or repaired and guard ropes should be inspected for wear and renewed where necessary.

Moving parts should be free to turn and should be greased as appropriate.

The lifting equipment should be inspected, tested, and maintained paying careful attention to the condition of the hoist wire. The wires used to support the means of embarkation and disembarkation should be renewed when necessary, as required by SOLAS regulation II-1/3-9.

Arrangements should also be made to examine the underside of gangways and accommodation ladders at regular intervals.

All inspections, maintenance work and repairs of accommodation ladders and gangways should be recorded to provide an accurate history for each appliance. The information to be recorded appropriately on board should include the date of the most recent inspection, the name of the person or body who carried out that inspection, the due date for the next inspection and the dates of renewal of wires used to support the embarkation and disembarkation arrangement.

Winch:
During annual surveys required by SOLAS regulations I/7 and I/8, the following items should be examined for satisfactory condition:

- Brake mechanism including condition of brake pads and band brake, if fitted.
- Remote control system; and
- Power supply system (motor).

At every five-yearly survey, the winch should be operationally tested with the specified maximum operational load of the accommodation ladder.

Marking:
Each accommodation ladder or gangway should be clearly marked at each end with a plate showing the restrictions on the safe operation and loading, including the maximum and minimum permitted design angles of inclination, design load, maximum load on bottom end plate, etc. Where the maximum operational load is less than the design load, it should also be shown on the marking plate.

(MSC.1/Circ.1331, Guidelines for Construction, Installation, Maintenance and Inspection/Survey of Means of Embarkation and Disembarkation, 2009)

The date of fall wire renewal should be stencilled in the vicinity of the fall wire winch.

All wires used to support the means of embarkation and disembarkation shall be maintained and inspected with special regard to the areas passing through sheaves. The falls should be 'renewed when necessary due to the deterioration of the falls or at intervals of not more than five years, whichever is the earlier as per SOLAS III/20.4, SOLAS II-1/3- and MSC.1/Circ.1206.

4.37 **Are pilot ladders used for pilot transfer in good condition and inspected regularly, clearly identified with tags or with permanent marking and are maintenance records available? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

All pilot ladders used for pilot transfer shall be clearly identified with tags or other permanent marking so as to enable identification of each appliance for the purposes of survey, inspection and record keeping. A record shall be kept on the ship as to the date the identified ladder is placed into service and any repairs effected.

(SOLAS 74, 2014)

The top of the pilot ladder should be secured to the certified fixing point and not to handrails. Ladder steps or spacers should not be rigged in a position in which they are taking the weight of the ladder.

(Code of Safe Working Practices for Merchant Seafarer's, 2019)

The easiest way to secure the ladder is the use of two strong (at least 2 x 24 kN) manila ropes directly attached to each side rope of the pilot ladder, by means of a rolling hitch knot.

Any pilot ladders not in use should be clearly identified and tagged.

The requirements in SOLAS V/23, deal with the standards for equipment installed and arrangements for pilot transfers on ships on or after 1 July 2012. The standards adopted by the IMO can be found in IMO Resolution A.1045(27) "Pilot transfer arrangements". SOLAS V/23.2.3 additionally states that a pilot ladder shall be certified by the manufacturer as complying with V/23 or "with an international standard acceptable to the Organization" and ref and refers to ISO 799:2004 Ships and marine technology.

4.38 **Has the vessel been provided with ship-specific fire safety and SOLAS training manuals and operational booklets? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Fire Safety training manual: A training manual shall be written in the working language of the ship and shall be provided in each crew mess room and recreation room or in each crew cabin. The manual shall contain the instructions and information required in regulation II-2/15.2.3.4. Part of such information may be provided in the form of audio-visual aids in lieu of the manual.

(SOLAS 74, 2014)

SOLAS training manual: Specific training manuals shall be provided in each crew mess room and recreation room, or in each cabin and shall contain instructions and information on the life-saving appliances provided in the ship. It shall also contain information on the best methods of survival. The material in the manual shall be in easily understood terms and illustrated where appropriate.

The following when applicable, shall be incorporated into the manual and explained in detail:

- Donning of lifejackets, immersion suits and anti-exposure suits, as appropriate.
- Muster at the assigned stations.
- Boarding, launching, and clearing the survival craft, rescue boats, fast rescue boats, free-fall boats and inflated boats.
- Method of launching from within the survival craft.
- Release from launching appliances.
- Methods and use of devices for protection in launching areas.
- Illumination in launching areas.
- Use of all survival equipment.
- Use of all detection equipment.
- With the assistance of illustrations, the use of radio lifesaving appliances.
- Use of sea anchors.
- Use of engine and accessories.
- Recovery of the survival craft, rescue boats, fast rescue boats, free-fall boats and inflated boats including stowage and securing.
- Hazards of exposure and the need for warm clothing.
- Best use of the survival craft facilities in order to survive.
- Methods of retrieval, including the use of helicopter rescue gear (slings, baskets, stretchers), breeches-buoy and shore life-saving apparatus and ship's line-throwing apparatus; all other functions contained in the muster list and emergency instructions.

The fire safety operational booklet shall contain the necessary information and instructions for the safe operation of the ship and cargo handling operations in relation to fire safety. The booklet shall be written in the working language of the ship and be provided in each crew mess room and recreation room or in each crew cabin. The booklet may be combined with the fire safety training manuals required in regulation II-2/15.2.3. The booklet may be combined with the fire training manual.

(SOLAS 74, 2014)

4.39 **If the vessel is provided with a helicopter operating area, does the area comply with the requirements of ICS guidelines, and is there a safe access from the hatch cover to deck? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a N/C if a strength confirmation letter from a classification society is not available on board. A copy of the strength letter shall be collected by inspector and forwarded to RightShip. Inspector to provide 360-degree photos of landing site and access when practicable.

The strength of the HLS for the vessel is to be confirmed by the following documents:

1. Maximum designed load for helicopter landing on HLS as described in the structural drawings such as hatch cover, upper deck, etc.
2. Strength confirmation letter by HLS designer (shipyard, hatch cover maker, etc.) or the Flag State.
3. Strength confirmation letter issued by classification society in cases where neither items 1 nor 2 above are available.

In order to issue the letter under this paragraph, the structural drawing of the HLS is to be submitted to the classification society. In addition, fire-fighting equipment for helicopter facilities are required to comply with the "Guide to Helicopter/Ship Operations, 4th Edition issued by the International Chamber of Shipping.

The access from hatch cover to deck should be a fixed height inclined ladder with fixed handrails and front platform with operational load for two persons (150 KG). The steps and platforms should be made of non-slip materials.

The master of a vessel must ensure that any obstacle within the landing or winching area is clearly marked if it does comply with the recommendations for obstacles in the ICS Guide.

(AMSA Marine Orders Part 57)

In addition to the marking arrangements described, the vessel's manager should ensure that, if possible, a minimum of two access/egress routes to and from the landing area available to ensure that, in the event of an incident on the landing area, helicopter passengers and crew can escape upwind of the incident.

Handrails exceeding the height limitation set out in section 4.1.2 of the Guide to helicopter/ship operation shall be retractable, collapsible or removed. Such handrails should be painted in a contrasting colour scheme and procedure should be in place to retract, collapse or remove them prior to the arrival of the helicopter.

Red and white strips should be used for marking the position of notifiable objects within either the manoeuvring zone or clearing zone that exceed the height limits for those zone(refer figure 4.1 of the ICS Guide to Helicopter/Ship Operations Edition 4):

> Object within the clear zone of heigh exceeding 2.5 cm
> Objects outside the clear zone but within the manoeuvring zone of height exceeding 25 cm.

Yellow should be used for marking the position of objects beyond the manoeuvring zone to which it is considered appropriate to draw the attention of the helicopter pilot. Yellow may also be used to mark objects within manoeuvring zone and clear zone below the height limits for either the clear zone(2.5 cm) or the manoeuvring zone(25 cm) and to which it is considered appropriate to draw the attention of the helicopter pilot.

(ICS Guide to Helicopter/Ship Operations Edition 4)

4.40 **Is an up-to-date muster list with ship specific emergency instructions displayed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Clear instructions to be followed in the event of an emergency shall be provided for every person on board in the language or languages required by the ship's flag State and in the English language.

Muster lists and emergency instructions shall be exhibited in conspicuous places throughout the ship, including the navigation bridge, engine-room, and crew accommodation spaces.

The muster list shall specify details of the general emergency alarm and public address system, and action to be taken by crew and passengers when this alarm is sounded. The muster list shall also specify how the order to abandon ship will be given.

The muster list shall specify which officers are assigned to ensure that lifesaving and fire appliances are maintained in good condition and are ready for immediate use.

The muster list shall specify substitutes for key persons who may become disabled.

The muster list shall be prepared before the ship proceeds to sea.

The muster list shall show the duties assigned to the different members of the crew including:

> Closing of the watertight doors, fire doors, valves, scuppers, side scuttles, skylights, portholes, and other similar openings in the ship
> Equipping of the survival craft and other life-saving appliances
> Preparation and launching of survival craft.
> General preparations of other life-saving appliances
> Muster of passengers
> Use of communication equipment manning of fire parties assigned to deal with fires, and
> Special duties assigned in respect to the use of fire-fighting equipment and installations.
> Illustrations and instructions in appropriate languages shall be posted in cabins and be conspicuously displayed at muster stations and other spaces to inform crew of:
> Their muster station.
> The essential actions they must take in an emergency, and
> The method of donning lifejackets.

4.41 **Are the crew familiar with the helicopter operation at sea, and are records available to show that the proper communication, shipboard helicopter safety checklist and specific risk assessment conducted prior to helicopter operation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The inventory of helicopter equipment shall be in compliance with section 9.3 of the record of approved Ship Safety Equipment.

Evidence of communication between helicopter and vessel's bridge team, shipboard safety checklist for helicopter operations, specific risk assessment (as per appendix B of Guide to Helicopter/Ship operation) should be available and reviewed by inspector.

Helicopter operations are commonly used for embarkation and disembarkation of Pilot and medical evacuation in emergency situations. The helicopter operation is a complicated, high-risk operation. This operation demands accuracy, training, and clearly established procedures. The officers and crew members associated with these operations should show a high level of situational awareness and good seamanship.

For additional information, reference should be made to the Rightship best practice & lessons learned for Helicopter Operations High Potential Near Miss Incidents. Please download the document via this link.

Section 5: Pollution Prevention and Control

5.1 **Is the Oil Record Book (Part 1) completed correctly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Flag Administration may permit the use of an electronic oil record book as an alternative substitute of the traditional paper ORB. However, Flag approval should be available on board and verified by the inspector. Non-automatic starting of discharge overboard via 15 ppm equipment, transfer, or disposal otherwise of bilge water which has accumulated in machinery spaces should be recorded in section D. Pumping of bilge water from engine-room bilge wells to a tank listed under item 3.3 in the Supplement to the IOPPC should be recorded in section D 15.3. Automatic starting of discharge overboard, transfer or disposal otherwise of bilge water which has accumulated in machinery spaces should be recorded in section E. The automatic starting systems will be activated by float switches in bilge wells or bilge holding tanks. This system is rarely installed in the machinery space of dry cargo vessels. The condition of oil filtering equipment and oil content meter or stopping device, including the alarm and automatic stopping devices when defective should be recorded in section F. A code 'I' entry should also be made indicating that the overboard valve was sealed shut due to non-working oil filtering equipment or oil content meter. On the date when the system is functional again, a new entry, using code F should be made. A code 'I' entry should also be made indicating that the overboard valve was unsealed since the operation of the oil filtering equipment or oil content meter has been restored. Accidental or other exceptional discharges of oil should be recorded in section G. Bunkering of fuel or bulk lubricating oil should be recorded in section H. Separate entries are required for each grade of fuel oil and lubricating oil respectively to ensure transparency. This entry is not required if lubricating oil are delivered on board in packaged form (55-gallon drum, etc.). Voluntary declaration of quantities retained in bilge water holding tanks (ref MEPC.1/Circ.640) should be record weekly in section I. (MEPC.1/Circ.736/Rev.2, Guidance for the Recording of Operations in the Oil Record Book Part I- Machinery Space Operations (All Ships), 2011) "When disposal of engine-room oil water or sludge to a shore reception facility has taken place, the entry in the Oil record Book shall be made accurately and in consistency with the shore reception facility receipt."

5.2 **Is an approved MARPOL Shipboard Oil Pollution Emergency Plan (SOPEP) available, and up to date and are ship's personnel familiar with their duties? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Every ship other than an oil tanker of 400 gross tonnage and above shall carry on board a shipboard oil-pollution emergency plan approved by the Administration. Such a plan shall be prepared based on guidelines developed by the Organisation and written in the working language of the master and officers. The plan shall consist at least of: > The procedure to be followed by the master or other persons having charge of the ship to report an oil pollution incident > The list of authorities or persons to be contacted in the event of an oil pollution incident > A detailed description of the action to be taken immediately by persons on board to reduce or control the discharge of oil following the incident > The procedures and point of contact on the ship for coordinating shipboard action in combating the pollution with national and local authorities > Description of equipment, its location, a plan for deployment and specific crewmember duties for handling small spills, and > An up-to-date IMO Coastal Contact List. The SOPEP must be re-approved after a change of management. The list of national operational contact points is issued electronically on a quarterly basis on the 31 January, 30 April, 31 July and 31 October at www.imo.org.

5.3 **Are the ship's personnel aware of the requirements of MARPOL Annex V with respect to the disposal of operational waste and cargo residues from ships? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Operational waste means all solid waste (including slurries) not covered by other Annexes that are collected on board during normal maintenance or operation of a ship or used for cargo stowage and handling. Operational waste also includes cleaning agents and additives contained in cargo holds and external wash water. Operational waste does not include grey water, bilge water, or other similar discharge essential to the operation of a ship, taking into account the guidelines developed by the Organisation. Cargo residues means the remnants of any cargo which are not covered by other Annexes and which remain on the deck or in holds following loading and unloading; including loading and unloading excess or spillage, whether in wet or dry condition or entrained in wash water; but does not include cargo dust remaining on the deck after sweeping or dust on the external surface of the ship. (MARPOL, 2017) The SKULD P&I club information paper "Guidance on disposal of cargo residues in line with MARPOL Annex V "provides further information.

5.4 **Are scupper plugs fitted, in satisfactory condition, and are scupper filters readily available for draining rainwater on deck when the vessel is involved in solid bulk cargo operations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Scuppers should be plugged during bunkering and some dirty dry bulk cargo operation. Scupper filters should be used when draining rainwater during loading/discharging dirty dry bulk cargoes.

5.5 **Is the vessel free from any visible bulkhead leakage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The examples of bulkheads are: > The engine room forward bulkhead at its intersection with the topside tank structure in the aftermost cargo hold. > The side shell plating of the cargo hold side structure. > Side shell plating in the foremost cargo hold. > The stool shelf plates of the transverse bulkheads in the cargo hold. > The transverse bulkheads at the topside tank connection, in the cargo hold. > The vertical corrugations of transverse bulkheads in the cargo hold. > The corrugated bulkheads at the intersection of the shredder plates in the cargo holds. > Any fuel tank bulkheads within the machinery space

5.6 **Are the cargo hold bilge pumping systems and bilge arrangements appropriately set, in good order and tested? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Bilge wells, including bilge covers, strum boxes; and bilge well valves, including non-return valves, should be in a clean and sound condition. Non-return valves must be checked to ensure they are fully operational. Overhaul of non-return valves at regular intervals should be incorporated into the planned maintenance system. Inspection and testing of these non-return valves should be incorporated in the pre-loading checks of the holds. The presence of previous cargo residues and/or scale around the valve's seat may prevent the correct operation of the non-return valve. Bilge lines should be blown back to confirm the effectiveness of the valves regularly. Bilge high-level alarms should be tested regularly. Records of testing of alarm systems should be retained on board. (Bulk Cargoes-Hold Preparation and Cleaning, 2011) When the cargo hold bilge system is not in use, all valves should be effectively shut and measures should in place to ensure that they remain shut i.e. visible signs.

5.7 **Is the sounding of cargo hold bilge, ballast tanks, chain lockers, pipe ducts and other void spaces regularly performed for accumulations of water, or alternative evidence of regular monitoring? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

5.8 **Are suitable containment arrangements in place around the hydraulic components of deck machinery? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Hydraulic component can include hatch cover rams and remote-control stand, cranes, winches, windlass.

5.9 **Are the arrangements for detection and disposal of water from forecastle store and chain locker in good order, and are measures in place to prevent the accidental discharge of oil? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Where there is a possibility of hydraulic or other oil accumulating in the forecastle space, and hand pumps or ejectors are fitted, pollution prevention notices should be posted and the overboard valves should be secured against accidental opening, but not padlocked unless the key is readily available in a sealed box.

5.10 **If a ballast water treatment system is fitted, is it in good order and are the officers familiar with its safe operation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ballast water treatment system installed after 28 October 2020 shall have a Flag State Administration IMO Type Approval Certificate in accordance with the BWMS Code. The Ballast Water Management (BWM) Convention is applicable to new and existing ships that are designed to carry ballast water and are of 400 gross tonnages and above. The BWM Convention came into force on 8th September 2017. The Convention includes two regulations that define ballast water management standards: Regulation D-1 addresses the Ballast Water Exchange standard, and Regulation D-2 details the Ballast Water Performance standard towards treatment of ballast water using a Type Approved Ballast Water Management System. The D-2 performance standard defines the performance standard for the ballast water treatment system. This criterion is in the form of specific limits on aquatic life in the ballast discharge. The ballast water treatment system must be approved by a Flag Administration. The Flag Administration may authorise a recognised organisation like a classification society to approve the treatment process on its behalf. If the vessel is provided with an approved ballast water treatment system, the system should be in good working order and officers should be familiar with its safe operation. Where hazardous chemicals or treatment additives are provided for ballast water treatment, inspectors should verify safe handling and access controls in place. Where a ballast water treatment plant is fitted, it should be maintained in accordance with the manufacturer's instructions and maintenance should be incorporated in the vessel's planned maintenance system. Sampling analysis at the commissioning test of Ballast Water Management System to verify the proper operation of equipment shall be carried out at the installation of any Ballast Water Management Systems (BWMS) in accordance with paragraph 8 of the Guidelines for Approval of Ballast Water Management Systems (G8) or Code for Approval of Ballast Water Management Systems (BWMS Code). (Sampling analysis at the commissioning test of Ballast Water Management System, 2020)

5.11 **Is an approved ballast water and sediment management plan provided and complied with? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
To show compliance with the requirements of the convention each ship shall have on board a valid certificate, a Ballast Water Management Plan and a Ballast Water Record Book.

5.12 **If ballast tanks are located adjacent to fuel oil tanks, or there is a possibility of contamination by hydraulic oil, are ballast tank contents being sampled to ensure there has been no contamination of the water by oil prior to discharge? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Ensure that the water in ballast tanks is uncontaminated prior to discharge, by sighting of the surface and sample drawn from the ballast tanks. Only ballast tanks adjacent to oil tanks or ballast tanks with oil pipelines running through them need to be checked. Ballast water containing oil sheen on the surface must not be discharged.

5.13 **Are the emergency bilge suction and emergency overboard discharge valves in the engine room in good order and clearly identified with a notice warning against accidental opening and, is the area around the bilge injection suction bellmouth clear of debris and clean? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector shall review the test procedure of emergency suction valves. Emergency bilge discharge valves and other overboard discharge valves of a similar nature that are normally closed are sealed in the closed position with numbered seals. The SMS should implement a suitable method, either manual or electronic, for recording the changes in the process, including removal and replacement of numbered seal tags, testing of valves, maintenance, and other operational requirements. In accordance with MSC-MEPC.4/Circ.3, the sealing of valves of an emergency nature shall not be construed as a requirement for the valve to be blanked or physically locked. It shall be ensured that such valves always remain available for use in case of an emergency, and valve sealing may be accomplished through use of a breakable seal, electronic tracking, or similar method.

5.14 **Are arrangements for sludge collecting pumps free from any connection to a direct overboard discharge? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Sludge collecting pumps are pumps capable of taking suction from any oil residue (sludge) producing equipment or tank, other than an oil residue (sludge) tank(s) and discharging only to oil residue (sludge) tank(s). (MEPC.1/Circ.642, Revised Guidelines for Systems for Handling Oily Wastes in Machinery Spaces of Ships Incorporating Guidance Notes for an Integrated Bilge Water Treatment System (IBTS), 2008)

5.15 **Are the Engine room Bilge pumping system and Oily Water Separator (OWS) in good order and being operated in accordance with MARPOL requirements? (V&M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

For vessels equipped with OWS filtering equipment complying with MEPC 107(49), officers and crew members must be thoroughly familiar with the operation and maintenance of the equipment, which includes the ability to retrieve historical data from the Oil Content Monitoring (OCM) in accordance with manufacturer's instructions and as indicated in MEPC 107 (49) and as paraphrased as follows:

- The 15-ppm bilge alarm should record date, time and alarm status, and operating status of the 15-ppm bilge separator.
- The recording device should also store data for at least eighteen months and should be able to display or print a protocol for official inspections as required.
- In the event the 15-ppm bilge alarm is replaced, means should be provided to ensure the data recorded remains available on board for 18 months.
- A certificate of type approval for a 15-ppm bilge alarm should be issued and retained on board.
- The accuracy of 15 ppm bilge alarms approved to resolution MEPC.107 (49) is to be checked through the calibration and testing of the equipment, to be conducted by the manufacturer or by persons authorised by the manufacturer. This should be done at intervals not exceeding five years, or within the term specified in the manufacturer's instructions (whichever is shorter). The five-yearly testing does not need to be carried out at the time of the IOPP certificate renewal survey.

(Resolution MEPC.107 (49), Revised Guidelines and Specifications for Pollution Prevention Equipment for Machinery Space Bilges of ships, 2003)

At least two power pumps connected to the main bilge system shall be provided, one of which may be driven by the propulsion machinery. If the Administration is satisfied that the safety of the ship is not impaired, bilge pumping arrangements may be dispensed with in particular compartments.

(SOLAS 74, 2014)

5.16 **Have specific warning signs been posted at the Oily Water Separator overboard discharge valve and effective sealing arrangements implemented to prevent accidental opening? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

5.17 **Is the steering compartment oily bilge water discharge arrangement satisfactory? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Hydraulic or other oil may accumulate in the bilge wells of the steering compartment. Suitable arrangements should be provided for the disposal of it. If overboard valves are provided, they should be secured, and pollution prevention notices should be posted.

5.18 **Has a declaration been provided by the shipper as to whether the cargo is harmful to the marine environment (HME)? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Solid bulk cargoes shall be classified in accordance with the criteria specified in the 2012 Guidelines for the implementation of MARPOL Annex V MEPC. 219(63) and a declaration provided by the shipper as to whether or not they are harmful to the marine environment.

Cargo residues classified as harmful to the marine environment (HME), which cannot be recovered using commonly available methods for unloading, cannot be discharged into the sea. This waste must be discharged to an onshore waste reception facility. MARPOL, 2017).

(Resolution MEPC.219 (63), Guidelines for the Implementation of Marpol Annex V, 2012)

(Resolution MEPC.277 (70) Amendments to the Annex of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the protocol of 1978 relating thereto, 2016)

5.19 **Has a Garbage Management Plan been provided and is the Garbage Record Book (GRB) being correctly maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Every ship of 100 gross tonnage and above and every ship which is certified to carry 15 persons or more shall carry a garbage management plan which the crew shall follow.

Every ship of 400 gross tonnage and above and every ship which is certified to carry 15 persons or more engaged in voyages to ports or offshore terminals under the jurisdiction of other Parties to the Convention and every fixed and floating platform engaged in exploration and exploitation of the seabed shall be provided with a Garbage Record Book Part 1.

The Garbage Record Book (GRB) is divided into two parts:
> Part I for all garbage other than cargo residues, applicable to all ships.
> Part II for cargo residues only applicable to ships carrying solid bulk cargo.

The GRB garbage categories should include e-waste1, and the category for cargo residues should be split into HME (harmful to the marine environment) and non-HME. The updated garbage category distribution is as follows:
A. Plastics
B. Food waste
C. Domestic wastes
D. Cooking oil
E. Incinerator ashes
F. Operational waste
G. Animal carcasses
H. Fishing gear
I. E-waste
J. Cargo residues (non-HME)
K. Cargo residues (HME)

The GRB discharge table should be updated, and the incineration start and stop date/time/position should be recorded.

A new table is included for reporting exceptional discharge or loss of garbage under regulation. It also covers the reason for the discharge or loss, details thereof and precautions taken and should be updated where applicable.

The GRB part II for solid bulk cargo residues includes entries for position or port, garbage category (J or K), amount discharged to sea or reception facilities, and start and stop positions for sea discharge.
Along with the GRB, receipts obtained from receptions facilities should be kept on board for at least two years.
Even though Annex V of MARPOL is mandatory for all ships, there are neither certification nor approval requirements.
However, the following is required under MARPOL:
> Placards posted on board noting the discharge requirements.
> A Garbage Management Plan
> A Garbage Record Book

(MARPOL, 2017)
(Resolution MEPC.220 (63), Guidelines for the Development of Garbage Management Plans, 2012)
(Resolution MEPC.295 (71), Guidelines for the Implementation of MARPOL Annex V, 2017)

5.20 **Are the garbage storage and disposal facilities in a tidy and hygienic condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Garbage collected throughout the ship should be delivered to designated processing or storage locations. Cleaning and disinfecting of garbage storage location are both preventative and remedial pest control methods that should be applied regularly in garbage storage areas.

(GUIDELINES FOR THE IMPLEMENTATION OF MARPOL ANNEX V, 2017)

5.21 **Has the vessel been provided with a specific Ship Energy Efficiency Management Plan (SEEMP)? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The SEEMP is a management tool to assist shipowners in managing the energy efficiency of their ships. It is designed to provide the framework against which a shipowner can develop best practice and energy efficient operations. The IMO introduced the SEEMP as a mandatory tool under MARPOL Annex VI, which entered into force on January 1, 2013. Planning, implementation, monitoring and self-evaluation and improvement are the four key processes that the SEEMP must address and describe and together they form a continuous improvement process.
(Resolution MEPC.213 (63), Guideline for the Development of a Ship Energy Efficiency Management Plan (SEEMP), 2012)

In addition, on or before 31 December 2018, in the case of a ship of 5,000 gross tonnage and above, the Ship Energy Efficiency Management Plan (SEEMP) shall include a description of the methodology that will be used to collect the data and the processes that will be used to report the data to the ship's Flag State. (International Maritime Organisation, 2018)

The first data collection period for IMO's fuel oil data collection system (IMO DCS) requirements start on 1 January 2019, and ships must have on board a confirmed SEEMP Part II with an accompanying Confirmation of Compliance from this date.

5.22 **Has the vessel been provided with an International Energy Efficiency Certificate? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

All ships of 400 gross tons and above engaged in international voyages will need to be issued with an International Energy Efficiency (IEE) Certificate. Owners and managers of ships engaged in international trade should ensure the IEE Certificate is issued and available after the first intermediate or renewal survey, whichever is the first, on or after 1 January 2013.
(MARPOL, 2017)

5.23 **If the vessel is provided with an exhaust gas cleaning system (scrubber system) are the engineers familiar with its safe operation and have procedures been incorporated in the Safety Management System? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

There are three types of exhaust gas cleaning systems at present – open loop system, closed loop system and Hybrid system. Record the type of exhaust gas cleaning system in comments.

Record N/C if there was soot on the water surface, which have been traced to the wash water discharge from vessels using an 'Open Loop Scrubber'.

Corrosion of overboard distance piece attached to the hull on SOX scrubber discharge water line can result in water ingress into areas such as the engine room, ballast tanks and cargo holds. Absence of or poor application of protective coatings on the inside of the pipe and at the welds, along with poor application of paint on hull plating near the wash water discharge were identified as the causes of accelerated corrosion. Rightship recommends that the vessel manager implement a method of monitoring the internal condition of distance piece in the PMS.

Crew should be fully trained to handle the scrubber system and hazardous chemicals used for the process. They should also be trained to deal with medical emergencies. Hazardous chemicals are used in a number of Exhaust Gas Treatment System (EGTS) and adequate controls should be put in place to protect the ship's staff.

There is also a possibility of further hazardous chemicals and compounds (such as ammonium bisulphate in selective catalytic reduction (SCR) systems) being generated. These will require robust procedures and crew training, as well as adequate signage and personal protective equipment (PPE). Crew training should cover the normal operation of the scrubber system, including bunkering of any chemicals (consumables), calibration of sensors and routine maintenance, as well as the procedures to be followed in case of system failure and deviation from normal operation.
(Your options for emissions compliance Guidance for shipowners and operators on the Annex VI SOx and NOx regulations, 2015)

The maintenance, calibration, cleaning, and chemical handling of the exhaust gas cleaning system shall be incorporated in the plan maintenance system. The system shall be approved by the classification society.

5.24 **Is the vessel free from any visible valve or pipeline leakage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

5.25 **Are the ballast pumping systems, their associated instruments, controls, valves, and pipework in good order and is there recorded evidence of regular inspection? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

5.26 **Are the ballast valves in good order and being maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The maintenance and testing of the ballast valves should be incorporated into the PMS.
Valves within the ballast system are usually screw lift valves, butterfly valves or gate valves.

Many valves within the ballast system are remote controlled and all should be fitted with local indicators to show whether the valve is open or shut. This will aid the visual safety inspection for isolation of ballast water tanks. The valve's position indicator should show the current position of the valve.

It is recommended that all shipside valves and main valves be opened out and overhauled, repaired and surveyed at dry dock to ensure their correct operation and tightness.

Operating time of the power operated ballast valves should be checked regularly, and the manufacturers guidance should be followed for optimum opening and closing times of the ballast valves

5.27 **Are ballast tank manholes being maintained in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The rubber gaskets and fastening bolts should be fitted in their original condition and maintained in good condition.

Section 6: Ship's Structure

6.1 **Is the vessel free of any hull repairs unreported to class? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a non-conformity if documents or visual evidence indicated that unauthorised hull repairs have been carried out.

The vessel's manager may engage a "Riding Crew" consisting of a qualified welder and fitters who carry out repairs and steel renewal at sea. The Riding Crew may be involved in welding fractures and replacing deck plate and hatch coaming in various locations, including cargo holds and ballast tanks. Many repairs carried out on voyages are not brought to the attention of the class society and are not always carried out in a professional way.

It is the responsibility of the shipowner to maintain and repair the vessel in periods between regular surveys. Moreover, the shipowner is required to inform the corresponding Classification Society as soon as any damage or defect which may affect conformance with Classification rules is discovered. There is no precise definition of what deficiencies are relevant in this respect. In general, these would be defects which diminish the structural capability of the hull, breach the watertight integrity of tanks or the hull, or impair redundancy or normal operation of a vessel's propulsion, steering, power generation, auxiliary machinery, and associated systems. In case of doubt as to whether a particular deficiency warrants Class attention, shipowners should contact their Classification Society for clarification.

(Onboard Repairs - Compliance with Class and Statutory Requirements - A P&I Perspective, 2017)

6.2 **Does the SMS include procedures for regular inspection of cargo holds, ballast tanks, void spaces, trunks, duct keel and cofferdams by the ship's personnel and are records maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record of inspection, photo and/or video evidence of such inspection shall be available. Record a non-conformity:
1. When the inspection report is not available, or
2. When inspection report was not supported with photos and /or video evidence.

After every discharge and each cleaning, holds should be formally inspected by the Master or Chief Officer. The ballast tanks, void spaces, cofferdams, and duct keel should be inspected at least annually. Ballast tanks and void spaces adjacent to grab or bulldozer's damage shall be inspected after completion of the discharge. This inspection should be recorded with photographs.

The inspection plan and records should at least cover the following:
- Framing of the holds – damaged and 'tripped' brackets
- Condition of bulkhead coatings on the holds
- Condition of hatch covers, trackways, compression bars, channel drainage, hatch rubbers, cross, hatch drain valve and side cleats
- Hatch and hold vents and watertight lids, including access hatch lids, rubber packing and closing cleats and dogs
- Tank top, any damage
- Condition of coating in ballast tanks, void space, cofferdam, and duct keel
- Condition of tank top double bottom or side tank access lid, condition and the fitting of the gaskets, condition of nuts
- Condition of hold ladders, platforms and handrails
- Condition of hold piping, air vent and water ballast sounding lines, and piping protection brackets
- Condition of bilge wells, including bilge covers, strum boxes, and bilge well valves, including non-return valves
- Condition of bilge high-level alarms
- Condition of lights and light fittings.

6.3 **Is the enhanced survey report file adequately maintained and does the condition evaluation report confirm the fitness of the ship for its intended service for the next five years? (M)**

Yes **No** **N/A** **N/V**

Guide to Inspection
Record the tank coating condition in comment. Bulk carriers and oil tankers shall have a survey report file and supporting documents complying with paragraphs 6.2 and 6.3 of annex A and annex B of resolution A.744(18) – Guidelines on the enhanced programme of inspections during surveys of bulk carriers and oil tankers. Note: refer to the requirements of survey report file and supporting documents for bulk carriers and oil tankers as referred to in paragraphs 6.2 and 6.3 of annex A/annex B, part A/part B, 2011 ESP Code. (SOLAS 1974, 2014)

6.4 **Are the access points to cargo holds, ballast tanks, and void spaces including vertical ladders, spiral ladders, rungs, stations, and platforms being maintained and in good order? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection
Corrosion wastage affects the structural safety. Record a non-conformity if vertical ladders, spiral ladders, rungs, station, and platform are found damaged or corroded.

6.5 **Are the air pipes and sounding pipes in the cargo holds and void spaces in good condition? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection
Deck sounding pipes pass through the weather deck and are fitted with screw-down caps. Sounding pipes for engine room double-bottom tanks are fitted with counterweight self-closing cocks. It is imperative that sounding pipe caps or cocks be kept shut and well maintained. Pipes passing through a dry cargo space must be inspected for physical damage after the completion of discharging operations. It is advisable to open and inspect air pipe headers on the exposed weather deck once every five years, following the first special survey. This is necessary because corrosion on the inside of an air pipe header will not be noticeable externally. To extend the life of air pipe headers, they should be galvanised. Screw-down caps are fitted to the top of sounding pipes. These caps should never be mislaid or replaced with wooden plugs. The self-closing cocks on engine room sounding pipes should never be tied open. (A Master's Guide to Ship's Piping, 2012)

6.6 **If the vessel has a duct keel, is the access, mechanical ventilator, and lighting adequate and is it free of water? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

6.7 **Is the vessel free of any apparent structural defects? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

6.8 **Are cargo hold ventilation systems being maintained in good condition? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection
Every ventilator should have a positive means of closing. The closing mechanism could be in the form of a weathertight door or a ventilator flap (or damper) set within the vent trunk and operated by an external lever, or it may consist of a cowl which can be screwed down into a closed position by the operation of a valve wheel. It is essential that the closing devices are maintained and in a good condition, which includes being greased as needed and inspecting the gaskets to ensure an effective seal, especially in the case of a fire or shipping spray in the vicinity of ventilator intakes. Ventilation ports and fan spaces must be checked for possible loose rust or paint chips that might fall onto the cargo, causing contamination. Prior to any loading operation, the fans for mechanical ventilation should be checked to ensure they are in operation. It is recommended that the ventilators are prominently and permanently marked with the space (that is being serviced by the vent) and that it is indicated whether the shut-off is open or closed with the direction of the damper mechanism.

For various cargoes, wire mesh guards shall be fitted over the fan openings on deck. The wire mesh guards shall have a mesh size not exceeding 13 x 13 mm and shall prevent foreign objects entering the fan casing which could produce sparks with the rotating impeller (SOLAS Regulation II-2/19.3.4.2 and MSC/Circ.1120). In addition, for the carriage of SEED CAKE UN 1386 (b), SEED CAKE UN 2217 and SULPHUR UN 1350, all ventilation openings on the deck shall be fitted with spark-arresting screens (IMSBC Code Appendix 1).

These screens have a much finer mesh size than wire mesh guards. A definition of the term is not included in the IMSBC Code. However, the U.S. Coast Guard (46 CFR §151.03–25), for example, defines the mesh size as follows: single screen with at least 30 x 30 threads per square inch or two screens with 20 x 20 threads per square inch fitted in series not less than half an inch or more than one and a half inches apart.

(CARGO AND CARGO HOLD VENTILATION, 2020)

Section 7A: Fuel Management (Oil Fuel)

Note: Oil Fuel means any oil used as fuel in connection with the propulsion and auxiliary machinery of the ship in which such as oil is carried.

7.1 **Is adequate manifold spill containment provided under the bunker manifolds, and are they clean and empty? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

7.2 **Is bunker transfer system hydrostatically tested to their Maximum Allowable Working Pressure (MAWP) on an annual basis and to 1.5 times their MAWP at least twice within any five years period?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A pressure test of 1.5 times the design pressure is a strength test. A test of the design pressure is a tightness test. Pressure testing can reveal small cracks and pin holes that may not be obvious from a visual examination.

A vessel's 'Bunker Transfer System' should be tightness tested at least annually. 'Oil Transfer Systems' should be strength tested at least twice within any five-year period.
(A Master's Guide to Ship's Piping, 2012) (US Government Publishing Office, 2012)

When conducting pressure testing, firstly fill the bunkering piping with fuel oil or similar liquid, then close all the valves connected to bunkering piping or sealed by blind plates and use the designated pump to pressurize to 1.5 times the Maximum Allowable Working Pressure (MAWP). The foresaid method can be adopted for annual testing on board with the testing pressure as 100% MAWP. Shipping companies can also use transfer pumps to make testing pressure. Ensure that the pressure of the safety valve of the transfer pump was adjusted greater than MAWP before operation.

The 1.5 times MAWP test is to be carried out combined with the drydock survey, with the assistance of the shipyard. The shipyard prepares the report, which is the same as that of ordinary pressure tests. As with the annual test, it is to be carried out by crews on board during navigation at sea, generally, and the report should be prepared by the master. The testing medium should not be air, but fuel oil or similar liquid.

7.3 **Are the drains, vents, and pressure gauges at the bunker manifolds in good order and blanks fitted when not in use? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

7.4 **Are save-alls fitted around all fuel, diesel, and lubricating oil tank vents; are they clean and empty, and is the drain plug secured with a strap chain to a save-all? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The height of any save-alls around fuel, diesel and lubricating tank vents must be smaller than the vent heads themselves, since this could lead to the ingress of water in bad weather if the save-alls become filled with water.

The vent heads should be clearly labelled to indicate the space that they serve. Containers should be clean, empty of water and free of oil. Drain plugs should be in place in port.

7.5 **Are there procedures for analysis of fuel, lubricating and hydraulic oils, and are oil sampling requirements aligned with equipment manufacturer's recommendations? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector shall review the test results and recommendations of the last analysis / report. Record a N/C when the status of an analysis report was marked "Critical", regardless of action taken. **Record a N/C when the instructions from the engine manufacturer as to how often oil samples should be drawn for testing was not followed.** **RightShip recommends that the vessel's manager subscribe to a fuel oil bunker analysis and advisory service.** Lubricating oil analysis by approved organisations is an important tool for monitoring the condition of machinery and components. It is highly recommended that laboratory analysis programmes for lubricating oil and hydraulic oil are implemented on board and are closely monitored by the shore-based technical management. The instructions and procedures for the analysis of fuel oil shall be incorporated in the safety management system. In the absence of clear instructions from the engine manufacturer as to how often oil samples should be drawn for testing, the lubricant manufacturer should be contacted for advice.

7.6 **Are SMS guidelines for the mitigation of engine damage due to catalytic fines and other potentially injurious elements or containments in place and being followed? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Heavy cycle oil is used worldwide in complex refining as a blending component for heavy fuel. Mechanically damaged catalyst particles (aluminium silicate) cannot be removed completely in a cost-effective way and are found in blended heavy fuel. Correct fuel purifying and filtration on board ships has a removal efficiency of approximately 80 to 90% for catalytic fines. To avoid abrasive wear of fuel pumps, injectors and cylinder liners, the maximum limit for aluminium and silicon defined in ISO 8217: 2010 is 40–60 mg/kg, depending on the viscosity. There are, however, still reported problems with catalytic fines especially in low sulphur fuels. Correct handling and purifying of the fuel, to reduce the presence of catalytic fines to the level recommended by engine manufacturers, can prevent engine damages. (Marine Engine Damage due to Catalytic Fines in Fuel, 2013) The Joint Hull Committee of the London insurance market "Marine Engine Damage due to Catalytic Fines in Fuel" provides further guidelines.

7.7 **Are bunkering and oil transfer operations carefully planned and executed in accordance with procedures, and are details of the last operation available? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Planning of bunkering operations should include the following: > An accurate summary of the different quantities and grades of fuel to be supplied. > A plan of which bunker tanks are to be filled, which must include the type and quantity assigned to each tank and the maximum filling volumes. > A schematic diagram of the bunker system and proper valve line-up. > The filling sequence and the required pumping rate, including initial, maximum, and topping off rate. > An indication of the safety margin or "slack" space to be left in each tank. For example, no tank is to be more than 90% full. > Soundings of each tank prior to commencement of bunkering and the expected soundings/ullages on completion. > The method of sounding and/or ullaging, which can be stipulated to avoid confusion. > Details of who is in overall charge of the operation; this is usually the chief engineer, and the plan should also indicate who else is involved and their respective duties. > Emergency procedures and contacts > Procedure of line draining and blowing after completion of bunkering > If a common line is used for multiple grades, then the line flushing volumes and procedures > Testing of high-level alarms setting in the fuel oil tanks or a substitute means in case alarms are not provided. > Proper identification and markings of the valves on the bunker lines. > Procedure for changing over tanks during the bunkering > Vessel stability drafts, trim, and list during the various stages of bunkering > Manning requirements to execute the operation safely. (Safe Bunkering Practices, 2013)

7.8 **Can the vessel safely comply with the requirements of Emission Control Area (ECA) and other local requirements regarding use of very-low or ultra-low sulphur fuels in the main engine, auxiliary engines and boilers? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

When ships pass through an Emission Control Area (ECA), their fuel oil is only allowed to contain a maximum of 0.10% sulphur (MARPOL Annex VI). All main and auxiliary engines and boilers are affected by the Regulation, meaning that vessels using heavy fuel oil must have completed the change-over process and operate on ultra-low sulphur fuel upon entering an ECA.

The manufacturers of the engines, boilers and/or control system should be consulted for possible modification. Modern boilers may not have been originally designed to burn lighter fuel types such as MGO. If modification of the burners and control systems of the boiler is required, such modification shall be approved by the class society. Upon satisfactory completion of surveys with the classification society, a statement of fact with the same description shall be issued by the classification society.

If modifications to the vessels' installed equipment and systems are not required, evidence of such an evaluation and / or a statement of fact from a classification society should be carried on board.

(Preparing for Low Sulphur Operation, 2015)

7.9 **Are ship-specific procedures to control the change from residual to low-sulphur / distillate fuels and vice versa provided, and is the fuel oil change over logbook and data collection system being maintained correctly? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The use of a fuel change over calculator is recommended.

Switching from one type of fuel to another is an operation that does have risks. Vessels trading between areas with different sulphur limitations are required to have specific and detailed change-over procedures. The crew needs to be well trained and aware of any risks associated with the change-over – otherwise they risk engine failure, power loss or even blackout. A full risk assessment should be conducted by all involved in the procedure.

(Emission Control Areas – Ultra Low Sulphur Fuel Oil Change-over Procedures, 2014)

Those ships using separate fuel oils to comply with MARPOL Annex VI, regulation 14.3 and entering or leaving an emission control area shall carry a written procedure showing how the fuel oil changeover is to be done. The volume of low-sulphur fuel oils in each tank as well as the date, time and position of the ship when any fuel oil changeover operation is completed prior to the entry into an emission control area or commenced after exit from such an area shall be recorded in such logbook as prescribed by the Administration.

(MARPOL, 2017)

The amendments to MARPOL Annex VI introducing the IMO fuel oil consumption data collection system (IMO DCS) came into force on 1 March 2018. In accordance with Regulation 22A of MARPOL Annex VI as envisaged in Resolution MEPC.278 (70), as from 1 January 2019, ships of 5,000 gross tonnage and above shall collect fuel oil consumption data according to a methodology to be described and included in the Ship Energy Efficiency Management Plan (SEEMP Part II) by latest 31 December 2018.

This shall be in line with the 2016 Guidelines for the Development of a Ship Energy Efficiency Management Plan adopted by Resolution MEPC.282 (70). Following the end of each calendar year, by not later than 31 March of the subsequent year, ships shall submit to the ship's classification society reports on fuel oil consumption data and transport work parameters for the previous calendar year.

The report related to the first reporting period, which starts on 1 January 2019, shall be submitted by not later than 31 March 2020. Upon verification of the submitted data, in line with Resolution MEPC.292(71) adopting the 2017 Guidelines for Administration verification of ship fuel oil consumption data, classification societies shall issue by 31 May 2020 to the ships a Statement of Compliance related to fuel oil consumption which should be kept on board for the period of its validity.

The Statement of Compliance shall be valid for the calendar year in which it has been issued and for the first five months of the subsequent calendar year. The disaggregated data that underlies the reported data for the previous calendar year shall be readily accessible for a period of not less than 12 months from the end of that calendar year and be made available to this Directorate (IMO) upon request.

Ship owners and vessel's managers are encouraged to start considering the methodology for collecting the fuel oil consumption data that is most appropriate for each ship and its operation profile, amending the SEEMP Part II, in accordance with the sample form of ship fuel oil consumption data collection plan included in Appendix 2 of the 2016 Guidelines for the development of a Ship Energy Efficiency Management Plan. The data collection plan should be submitted to the classification societies for approval.

(Resolution MEPC.282 (70), Guidelines for the Development of a Ship Energy Efficiency Management Plan (SEEMP), 2016)

7.10 **Are the Quick Closing Valves of the fuel system being regularly tested and in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Quick Closing Valves are fitted to the outlets of lubricating and fuel oil storage, and settling and service tanks within the machinery space, boiler room and the emergency generator room. These spring-loaded valves may be operated locally or remotely by pull wires, hydraulics, or compressed air. Quick Closing Valves are essential safety devices. They should be properly maintained. (Quick Closing and Self Closing Valves, 2011)

7.11 **Are high pressure fuel delivery pipes of diesel engines protected with a jacketed piping and alarm system, and is the alarm system being tested regularly and in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
External high pressure fuel delivery lines between the high-pressure fuel pumps and fuel injectors shall be protected with a jacketed piping system capable of containing fuel from a high-pressure line failure. A jacketed pipe incorporates an outer pipe into which the high-pressure fuel pipe is placed, forming a permanent assembly. The jacketed piping system shall include a means for the collection of leakages and arrangements shall be provided for an alarm to be given of a fuel line failure. (SOLAS74, 2014)

7.12 **Are purifier rooms and fuel and lubricating oil handling areas ventilated, free of oil leaks and clean? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

7.13 **Is the reserve fuel tank of the emergency generator filled with sufficient fuel of a suitable type for at least 18 hours operation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
If the vessel is trading in area with sub-zero temperature, the fuel tank of the emergency generator should be charged with fuel designed for use in sub-zero temperatures. > The generator should be capable of providing full load requirements for at least 18 hours. > Every oil fuel pipe (which, if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom) shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position, outside the space concerned, in the event of a fire occurring in the space in which such tanks are situated. > Oil fuel pipes (which, if damaged, would allow oil to escape from a storage, settling or daily service tank having a capacity of 500 litres and above situated above the double bottom) shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position, outside the space concerned, in the event of a fire occurring in the space in which such the tanks are situated. > The controls for the remote operation of the valve for the emergency generator fuel tank shall be in a separate location from the controls for the remote operation of other valves for tanks located in machinery spaces. (SOLAS 74, 2014)

Section 7B: Fuel Management (LNG Fuels)

Note: The IGF Code applies to ships using low-flashpoint fuels for which the building contract is placed on or after 1 January 2017; the keels of which are laid, or which are at a similar stage of construction on or after 1 July 2017 (in the absence of a building contract); or the delivery of which is on or after 1 January 2021. Ships which commence a conversion to use low-flashpoint fuels (or use additional or different low-flashpoint fuels other than those for which the ship was originally certified) on or after 1 January 2017 will also be required to comply with the IGF Code (see SOLAS regulation II-1/56).

Low-flashpoint fuel means gaseous or liquid fuel having a flashpoint lower than otherwise permitted under paragraph 2.1.1 of SOLAS regulation II-2/4.

This section shall be completed when equipment, machinery, or a system on board the ship is using alternative fuel such as LNG.

7.1 **Is there an approved LNG Fuel Handing and Emergency Procedure Manual, and are crew familiar with the bunkering and emergency procedures such as leakage, fire or potential fuel stratification resulting in rollover?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
LNG bunker operations shall be conducted in accordance with the detailed fuel handling manual and the emergency procedures specified in 18.2.3 of the IGF Code that have been approved for the vessel or vessels by their flag State, recognized organization or classification society that has classed the vessel and complies with the applicable uniform interpretations and requirements posted by the IACS. Transfers from terminals or mobile facilities shall be conducted in accordance with approved terminal or mobile facility transfer procedures. The LNG Fuel Handing and Emergency Procedure Manual requires a level of staffing during bunkering operations; however, it does not relieve vessel captains or facility operators from their responsibilities. (ISO 20519:2017, 2017) A low flashpoint bunkering manual should be established with involved parties agreeing technically and commercially on methodology, flow rate, temperature, pressure of the delivery of low flashpoint fuels and receiving tanks. This manual shall gather all the information, certificates, procedures, and checklist(s) necessary for an effective and safe low flashpoint bunkering operation. The documented operational procedures shall cover the loading, storage, operation, maintenance and inspection of systems and emergency procedures. "Guidelines for Gas Fuelled Ships" and "Guidelines for Ships Using Low Flashpoint Fuels" from ClassNK provides further guidance on how to prepare such a manual.

7.2 **Do the master, engineering officers and all personnel with immediate responsibility for the care and use of fuels and fuel systems on ship, hold a certificate in advanced training for service on the ships subject to the IGF Code?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Masters, engineering officers and all personnel with immediate responsibility for the care and use of fuels and fuel systems on ships subject to the IGF Code shall hold a certificate in advanced training for service on ships subject to the IGF Code. Every candidate for certification in advanced training for service on ships subject to the IGF Code shall: 1. Have successfully completed the approved advanced training required by regulation V/3, paragraph 7 in accordance with their capacity, duties and responsibilities as set out in STCW Code table A-V/3-2; and 2. Provide evidence that the required standard of competence has been achieved in accordance with the methods and the criteria for evaluating competence tabulated in columns 3 and 4 of STCW Code table A-V/3-2; or 3. Have received appropriate training and certification according to the requirements for service on liquefied gas tankers as set out in STCW Code regulation V/3, paragraph 8. Seafarers holding the advanced training for service on ships subject to the IGF Code shall, at intervals not exceeding five years, undertake appropriate refresher training or be required to provide evidence of having achieved the required standard of competence within the previous five years. (Regulation V3, STCW 2010)

7.3 **Do seafarers responsible for designated safety duties associated with the care, use or emergency response to the fuel onboard the ship, hold a certificate in basic training for service on ships subject to the IGF Code?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Every candidate for certification in basic training for service on ships subject to the IGF Code shall: 1. Have successfully completed the approved basic training required by regulation V/3, paragraph 5, in accordance with their capacity, duties and responsibilities as set out in STCW Code table A-V/3-1; and 2. Be required to provide evidence that the required standard of competence has been achieved in accordance with the methods and the criteria for evaluating competence tabulated in columns 3 and 4 of STCW Code table A-V/3-1. Seafarers holding the basic training for service on ships subject to the IGF Code shall, at intervals not exceeding five years, undertake appropriate refresher training or be required to provide evidence of having achieved the required standard of competence within the previous five years. (Regulation V3, STCW 2010)

7.4 **Does the schedule of drills and exercises related to LNG fuels address potential emergency shipboard situations and has it been conducted effectively?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Exercises related to low-flashpoint fuels should include at least the following:

> A desktop exercises.
> Review of fuelling procedures based on the ISM approved Company Operations Procedures Manual.
> Responses to identified hazardous contingences.
> •Tests of equipment intended for contingency response.
> Reviews to confirm that assigned seafarers are trained to perform assigned duties during fuelling and contingency responses.

Gas related exercises may be incorporated into periodical drills required by SOLAS. The response and safety system for hazards and accident control shall be reviewed and tested.

(RESOLUTION MSC.391(95), ADOPTION OF THE INTERNATIONAL CODE OF SAFETY FOR SHIPS USING GASES OR OTHER LOW-FLASHPOINT FUELS (IGF CODE), 2015)

7.5 **Are hazardous areas marked with clearly visible warning signage and are the crew familiar with the special precautions and the risks for those areas?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

During the transfer operation, personnel in the bunkering manifold area shall be limited to essential staff only. All staff engaged in duties or working in the vicinity of the operations should wear appropriate personal protective equipment (PPE) and every individual shall wear portable gas detector.

Hazardous area means an area in which an explosive gas atmosphere or a flammable gas or vapour is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of electrical apparatus or any other equipment that may provide potential sources of ignition. Hazardous areas are divided into zone 0, 1 and 2.

For additional information, refer to the ICF Code for the definitions of Zone 0,1 and 2.

Hazardous Area Zone 0
This zone includes but is not limited to the interiors of fuel tanks, any pipework for pressure relief or other venting systems for fuel tanks, pipes and equipment containing fuel.

Hazardous Area Zone 1
This zone includes, but is not limited to:
1. Tank connection spaces, fuel storage hold spaces and intercarrier spaces;
2. Fuel preparation rooms arranged with ventilation.
3. Areas on open deck, or semi-enclosed spaces on deck, within 3m of any fuel tank outlet, gas or vapour outlet, bunker manifold valve other fuel valve, fuel pipe flange, fuel preparation room ventilation outlets and fuel tank openings for pressure release provided to permit the flow of small volumes of gas or vapour mixtures caused by thermal variation.
4. Areas on open deck or semi-enclosed spaces on deck, within 1.5 m of fuel preparation room entrances, fuel preparation room ventilation inlets and other openings into zone1 spaces.
5. Areas on the open deck within spillage coamings surrounding gas bunker manifold valves and 3m beyond these, up to a height of 2.4 m above the deck.
6. Enclosed or semi-enclosed spaces in which pipes containing fuel are located, e.g. ducts around fuel pipes, semi-enclosed bunkering stations;
7. The emergency shutdown (ESD)-protected machinery space is considered a non-hazardous area during normal operation, but any equipment which will need to be operated there following detection of gas leakage must be certified as suitable for zone 1;
8. A space protected by an airlock is considered as a non-hazardous area during normal operation but any equipment which will need to be operated there following detection of gas leakage must be certified as suitable for zone1;
9. A space protected by an air lock is considered as a non-hazardous area during normal operation, but any equipment which will need to be operated there following loss of differential pressure between the protected space and the hazardous area must be certified as suitable for zone 1;
10. Except for type C tanks, an area within 2.4 m of the outer surface of a fuel containment system where such surface is exposed to weather.

Hazardous Area Zone 2
This zone includes but is not limited to areas within 1.5 m surrounding open or semi-enclosed spaces of zone 1.
Spaces containing a bolted hatch to a tank connection space.

(ICF Code 2015)

7.6 **Are staff responsible for LNG bunkering aware of their responsibilities and actions to be taken in case of malfunction or emergency and are instructions and warning signs clearly posted on site for safe LNG bunkering operation?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
There shall be written detailed instructions for the bunkering process on both ships regarding responsibility and actions required in case of malfunction or emergency. The instructions are to be quickly available at all times and all personnel involved in bunkering operations are to be familiar with the content and location of the instructions. The instructions should cover the following areas: > Loss of communication or control system (ESD) > Loss of power > Safe break-away of ships in case of fire > Handling of cryogenic and petroleum products including use of personal protection equipment, ice formation and awareness of sharp edges. > Waves and weather conditions There shall be warning, and instruction signs posted around hazardous area on both ships. The signs are to be clearly visible and placed according to an accepted guideline for placement of warning signs. The warning signs are to cover the risks of handling cryogenic liquid, fire and safety issues and show restricted areas. (LNG bunkering ship to ship procedure, 2020)

7.7 **Is the safety zone clearly marked and, have restrictions within the safety zone been enforced and followed?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Since the receiving ship normally is larger than the bunker ship is it important to have a safety zone above the bunker station during bunkering. The extent of the safety zone should be 10 metres on each side of the bunker station manifold. This safety zone shall be clearly marked and have the following restrictions: > No unauthorised persons to be able to access open deck areas directly above the bunker area > Warning signs to be posted around the area > Access doors to be locked and only to be opened by trained and authorised personnel > No overhead crane lifting in this area during bunkering > No maintenance work in the area during bunkering > No manoeuvring of ship equipment in the area during bunkering > Ventilation inlets in the area to be closed during bunkering (LNG bunkering ship to ship procedure, 2020)

7.8 **Are the self-igniting lights of lifebuoys located in the hazardous area intrinsically safe?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Lifebuoy self-igniting lights do not need to be intrinsically safe if located outside of the hazardous area. However, there must be strict controls in place to avoid those non-intrinsically safe lights being misplaced into the hazardous zone. This may include highlighting/marking of those lights or other appropriate means.

7.9 **Is the LNG bunkering operator control panel fitted with an earth indicator light to indicate the faulty circuits and is the control panel free of any faulty earth indication during LNG bunkering?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The main switchboard on the bunker ship and the control panel on the receiving ship are to have earth indicator lights to indicate faulty circuits. Any indications of faulty circuits are to be immediately traced and isolated to avoid arcing around the bunker area. The bunkering operation is to be suspended in case of faulty earth indication during ongoing transfer. (LNG bunkering ship to ship procedure, 2020)

7.10 **Is the main radio aerial earthed and are portable two-way UHF radios approved for use in hazardous areas?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ships' main radio transmissions may cause electrical resonance in insulated parts of some ship fittings such as mast stays, and this can cause arcing across deck fittings. Radio aerials should be earthed but can induce arcing if insulators are coated with salt, dirt, or water. The use of ships main radio equipment during transfer operations can be dangerous and should be restricted during the process. The equipment is not to be used if there is á possibility of flammable gas in the vicinity of the antenna. Satellite communication equipment normally operates at low power levels and is considered to be a low ignition hazard. The equipment is not to be used if there is a possibility of flammable gas in the vicinity of the antenna. VHF and UHF communications are low voltage operated and are considered to be safe to use. Hand-held VHF or UHF radios are considered to be intrinsically safe. Portable electronic devices such as mobile phones, cameras etc using batteries are not allowed in hazardous areas unless they are intrinsically safe. It is especially important for personnel working in or visiting such areas to be aware of this. Warning/ notification signs are to be posted around these areas. (LNG bunkering ship to ship procedure, 2020) Rightship recommends that only intrinsically safe torches and portable two-way UHF radios should be available and used on board every ship covered by the ICF Code.

7.11 **Has a pre-compatibility assessment and study of the weather and current forecast been carried out prior to confirming the bunkering operation and is there documented evidence of such assessment and study?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Weather and current forecast for the area are to be studied before commencing bunkering operations. Each master is responsible for his own ship and bunkering is only allowed when both masters agree that ambient conditions (like wind and weather) are acceptable. Each master is also responsible for determining restrictions and taking action in case of a sudden change of ambient conditions during a started bunker transfer. (LNG bunkering ship to ship procedure, 2020) A compatibility assessment of the bunkering facility and receiving ship should be undertaken prior to confirming the bunkering operation to identify any aspects that require particular management. The compatibility assessment should be undertaken with the assistance of an appropriate checklist to be completed and agreed by master(s) and Person in Charge (PIC) prior to engaging in the bunkering operation. Where applicable, as a minimum, compatibility of the following equipment and installations should be checked prior to engaging further in any low flashpoint bunkering operation: > Communication system (hardware, software if any and language) between the PIC, ship's crew and Bunkering Facility Organisation (BFO) personnel > ESD system > Bunker connection > Emergency release system (ERS) or coupling (ERC) > Vapour return line > Nitrogen lines' availability and connection > Mooring equipment > Bunker station location > Transfer system sizing and loading on manifold > Location of ERS > Closure speed of valves > Hazard Operability Analysis (HAZOP) results as applicable

7.12 **Is all lighting around the bunker area Ex-rated and does it appear adequate to illuminate the bunker area?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The bunkering operation is preferably to be conducted during daylight hours. It is necessary to have adequate lighting in case of mooring and bunkering operations after daylight hours. The minimum lighting requirements are the bunker ship deck, the receiving ship bunker station, and the mooring bollards. Normal deck-lighting should in most cases be sufficient, but portable spotlights or bridge wing spotlights may be useful for night operations. Note that all lights around the bunker area are to be of Ex- rated. (LNG bunkering ship to ship procedure, 2020)

7.13 **Have the key components of the LNG bunkering system been identified, included within the PMS, maintained and where applicable, calibrated as per the manufacturer's recommendation?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Key components of the ship's systems are to be identified with emphasis on safety to avoid leakage and ignition sources in and around the bunker areas. These components should have a maintenance and replacement schedule where inspections and actions are documented and stored on board. These components shall have redundancy back-up which can start up within a short period of time.

(LNG bunkering ship to ship procedure, 2020)

7.14 **Is there a procedure for communication failure during LNG bunkering operation and are crew familiar with such a procedure?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Communication failure during approach: Abort approach and re-establish contact before attempting a new approach. Communication failure during bunker operations: Sound the emergency signal and suspend all operations in progress immediately. Operations shall not be resumed before communication has been re-established.

(LNG bunkering ship to ship procedure, 2020)

7.15 **Is there an agreed method of tank pressure and temperature control between the delivering and receiving vessels and is there recorded evidence to show that both ships' combined temperature and pressure range are within the safety limits before commencing LNG bunkering?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Both ships must check the LNG tanks regarding temperature and pressure prior to bunkering and note this on the pre-transfer bunker checklist. If the temperature of the receiving tank is significantly higher than the bunker tank, there will be an initial vaporisation when starting to transfer the LNG. This will increase the tank pressure and can trigger the pressure-relief valve to open if the pressure exceeds the set limit. The pressure of both tanks must be reduced prior to the bunkering in case of a high receiving-tank temperature.

The bunker ship master is to confirm that both ships combined temperature and pressure range are within the safety limits before commencing transfer.

(LNG bunkering ship to ship procedure, 2020)

7.16 **Is there evidence to show that a detailed mooring plan was exchanged between the delivering and receiving vessels and has the master of the receiving vessel reviewed the type and size of fenders of the delivering vessel?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The receiving ship should be able to supply, if requested, a sketch with information about placement and number of fairleads and mooring bitts and their relative distances to the bunker station. A mooring plan, showing number of lines and fenders and their locations should be agreed upon before making berth.

It is recommended to use pneumatic type main fenders with a diameter of approx. 1 metre. Size and type of secondary fenders to be determined due to the design of the bunker ship. All fenders to be approved by class.

(LNG bunkering ship to ship procedure, 2020)

7.17 **Has the LNG hose handling operation been carried out and supervised by trained personnel?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Dedicated bunker ships may be fitted with specialised hose-handling equipment, but a rather common method is to use a hose crane to deliver bunker hoses from the bunker ship to the receiving ship.

The hoses are to be supported to the receiving ship, disconnected from the hose crane, and connected to the manifold, by trained personnel from the receiving ship, before the operation commences.

Each manifold is to be earthed and the receiving ship shall be equipped with an insulating flange near the coupling to prevent a possible ignition source due to electrostatic build-up. The hoses with couplings should not touch any un-earthed part before connection to avoid possible electrical arcing.

(LNG bunkering ship to ship procedure, 2020)

7.18 **Is a water curtain system provided for the ship's sides in way of manifold and is the manifold tray arrangement adequate and free of any sharp edges?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
There shall not be any sharp edges in the hose handling area. If the receiving vessel has on-board traffic in the vicinity of the bunker station, there should be reinforcements built-in to protect the equipment from traffic impact. Both ships must have insulated stainless steel trays, below the LNG and vapour-return manifolds, to prevent damage to the steel hull in case of leakage. The cold LNG liquid causes brittle fractions contacting mild steel. Each tray should have an outlet overboard which can be a temporary fitted pipe or hose to lead a possible spill to the water without contact to the hull. (LNG bunkering Ship to Ship procedure, 2020) For cargo temperatures below -110°C, a water distribution system shall be fitted in way of the hull under the shore connections to provide a low-pressure water curtain for additional protection of the hull steel and the ship's side structure. This system is in addition to the requirements of 11.3.1.4 and shall be operated when cargo transfer is in progress. (International code for the construction and equipment of ships carrying liquefied gases in bulk, 2016)

7.19 **Has the LNG fuels bunkering checklist been correctly completed and is there evidence to show that they are effectively managing their obligations as accepted in the checklist?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The pre-transfer bunker checklist is to be filled out, signed by the responsible operator on the receiving ship and returned to the bunker ship before starting any transfer. The signed checklist is to be kept on board the bunker vessel for 3 months. No bunker operation is to begin until this checklist is signed and returned to the bunker ship. (LNG bunkering ship to ship procedure, 2020) ISO 20519:2017(E) and the International Association of Ports and Harbors (IAPH) have developed three bunkering checklists for LNG bunkering. For additional information, refer to the IAPH website **(Click Here).**

7.20 **Are LNG bunker lines being inerted immediately after completion of LNG bunkering and disconnection of hoses from the manifolds and before departure?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The receiving ship must inert the bunker lines before departure, which means that the inerting sequence is to start as soon as the hoses are disconnected from the manifold and run until lines are gas free. There shall be a system for gaseous nitrogen onboard the ships. This is needed for purging the piping system from LNG and natural gas after bunkering (inerting). The manually operated valves, which will introduce nitrogen to the LNG system, are located in the bunker stations. If liquefied gas is trapped in a pipe between two valves or a tank without an exit, the pressure in the tank or pipe will rise until the pipe or tank bursts. The consequence can be severe injury to personnel. All pipe sections and tanks must therefore be secured with thermal relief valves. (LNG bunkering ship to ship procedure, 2020)

7.21 **Are system safety valves in good order and officers aware of the requirements?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The system includes valves regarded as ordinary safety relief valves as well as so called thermal relief valves. The tanks' main safety valves are designed to meet the requirements for a LNG tank. Thermal relief valves are designed to meet capacities in a trapped volume in pipes. A safety valve exhausts/vents to a vent mast. To ensure that both safety valves to the LNG tanks are not out of operation at the same time, the safety valve system incorporates an "interlock system". The interlock system consists of lockable valves and a set of keys that permits only one of the safety valves on each tank to be closed. It will be possible to divert gas from different parts of the system to the atmosphere through a vent mast. The LNG tanks' safety valves will also exhaust to this vent mast, as well as the nitrogen used for purging. (LNG bunkering ship to ship procedure, 2020)

7.22 **Is the receiving vessel in a high state of readiness at all times during LNG bunkering operations?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Both ships are to be in a high state of readiness at all times during bunkering operations. The following arrangements should be made on both ships:

- ESD-system tested and in operation mode
- Emergency stop box (or Link) led from bunker ship to receiving ship
- Fire-fighting equipment made ready for immediate use
- Ships prepared to disconnect hoses at short notice
- Axes placed at bunker ship mooring stations for quick release of mooring lines
- Soft rope mooring lines (or tails) are being used for easier emergency cutting
- Ships have main engines ready for immediate use
- Outlet from LNG spill trays are led overboard and away from hull.

It is possible to have a water curtain system which, in an emergency, sprays water over the ship's sides around the bunker stations to protect the hulls from direct LNG contact, if in place, it should be ready to use.

(LNG bunkering ship to ship procedure, 2020)

7.23 **Was the vessel provided with contingency plans for dealing with emergencies?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Due to the risk of accidents and the potential consequences, it is required that each ship has contingency plans for dealing with emergencies. A contingency plan is a summary of individual emergency procedures and shows emergency duties for all ship personnel and plans for taking care of passengers. The contingency plans should be integrated with port and local authorities and agreed upon between both ships prior to commencing operations.

The following emergencies are example of sections in the contingency plan:

- Fire on either ship
- LNG leakage
- Hose failure
- Hose quick release arrangements
- Mooring line failure
- Communication failure
- Personnel injuries (frost burns, suffocation etc.)
- Emergency departure procedure
- Oil pollution from additional petroleum bunkering
- Fender burst
- These potential emergencies are to be evaluated to see if some of the risk scenarios are more likely to occur; if so, they should be included in the contingency plan.

(LNG bunkering ship to ship procedure, 2020)

7.24 **Is the emergency shutdown system in good order and is there recorded evidence of regular testing?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The bunker ship should preferably provide an emergency stop to the receiving ship in order for both ships to be able to stop the pumps.(LNG bunkering ship to ship procedure, 2020)

The bunkering facility and receiving ship should both test their emergency shutdown (ESD) systems not more than 24 hours before bunkering operations commence. These tests should be documented in accordance with the bunkering procedure manual. The time taken for emergency shutdown valves to move from open to closed, and from closed to open, should be checked regularly and documented.

7.25 **Are tank domes, domes' insulation, vapour and filling pipes' insulation, manhole cover insulation and associated fittings in good order, free from leaks and corrosion?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The main purposes of the insulation system are to:

- Minimize loss of boil-off rate of fuel gas (LNG) by restricting heat ingress.
- Protect the hull structure against harmful temperature fluctuations and absolute temperatures.
- Minimize condensation or forming of ice on the cold surfaces and thereby reduce accumulation of water and moisture in the cargo containment system.

7.26 **Are LNG fuel tanks protected by an independent LNG tank level alarm device and is there recorded evidence to show that the device has been tested regularly?**

☐ Yes ☐ No ☐ N/A ☐ N/V

7.27 **Is there recorded evidence of regular calibration of thermometers, pressure gauges, the gas detection system and tank level gauges?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Instruments shall be tested to ensure reliability under working conditions and recalibrated at regular intervals. Test procedures for instruments and the intervals between recalibration shall be in accordance with manufacturers' recommendations.
(International code for the construction and equipment of ships carrying liquefied gases in bulk, 2016)

7.28 **Is prevention of over-pressurization of the LNG transfer system in the event of activation of the ERS or the ESD documented in the LNG fuel-handing manual?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Select N/A if the transfer system is designed to consider over pressurization due to surge pressure in the event the ERS or the ESD is activated.

7.29 **Are precautions to prevent electrostatic charge in the LNG bunker hose being taken and, have the minimum and maximum hose lengths and diameters that the hose support loading arm and/or hose saddles can support been documented in the LNG fuel-handing manual?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

To prevent arcing between the ships the manifolds on both ships are to be earthed, all hoses are to be electrically continuous, and each hose string shall be fitted with an insulating flange on the bunker ship manifold. It is important that the insulating flange is only fitted to one ship; otherwise, there may be an electrostatic build-up in the hose between the insulating flanges which can result in arcing.

Electrical Arcing

Other places (besides hose connections) where arcing can occur are:
- Mooring lines (should be insulated)
- Ladders or gangways between ships (should be insulated)
- Crane wire runners and hooks (operate carefully)
- Bare wires and chains for fender support (should be insulated)

(LNG bunkering Ship to Ship procedure, 2020)

Hose support loading arm and hose supports (saddles), if used, shall conform to ISO 16904 or EN 1474-3 and be designed to safely support the loads (static and dynamic) imposed by the LNG transfer operations during hose connection, transfer operations and when the hose is disconnected under emergency conditions. They shall provide the necessary support so that the hose bending radius is not below recommended minimum bending radius specified by the hose manufacturer.

The minimum and maximum hose lengths and diameters that the hose-support loading arm and/or hose saddles can support shall be documented in the LNG bunkering procedures manual.

(ISO 20519:2017, 2017)

7.30 **Are the officers aware of any LNG bunker loading limitations for the vessel and are these limitations, if applicable, clearly posted at the LNG bunker operation panel?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A document shall be provided to the ship, specifying the maximum allowable loading limits for each cargo tank and product, at each applicable loading temperature and maximum reference temperature. The information in this document shall be approved by the administration or recognised organisation acting on its behalf. The pressure at which the pressure relief valves (PRVs) have been set shall also be stated in the document. A copy of the document shall be permanently kept on board by the master.

(International code for the construction and equipment of ships carrying liquefied gases in bulk, 2016)

Section 8A: Cargo Operation- Solid Bulk Cargo other than Grain

8.1 **Is the vessel provided with vessel manager's procedures and relevant publications for the safe carriage and handling of solid bulk cargoes? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A list of on-board publication shall be incorporated in SMS. A nonconformity should be filed by inspector against ships not carrying publications in accordance with National requirements and the SMS.

The ISM Code requires every ship's manager to have an SMS which covers instructions and procedures to ensure safe operation of ships and protection of the environment. This should include precautions that should be taken before accepting cargoes for shipment and the procedures that should be followed for safe loading and carriage, and details of the primary hazards associated with the different types of solid bulk cargo.

The IMO codes of practice and conventions set out requirements which must be followed and complied with for safe handling and carriage of bulk cargo.

MSC-MEPC.2/Circ.2 of 1 June 2006, "IMO requirements on carriage of publications on board ships" provides the publications which are specifically required to be carried on board ships by IMO instruments.

IMO instruments such as the SOLAS, MARPOL, LL, COLREG and STCW Conventions deal with many operational aspects, inter alia, navigational responsibilities, safety-related training/drills on board, safe cargo handling, oil spill prevention, collision avoidance activities and watchkeeping standards.

Therefore, these publications, although not expressly required by IMO instruments, may need to be carried on board to improve the crew's knowledge and to enhance the implementation of IMO instruments. No non-conformity should be filed by the inspector against ships not carrying such publications on board unless otherwise required by the ships Safety Management System manual.

(IMO REQUIREMENTS ON CARRIAGE OF PUBLICATIONS ON BOARD SHIPS, 2006)

8.2 **Has appropriate information about the cargo and its characteristics been provided to the master prior to loading? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The IMSBC Code categorises cargoes into three groups:

- Group A —cargoes that may liquefy if shipped at a moisture content exceeding their transportable moisture limit (TML). TML is the maximum moisture content considered safe for carriage. Liquefaction means that the cargo becomes fluid or liquefies. On ships, this happens when the cargo is compacted by the ship's motion. Cargoes that 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 shifting and even to the capsize of the ship.
- Group B—cargoes that involve a chemical hazard that could give rise to a dangerous situation on a ship
- Group C—cargoes that are neither liable to liquefy (Group A), nor involve chemical hazards (Group B), but might still be hazardous.
- Cargoes can be in Group A, B or C, or Group A and B.
- Group B cargoes are those that meet either the IMDG Code's dangerous goods hazard criteria or the IMSBC Code's 'materials hazardous only in bulk' (MHB) criteria. MHB cargoes are materials that involve chemical hazards when transported in bulk, but that do not meet the criteria for inclusion in the IMDG classes above. However, they present significant risks to health and safety when carried in bulk and require special precautions.
- The shipper must provide the Master with valid, up-to-date information about the cargo's physical and chemical properties. The exact information and documentation they must provide is listed in the IMSBC Code under 'Assessment of acceptability of consignments for safe shipment; Provision of Information', and includes the correct Bulk Cargo Shipping Name (cargo's official name used in the Code) and a declaration that the cargo information is correct.
- To carry dangerous goods in solid form in bulk, the vessel 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.

(IMSBC code, 2020)

8.3 **Has the Master been provided with a signed certificate or declaration, indicating the moisture content, Transportable Moisture Limit (TML) and density? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Before loading is started, copies of all appropriates certificates for the cargo shall be provided, for example moisture content, transportable moisture limit (TML) and density. The Master is to ensure the documents are in the correct format, can be clearly understood and gives all appropriate information for the safe loading and carriage of the intended cargo. Certificates of transportable moisture limit must also be issued, with the interval between sample or testing and loading not exceeding six months. However, if it is suspected that the moisture content may have increased since the time of testing, or that the flow moisture properties of the cargo may have changed –possibly resulting from heavy rainfall or inefficient stockpiling – additional testing should be carried out to confirm the safety and suitability of the cargo to be loaded. SOLAS requires that the shippers of bulk cargoes provide the master in writing and sufficiently in advance of loading with information on any special properties of the cargo, including the likelihood of shifting, and, for concentrates* or other cargoes which may liquefy, additional information in the form of a certificate on the moisture content of the cargo and its Transportable Moisture Limit (TML). Cargoes which may liquefy shall only be accepted when the actual moisture content is less than the TML. *Concentrates are materials obtained from a natural ore by a process of enrichment or beneficiation by physical or chemical separation and removal of unwanted constituents.

8.4 **Is information readily available on the ballasting and de-ballasting rate, the maximum allowable load per unit, the surface area of the tank-top plating, and the maximum allowable load per hold? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
This information should be prominently posted or readily available to the user.

8.5 **Is there an approved damaged stability / stability and loading booklet available? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ship shall be provided with an approved stability and loading booklet written in a language understood by the ship's officers. (The Code of Practice for the Safe Loading and Unloading of Bulk Carriers, 2011)

8.6 **Is a Class-approved loading computer or programme in use and has the operational accuracy been regularly tested? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A loading instrument is an instrument, which is either analogue or digital, by means of which it can be easily and quickly ascertained that, at specified read-out points, the still water bending moments, shear forces, and the still water torsional moments and lateral loads, where applicable, in any load or ballast condition will not exceed the specified permissible values. A loading instrument comprises hardware and software. SOLAS Requirement, regulation 11, Loading Instrument: Bulk carriers of 150m in length and upwards shall be fitted with a loading instrument capable of providing information on hull girder shear forces and bending moments, taking into account the recommendation adopted by the Organization. Bulk carriers of 150m in length and upwards, constructed before 1 July 1999, shall comply with the requirements not later than the date of the first intermediate or periodical survey of the ship to be carried out after 1 July 1999. Bulk carriers of less than 150m in length, constructed on or after 1 July 2006, shall be fitted with a loading instrument capable of providing information on the ship's stability in the intact condition. The computer software shall be approved for stability calculations by the Administration and shall be provided with standard conditions for testing purposes relating to the approved stability information. (SOLAS 74, 2014)

It is the responsibility of the ship's master to check the accuracy of the loading computer system at each annual survey by applying at least one approved test loading condition (other than light ship). If a surveyor is not present for the computer check, a copy of the test conditions results obtained by the computer check is to be retained on board as documentation of satisfactory testing for the surveyor's verification. At each renewal survey this checking for all approved test loading conditions is to be done in the presence of the Society surveyor.

(Computer Software for On-board Stability Calculations-IACS Unified Interpretations, 2017)

Regular on-board testing should also take place and records attesting to this should be maintained.

8.7 **Are the stresses, stability information and any limitations included in the cargo plan understood by the cargo watch officers, and are conditions being monitored and maintained within design limits throughout the cargo operation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The officer in charge should closely monitor the ship's condition during cargo operations. If a significant deviation from the agreed loading/unloading plan is detected, all cargo and ballast operations must STOP.

The officer in charge should ensure that:

- The cargo operation and intended ballast/de-ballast procedure are synchronised
- Draught surveys are conducted at appropriate steps of the loading/discharge plan to verify the ship's condition
- The draught readings, usually taken at amidships and the fore and aft perpendiculars, should be in good agreement with values calculated in the loading/discharging plan
- Ballast tanks are sounded to verify their contents and rate of ballasting/de-ballasting
- The cargo load is in agreement with the figures provided by the terminal
- The SWSF, SWBM and, where appropriate, hold cargo weight versus draught calculations are performed at intermediate stages of the cargo operation. These results should be logged.
- Any revised loading/unloading plan should be signed by a terminal representative and by the master or chief officer.

Inspectors should make sure that regular monitoring of stress and stability have been taking place throughout cargo operation and verify if the vessel's conditions have been maintained within design limits.
There are three main problems associated with high loading rates which may result in over-stressing the ship's structure, namely:

- The SWSF and SWBM may exceed the allowable limit
- Overloading the local structure.
- Synchronisation of the ballasting operations.

High cargo loading rates may create problems with the ballasting operation as the pumping capacity of the ship may be relatively low compared to the cargo loading rate. In such cases the cargo operation must be stopped to ensure synchronisation with the ballasting operation is maintained.

When necessary, the loading rate must be adjusted to synchronise with the ship's pumping capacity.

(Bulk Cargo Loading and Discharging Guidance, 2012)

8.8 **Are there procedures in place for loading, ballasting and de-ballasting of the designated ballast holds? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

When cargo is to be carried in the ballast hold:

- Proper steps should be taken to ensure that ballast water cannot be admitted to the hold by accident
- Blanks or cover plates which were fitted to the bilge, the CO2 smothering lines and to the hatch coaming drains must be removed so that these systems can operate whilst cargo is being carried.

Before ballasting of ballast hold:

- It is vital to remove any blanks or cover plates which have been fitted to ballast suctions within the hold
- The bilge suctions should be sealed to prevent ballast from leaking through the bilge system
- The CO_2 injection and the coaming drains must be sealed
- Cargo residue and rubbish could block the ballast suction, so they must be removed from the hold.

De-ballasting:

- Hatch Cover Vents open.

Hold vents must be open when ballasting and/or de-ballasting the designated ballast hold.

8.9 **Are there guidelines and procedures for hold cleaning after completion of unloading? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record the list of hold cleaning equipment available on board in comments.

Bulk cargoes include a very wide range of commodities. The level of cleanliness required before loading and additional preparation will depend upon the type of cargo to be loaded. The vessel's manager shall provide comprehensive hold cleaning guidelines, procedures, a hold cleaning matrix for change of cargo and a hold cleaning inspection checklist.

Cargo hold cleaning plans shall consist of the following steps, where applicable:
1. Removal of dunnage, lashing material and / or cargo residues
2. Holds swept down
3. Holds swept down a second time (double swept)
4. Cargo residues that have set hard removed
5. Cleaning chemicals applied to hold surfaces and allowed to penetrate/react with stains prior to being washed off
6. Holds washed down with sea water
7. Holds washed down with detergents mixed in fresh water
8. Holds rinsed with fresh water to remove all traces of chlorides and detergents
9. Bilge wells and plates / strainers cleaned
10. Holds air dried
11. Loose paint flakes, loose rust scale and paint blisters removed
12. Paintwork touched-up
13. Barrier coat applied

Some vessels are equipped with fixed cargo hold washing machines, however, these vessels are in a minority and most vessels carrying solid bulk cargoes will need to manually wash the cargo holds. Where fixed washing machines are used, manual cleaning of shadow sectors within the holds may still be required.

(Cargo Hold Cleaning, 2017)

During the operation, the master or chief officer should carry out inspections to ensure the cleaning is being carried out correctly and by use of the correct material and equipment. Inspections should be carried out at least once during each day by the master or chief officer accompanied by the boson, to establish how the operation is progressing.

The cargo hold cleaning checklist should be incorporated in the vessel manager's hold cleaning procedure.

8.10 **Is the vessel free of any limitations or restrictions specified in the Loading Manual or Trim and Stability Booklet? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Important restrictions should be recorded in the inspector comments section.

Bulk carriers of 150 m in length and upwards of single-side skin construction, carrying cargoes having a density of 1,780 kg/m³ and above, if not meeting the requirements for withstanding flooding of any one cargo hold as specified in regulation 5.1 and the standards and criteria for side structures of bulk carriers of single-side skin construction, adopted by the Organization by resolution MSC.168(79), shall not sail with any hold loaded to less than 10% of the hold's maximum allowable cargo weight when in the full load condition, after reaching 10 years of age. The applicable full load condition for this regulation is a load equal to or greater than 90% of the ship's deadweight at the relevant assigned freeboard.

(SOLAS 74, 2014)

Strength of the inner bottom plating could be deteriorated due to corrosion wastage. The operational parameters and tank top strength(T/m2) of the effected vessels may be updated by the classification society.

8.11 **Are officers familiar with the risk, hazard and carriage requirements of solid bulk cargo on board the ship? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

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).
- 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 liable to liquefy (Group A) nor possess chemical hazards (Group B). Cargoes in this group can still be hazardous.

Cargo-carrying can involve serious risk, which must be managed carefully to safeguard the crew and the ship. These risks include but are not limited to 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.

Officers shall be able to demonstrate a basic knowledge of the following:
- Shipboard operations and cargo handling
- MARPOL ANNEX V The discharge of wash water and any non-recoverable cargo residues
- The IMSBC Code and BLU Codes
- Cargo familiarity, i.e., hazard, stowage and segregation, hold cleanliness, weather precautions, ventilation, carriage, discharge and clean up requirements.
- Sampling and testing of the moisture content for solid bulk cargo, where applicable and, as required:
- Precautions for cargoes which may liquefy.
- Precautions for cargoes with chemical hazards.
- Limitations when loading high density cargoes.
- Precautions when loading/unloading corrosive cargoes.
- Hazards associated with solid cargo that give off toxic gas.
- Handling high density cargoes
- Can Test

A ship's master may carry out a check test for approximately determining the possibility of flow on board the ship or at the dockside by the following auxiliary method:

Half fill a cylindrical can or similar container (0.5 to 1 litre capacity) with a sample of the material. Take the can in one hand and bring it down sharply to strike a hard surface, such as a solid table, from a height of about 0.2 m. Repeat the procedure 25 times at one- or two-second intervals. Examine the surface for free moisture or fluid conditions. If free moisture or a fluid condition appears, arrangements should be made to have additional laboratory tests conducted on the material before it is accepted for loading.

If samples remain dry following a can test, the moisture content of the material may still exceed the Transportable Moisture Limit (TML).

(IMSBC code, 2020)

Can test is a simple and useful check available to the ship's crew. When performed correctly, it can help determine if a cargo might be unsafe.

8.12 **Have precautionary measures to minimise the risk of potential liquefaction and chemical reaction within the cargo during the voyage been incorporated in the procedures, and are these procedures being followed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

During the voyage, the master and crew should continue to monitor the state of the cargo as per the vessel's manager's procedures and IMSBC Code, even if they are satisfied about the condition of the cargo they loaded.

Mechanical ventilation is to be provided for cargoes liable to emit flammable gases or vapours in an amount which can form an explosive atmosphere with air

(IMSBC Code subsections 3.5.1 and 9.3.2.1.3).

For some cargoes like FERROSILICON 14082 or ALUMINIUM SILICON POWDER, UNCOATED 1398, the mechanical ventilation system must have a capacity of at least six air changes per hour based on an empty cargo space for removal of gases and vapours from cargo holds

(SOLAS Regulation II-2/19.3.4.1 and the IMSBC Code Appendix 1. For the removal of gases and vapours, exhaust ventilation is recommended.

For other cargoes, a specific capacity is not clearly defined. In this case, the ventilation should be adequate to avoid the build-up of a flammable atmosphere.3

For cargoes with self-heating properties, mechanical ventilation should only be applied in special circumstances. In no case shall the ventilation be directed into the body of the cargo

(IMSBC Code subsection 3.5.6 and Appendix 1).

Continuous ventilation is required for cargoes that fall under IMDG Class 4.3 and are substances which, in contact with water, emit flammable gases, such as hydrogen gas, falling within the UN N.5 test as Dangerous Goods. In addition to Class 4.3 cargoes, there are cargoes assigned MHB (WF) such as 'FERROPHOSPHORUS (including briquettes)' and 'FERROSILICON with at least 25% but less than 30% silicon, or 90% or more silicon' that also require continuous ventilation. IMSBC references to continuous ventilation requirements can be found within IMSBC Code subsections 3.5.3 and 3.5.4.

(CARGO AND CARGO HOLD VENTILATION, 2020)

8.13 **If the solid bulk cargo is not listed in the IMSBC Code, has the Master been provided with a certificate from the shipper, endorsed by the competent authority of the port, stating the characteristics of the cargo and the required conditions for carriage and handling? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

If a solid cargo which is not listed in appendix 1 of the IMSBC Code is proposed for carriage in bulk, the shipper shall, prior to loading, provide the competent authority of the port of loading with the characteristics and properties of the cargo in accordance with section 4 of the IMSBC Code. Based on the information received, the competent authority shall assess the acceptability of the cargo for safe shipment.

When it is assessed that the solid bulk cargo proposed for carriage may present hazards, such as those defined by group A or B of the IMSBC Code as defined in 1.7 of the code, advice is to be sought from the competent authorities of the port of unloading and of the Flag State. The three competent authorities will set the preliminary suitable conditions for the carriage of this cargo.

When it is assessed that the solid bulk cargo proposed for carriage presents no specific hazards for transportation, the carriage of this cargo shall be authorised. The competent authorities of the port of unloading and of the Flag State shall be advised of that authorisation.

The competent authority of the port of loading shall provide to the master a certificate stating the characteristics of the cargo and the required conditions for carriage and handling of this shipment. The competent authority of the port of loading shall also submit an application to the Organization, within one year from the issue of the certificate, to incorporate this solid bulk cargo into appendix 1 of the IMSBC Code.

Competent Authority means any national regulatory body or authority designated or otherwise recognized as such for any purpose in connection with the IMSBC Code. The competent authority shall operate independently from the shipper.

(IMSBC code, 2020)

8.14 **Has as a cargo loading/unloading plan providing a detailed sequence of cargo and ballast transfer been prepared, understood, and signed off by the master and deck officers? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

General requirements

A cargo loading/unloading plan should be laid out in such a way that for each step of the cargo operation there is a clear indication of:

- The quantity of cargo and the corresponding hold number(s) to be loaded/unloaded.
- The amount of water ballast and the corresponding tank/hold number(s) to be discharged/loaded.
- The ship's draughts and trim at the completion of each step in the cargo operation.
- The calculated value of the still-water shear forces and bending moments at the completion of each step in the cargo operation.
- Estimated time for completion of each step in the cargo operation.
- Assumed rate(s) of loading and unloading equipment.
- Assumed ballasting rate(s)

The loading/unloading plan should indicate any allowances for cargo stoppage (which may be necessary to allow the ship to de-ballast when the loading rate is high), shifting ship, bunkering, draught checks, and cargo trimming.

(Bulk Cargo Loading and Discharging Guidance, 2012)

Loading plan consideration:

- The arrangements at the port including the number of loaders and their range of movement, the least depth alongside and the air draft requirements
- The loading sequence, including the number of pours per hold, where loading should begin and where the final trimming pours should be loaded
- De-ballasting, including the timing of that operation, to coincide with the loading sequence, and the need for a substantial trim during stripping of the ballast tanks
- The shear force, bending moments and stability of the ship at all stages of the operation, and
- Trimming pours and the final draft requirements.

Unloading plan consideration:
> The port arrangements, including the number of unloaders available and their range of movement, the maximum draft available and the minimum draft available
> The weight of cargo to be unloaded at the port or ports and its distribution on board
> Ballasting including the timing of that ballasting operation which should coincide with the unloading sequence and trim of the ship
> The shear force, bending moments and stability of the ship at all stages of the operation, and
> Final draft requirements and air draft requirements.

(Bulk Cargoes: A Guide to Good Practice, 2016)

The cargo loading/unloading plan should be completed by the responsible officer prior to arrival at port and the commencement of cargo operations and verified and approved by the master.

8.15 **Is an adequate record of all cargo operation activities maintained during loading and unloading? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

The followings should be recorded in the port logbook or deck log book:
> Starting and stopping of work at each hold; times and dates
> Tonnages loaded per pour into each hold, and a running total loaded; and in the case of unloading, tonnages offloaded per shift from each hold and a running total offloaded.
> Weather conditions at intervals – for example, 6 hours
> Use of ship's cranes, if appropriate
> Movement of shore cranes, loaders or floating crane alongside
> Movement of barges alongside, and of floating cranes or loaders if ship is at anchor
> Opening and closing of hatches
> Periods of precipitation
> Draft readings
> Any delays caused on board
> Any surveyors attending or boarding with reason for attendance
> Any stevedore's damage to ship's structure and/or fittings, and
> Cargo temperature – in particular for seed cake and coal.

The values of SF and BM should be calculated at least at the end of each pour during cargo operation.

(Bulk Cargoes: A Guide to Good Practice, 2016)

8.16 **Have details of cargo care during the voyage been adequately recorded? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

Where applicable, the following shall be recorded:
> Records of ventilation on each day for each hold
> All temperatures taken and dew points calculated
> Whether or not ventilation has been carried out
> Reason for not ventilating
> Weather and sea conditions
> Ventilation rule applied (e.g., three- degree rule or dew point rule)

Records relating to monitoring of cargo or hold atmosphere for each day (e.g., for coal or silicomanganese):
> Result of measuring methane, oxygen, carbon monoxide and pH value; where applicable taken at each hold, with time reading taken
> Any action necessary because of readings obtained, and the results of action taken
> Findings during inspections of cargo in each hold, with time inspections carried out
> Any action necessary because of findings, and the results of action taken

Records of bilge soundings and pumping operations:
> Bilge sounding record
> Time and dates of bilge pumping
> Amount of water pumped out of each bilge well during each pumping
> Sounding before and after each pumping

Regular hold bilge testing shall be systematically carried out during voyages carrying coal cargo. If the pH monitoring indicates that a corrosion risk exists, bilges shall be frequently pumped out during the voyage in order to avoid the possible accumulation of acids on tank tops and in the bilge system. Record of such monitoring should be available on board.

(Bulk Cargoes: A Guide to Good Practice, 2016)

8.17 **Are the dangers associated with oxygen depletion of cargo understood by officers and crew, and have reasonable precautions been taken during routine inspections of the cargo, when entering the holds and adjacent spaces? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Some solid bulk cargoes are susceptible to oxidation, which may result in oxygen depletion, emission of toxic gases or fumes and self-heating. Some cargoes are not liable to oxidize but may emit toxic fumes, particularly when wet. There are also cargoes which, when wetted, are corrosive to skin, eyes and mucous membranes or to the ship's structure. When these cargoes are carried particular attention shall be paid to protection of personnel and the need for special precautions to be taken prior to loading and after unloading. Many solid bulk cargoes are liable to cause oxygen depletion in a cargo space or tank.

These include, but are not limited to, most vegetable products and forest products, ferrous metals, metal sulphide concentrates and coal cargoes. Emergency entry into a cargo space shall be undertaken only by trained personnel wearing self-contained breathing apparatus and protective clothing, and always under the supervision of a responsible officer.

(IMSBC code, 2020)

Below are examples of materials that can cause oxygen depletion:

- Grain, grain products and residues from grain processing (such as bran, crushed grain, crushed malt, or meal), hops, malt husks and spent malt
- Oilseeds as well as products and residues from oilseeds (such as seed expellers, seed cake, oil cake and meal)
- Copra
- Wood in such forms as packaged timber, round wood logs, pulpwood, props (pit props and other prop wood), woodchips, wood shavings, wood pulp pellets and sawdust
- Jute, hemp, flax, sisal, kapok, cotton and other vegetable fibres, empty bags, cotton waste, animal fibres, animal and vegetable fabric, wool waste, and rags
- Fishmeal and fish scrap
- Guano
- Sulphatic ores and ore concentrate.
- Charcoal, coal, and coal products
- Direct reduced iron (DRI)
- Dry ice
- Metal wastes and chips, iron swarf, steel and other turnings, borings, drillings, shavings, filings, and cuttings; and scrap metal.

8.18 **If coal cargo is being carried, was the ship equipped with appropriate instruments for measuring the temperature of cargo, monitoring the atmosphere of the cargo hold and checking the pH value of cargo bilge sample? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The ship shall be suitably fitted and carry on-board appropriate instruments for measuring the followings without requiring entry into the cargo space:

- Concentration of methane in the atmosphere
- Concentration of oxygen in the atmosphere
- Concentration of carbon monoxide in the atmosphere
- Temperature
- pH value of cargo space bilge samples.

These instruments shall be regularly serviced and calibrated. Ship personnel shall be trained in the use of such instruments. It is recommended that means be provided for measuring the temperature of the cargo in the range 0°C to 100°C to enable the measurement of temperature of the cargo while being loaded and during voyage without requiring entry into the cargo space.

(IMSBC code, 2020)

Glass thermometers, either mercury or alcohol filled, are too fragile and thus unsuitable for this purpose. “Pocket thermometers”, in which the glass thermometer is held within a metal casing usually for mounting in tanks or pipes, are also unsuitable since the reaction time of the thermometer will be greatly increased due to the metal casing having to equilibrate with the temperature of the coal being measured. Infrared thermometers only measure the surface temperature. Probes can typically measure at depths up to 1m below the surface.(Monitoring of Self-Heating Coal Cargoes Prior to Loading, 2014)

Temperatures measured by lowering thermometers into sounding pipes may be useful in general terms but should not be relied upon to reflect any changes occurring in the bulk of the cargo, as temperature monitoring via sounding pipes will only detect heating coal in the immediate vicinity and will not provide information on the bulk of the cargo.

(How to monitor coal cargoes from Indonesia, 2011)

All temperature-measuring equipment should be regularly checked, serviced, and calibrated as recommended by the manufacturer, and the vessel should carry a sufficient quantity of spare parts.

8.19 **Is any special emergency equipment required by IMSBC on board(as applicable) and in a state of readiness during the cargo operation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Section 8B: Cargo Operation - Bulk Grain

Note: This section can only be completed if the vessel is provided with a document of authorisation for the carriage of grain and a grain loading manual. The vessel must be carrying grain in bulk at the time of the inspection. However, a bulk carrier which, at the time of inspection is not actually carrying grain for a brief period, may be inspected as a bulk carrier (Bulk Grain), provided that an adequate assessment of the procedures on board for the carriage of grain can be made. In such cases, the report must clearly note the circumstances.

A ship without a document of authorisation for the carriage of grain and a grain loading manual shall not load grain until the master demonstrates to the satisfaction of the Administration, or of the Contracting Government of the port of loading acting on behalf of the Administration, that, in its loaded condition for the intended voyage, the ship complies with the requirements of section A 8.3 and A 9 of The International Code for the Safe Carriage of Grain.

The International Code for the Safe Carriage of Grain applies to ships (regardless of size, including those of less than 500 tons gross tonnage) engaged in the carriage of grain in bulk, to which part C of chapter VI of the 1974 SOLAS Convention, as amended, applies.

The term grain covers wheat, maize (corn), oats, rye, barley, rice, pulses, seeds, and processed forms thereof, whose behaviour is similar to that of grain in its natural state.

Grain cargoes carried in bags are not considered as bulk cargo.

8.1 **Has the vessel manager provided policy statements and relevant publications for the safe carriage and handling of grain in bulk? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A list of on-board publication shall be incorporated in SMS. A nonconformity should be filed by inspector against ships not carrying publications in accordance with National requirements and the SMS. The ISM Code requires every ship's manager to have an SMS which covers instructions and procedures to ensure safe operation of ships and protection of the environment. This should include precautions that should be taken before accepting cargoes for shipment and the procedures that should be followed for safe loading and carriage, and details of the primary hazards associated with the different types of bulk grain. The IMO codes of practice and conventions set out requirements which must be followed and complied with for safe handling and carriage of bulk cargo. MSC-MEPC.2/Circ.2 of 1 June 2006, "IMO requirements on carriage of publications on board ships" provides the publications which are specifically required to be carried on board ships by IMO instruments. IMO instruments such as the SOLAS, MARPOL, LL, COLREG and STCW Conventions deal with many operational aspects, inter alia, navigational responsibilities, safety-related training/drills on board, safe cargo handling, oil spill prevention, collision avoidance activities and watchkeeping standards. Therefore, these publications, although not expressly required by IMO instruments, may need to be carried on board in order to improve the crew's knowledge and to enhance the implementation of IMO instruments. No non-conformity should be filed by the inspector against ships not carrying such publications on board unless otherwise required by the ships Safety Management System manual. (IMO REQUIREMENTS ON CARRIAGE OF PUBLICATIONS ON BOARD SHIPS, 2006)

8.2 **Has appropriate information about the cargo and its characteristics been provided to the master or master's representative prior to loading? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The IMSBC does not cover carriage of grain in bulk; this is covered by the International Grain Code. Form of cargo information is required to be issued by shippers to the master or master's representative prior to loading. The cargo information should contain relevant information on inherent quality, safety risks and precautions. These forms should be the master's initial point of reference in preparing to load the particular cargo. However, the master should also refer to other accepted industry guidelines, such as Thomas' Stowage to verify the information stated on the form. (Carriage of Bulk Grain Cargoes, 2015) **General Rule:** Grain cargoes shipped with average moisture content in the region of 12 to 14% have a high risk of going mouldy during the voyage. The risk increases significantly if average moisture content exceeds 14%. Grain cargoes with an average moisture content of 10% or below has a low risk of going mouldy during the voyage. (Carriage of Grain Cargoes, 2015)

8.3 **Has the grain cargo been examined and sampled during loading to ensure that the apparent conditions meet the requirements as described in the documentation and is there recorded evidence of regular monitoring where applicable? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The apparent condition of cargo such as temperature, colour, colour range, dryness, dampness, free-flowing, not free- flowing, lumps present, size, quantity, foreign matter, etc., should be recorded.(Bulk Cargoes: A Guide to Good Practice, 2016) Taking good quality photographs and keeping an accurate port logbook will assist investigations into causation and the extent of damage in the event that a claim does arise. Representative composite samples made from incremental samples collected throughout loading are good indicators of the cargo condition at load port. The samples should be placed in a clean container, sealed, labelled appropriately, and stored at a constant room temperature and out of direct light. Sampling should be done in accordance with the sampling rules specified on the commercial contract. (Carriage of Bulk Grain Cargoes, 2015)

8.4 **Is the approved document of authorisation and grain stability booklet (Grain Loading Manual) provided? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A document of authorisation shall be issued for every ship loaded in accordance with the regulations of the Grain Code either by the Administration or an organization recognized by it or by a Contracting Government on behalf of the Administration. It shall be accepted as evidence that the ship is capable of complying with the requirements of these regulations. The document shall accompany or be incorporated into the grain loading manual provided to enable the master to meet the requirements of A7 of the Code. The manual shall meet the requirements of A6.3. of the Code. The intact stability characteristics of any ship carrying bulk grain shall be shown to meet, throughout the voyage, at least the criteria described in section 7 and Part B of the Grain code. (International Code for the Safe Carriage of Grain in Bulk, 1991)

8.5 **If the document of authorisation was not provided, can the master demonstrate the compliance of the ship's stability with the Grain Code? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A ship without a document of authorisation shall not load grain until the master satisfies the Administration, or the Contracting Government of the port of loading on behalf of the Administration, that the ship will comply with the requirements of the International Grain Code in its proposed loaded condition. > The total weight of the bulk grain shall not exceed one third of the deadweight of the ship. > All filled compartments, trimmed, shall be fitted with centreline divisions extending, for the full length of such compartments, downwards from the underside of the deck or hatch covers to a distance below the deck line of at least one eighth of the maximum breadth of the compartment or 2.4 m, whichever is the greater, except that saucers constructed in accordance with Grain code may be accepted in lieu of a centreline division in and beneath a hatchway except in the case of linseed and other seeds having similar properties; > All hatches to filled compartments, trimmed, shall be closed and covers secured in place. > All free grain surfaces in partly filled cargo space shall be trimmed level and secured in accordance with grain code. > Throughout the voyage the metacentric height after correction for the free surface effects of liquids in tanks shall be 0.3 m or that given by the following formula, whichever is the greater: GMR = L B Vd (0.25 B – 0.645 × square root of Vd B)/ SF x Δ x 0.0875 **Where:** **L =** total combined length of all full compartments (metres) **B =** moulded breadth of the vessel (metres) **SF =** stowage factor (cubic metres per tonne) **Vd =** calculated average void depth calculated in accordance with B 1 (metres-Note: not millimetres) **D =** displacement (tonnes) The master must demonstrate to the satisfaction of the Administration or the Contracting Government of the port of loading on behalf of the Administration that the ship in its proposed loaded condition will comply with the requirements of this section. (International Code for the Safe Carriage of Grain in Bulk, 1991)

8.6 **Is a Class-approved loading computer or programme in use and has its operational accuracy been regularly tested? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The Grain Code specifies how to determine the grain shift moment, and it sets the stability criteria for ships carrying grain in bulk. The loading computer or program shall be able to:

- Calculate grain shift moments.
- Calculate the allowable grain heeling moments.
- Determine whether a loading condition complies with the grain stability criteria.
- Create the table needed for the loading manual.

A loading instrument is an instrument, which is either analogue or digital, by means of which it can be easily and quickly ascertained that, at specified read-out points, the still water bending moments, shear forces, and the still water torsional moments and lateral loads, where applicable, in any load or ballast condition will not exceed the specified permissible values. A loading instrument comprises hardware and software.

(SOLAS Requirement, regulation 11, Loading Instrument)

Bulk carriers of 150 m in length and upwards shall be fitted with a loading instrument capable of providing information on hull girder shear forces and bending moments, taking into account the recommendations adopted by the Organization.
Bulk carriers of 150 m in length and upwards constructed before 1 July 1999 shall comply with the requirements not later than the date of the first intermediate or periodical survey of the ship to be carried out after 1 July 1999.

Bulk carriers of less than 150 m in length constructed on or after 1 July 2006 shall be fitted with a loading instrument capable of providing information on the ship's stability in the intact condition.

The computer software shall be approved for stability calculations by the Administration and shall be provided with standard conditions for testing purposes relating to the approved stability information.

(SOLAS 74, 2014)

It is the responsibility of the ship's master to check the accuracy of the loading computer system at each annual survey by applying at least one approved test loading condition (other than light ship). If a surveyor is not present for the computer check, a copy of the test conditions results obtained by the computer check is to be retained on board as documentation of satisfactory testing for the surveyor's verification. At each renewal survey this checking for all approved test loading conditions is to be done in the presence of the Society surveyor.

(Computer Software for On-board Stability Calculations-IACS Unified Interpretations, 2017)

Regular on-board testing should also take place and records attesting to this should be maintained.

8.7 **Are the stresses, stability information and any limitations included in the cargo plan understood by the cargo watch officers and are conditions being monitored and maintained within design limits throughout cargo operations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Inspectors should make sure that regular monitoring of stress and stability have been taking place throughout cargo operations and verify if the vessel's condition has been maintained within design limits.

The officer in charge should closely monitor the ship's condition during cargo operations. If a significant deviation from the agreed loading/unloading plan is detected, all cargo and ballast operations must STOP.

The officer in charge should ensure that;

- The cargo operations and intended ballast/de-ballast procedure are synchronised.
- Draught surveys are conducted at appropriate steps of the loading/discharge plan to verify the ship's condition.
- The draught readings, usually taken at amidships and the fore and aft perpendiculars, should be in good agreement with values calculated in the loading/discharging plan.
- Ballast tanks are sounded to verify their contents and rate of ballasting/de-ballasting.
- The cargo load agrees with the figures provided by the terminal.
- The SWSF, SWBM and, where appropriate, hold cargo weight versus draught calculations are performed at intermediate stages of the cargo operation. These results should be logged.
- Any revised loading/unloading plan should be signed by a terminal representative and by the master or chief officer.
- The master and chief officer should be aware of the worst-case damage condition for the existing cargo on board.
- Cargo trimming is a mandatory requirement for grain cargoes. The loading and unloading plan should indicate any allowance for cargo trimming.

(Guidance and Information on Bulk Cargo Loading and Discharging to Reduce the Likelihood of Over-stressing the Hull Structure, 2018)

8.8 **Are there procedures in place for loading, ballasting and de-ballasting of the ballast holds? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

When cargo is to be carried in ballast hold:
> Proper steps should be taken to ensure that ballast water cannot be admitted to the hold by accident.
> Blanks or cover plates which were fitted to the bilge, to the CO2 smothering lines and to the hatch coaming drains must be removed so that these systems can operate whilst cargo is being carried.

Before ballasting of ballast hold:
> It is vital to remove any blanks or cover plates which have been fitted to ballast suctions within the hold.
> The bilge suctions should be sealed to prevent ballast from leaking through the bilge system.
> The CO_2 injection and the coaming drains must be sealed.
> Cargo residue and rubbish must be removed from the hold, as they could block the ballast suction.

Deballasting:
> Hatch cover ventilations must be open.

(Bulk Carrier Practice, Isbester, 2013)

Hold vents must be open when ballasting and/or de-ballasting the designated ballast hold.

8.9 **Are there guidelines and procedures for hold cleaning in place (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record the list of hold cleaning equipment available on board in comments.

Bulk cargoes include a very wide range of commodities. The level of cleanliness required before loading and additional preparation will depend upon the type of cargo to be loaded. The vessel's manager shall provide comprehensive hold cleaning guidelines, procedures, hold cleaning matrix for change of cargo and hold cleaning inspection checklist.

Cargo hold cleaning plans shall consist of the following steps, where applicable:
1. Removal of dunnage, lashing material and/or cargo residues
2. Holds swept down
3. Holds swept down a second time (double swept)
4. Cargo residues that have set hard removed
5. Cleaning chemicals applied to hold surfaces and allowed to penetrate/react with stains prior to being washed off
6. Holds washed down with sea water
7. Holds washed down with detergents mixed in fresh water
8. Holds rinsed with fresh water to remove all traces of chlorides and detergents
9. Bilge wells and plates/strainers cleaned
10. Holds air dried
11. Loose paint flakes, loose rust scale and paint blisters removed
12. Paintwork touched-up
13. Barrier coat applied

Some vessels are equipped with fixed cargo hold washing machines, however, these vessels are in a minority and most vessels carrying solid bulk cargoes will need to manually wash the cargo holds. Where fixed washing machines are used, manual cleaning of shadow sectors within the holds may still be required. (Cargo Hold Cleaning, 2017)

During the operation, the master or chief officer should undertake inspections to ensure the cleaning is being carried out correctly using of the correct material and equipment. Inspections should be conducted at least once during each day by the master or chief officer accompanied by the bosun, to establish how the operation is progressing.

The cargo hold cleaning checklist should be incorporated in the operator's hold cleaning procedure.

8.10 **Have cargo holds been grain or hospital cleaned, where applicable, and has a ship's hold inspection certificate been issued by a 3rd party prior to loading grain? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Hospital clean is the most stringent cleaning standard, requiring the holds to have 100% intact paint coatings on all surfaces, including the tank top, all ladder rungs and undersides of hatches. The standard of hospital clean is a requirement for certain cargoes, for example kaolin/china clay, mineral sands including zircon, barites, rutile sand, ilmenite, fluorspar, chrome ore, soda ash, rice in bulk, and high grades of wood pulp. Generally, these high standards of cleanliness will only be met by vessels trading exclusively with such cargoes. It will rarely be required in the tramp trades.

Grain clean is the most common requirement. A ship will be required to be grain clean for the majority of bulk and break bulk cargoes, such as all grains, soya meal and soya products, alumina, sulphur, bulk cement, bauxite, concentrates, and bulk fertilisers. Some ports and shippers may allow a different standard of cleanliness.

The industry accepted definition of grain clean is provided by the National Cargo Bureau (NCB).

"Compartments are to be completely clean, dry, odour-free, and gas-free. All loose scale is to be removed." The definition is clear:
1. All past cargo residues and any lashing materials are to be removed from the hold
2. Any loose paint or rust scale must be removed
3. If it is necessary to wash the hold, as it generally will be, the holds must be dried after washing
4. The hold must be well ventilated to ensure that it is odour-free and gas-free

It is important to differentiate such scale from oxidation rust (i.e. light atmospheric rusting). Loose scale will break away when struck with a fist or when light pressure is applied with a knife blade or scraper under the edge of the scale. Oxidation rust will typically form on bare metal surfaces but will not flake off when struck or when light pressure from a knife is applied. Generally, the presence of hard-adhering scale within a hold is acceptable in a grain clean hold. The scale should not fall during the voyage or during normal cargo operations. (Bulk Cargoes Hold Preparation and Cleaning, 2011)\

The 3rd party inspection company should be a member of the Grain and Feed Trade Association (GAFTA) or Federation of Oils, Seeds and Fat Associations (FOSFA) analyst and superintendent.

8.11 **Is the vessel free of any limitations or restrictions specified in the loading manual or trim and stability booklet? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Important restrictions should be recorded in the inspector's comments section.

8.12 **Are officers familiar with the risk, hazard and carriage requirements of grain cargo on board the ship? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Shift of grain, contamination, ingress of water, moisture migration, and transfer of heat from engine room and / or bunker tank bulkhead and inadequate surface ventilation are the major risks and hazards associated with the handling grain cargo at sea.

Heat can be transmitted from engine room to the aft cargo hold and subsequently affect the cargo loaded against the aft bulkhead. The pattern of damage in cargoes situated close to fuel tanks which have overheated will be obvious as grain will discolour and clump where there has been heat transfer. If possible, stow grain cargoes in holds which will not be affected by heated fuel tanks. Fuel oil temperature should be closely regulated and recorded during the voyage.
(Carriage of Bulk Grain Cargoes, 2015)

As far as possible, the bunkers used during the voyage should be drawn from tanks situated well away from holds containing hygroscopic products. If impracticable, bunker tanks adjoining cargo spaces should be heated only when required, ensuring that the temperature does not rise above normal operational levels. (Cargo Ventilation and Precautions to Minimise Sweat, 2012)

8.13 **Have hatch covers been ultrasonically tested for weather tightness before loading? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Before loading it will always be prudent to have the hatches tested for weather tightness by ultrasonic testing.
(Carriage of Grain Cargoes, 2015)

The technique is widely used throughout the industry to test and prove the weather tightness of hatch covers. The advantages of this method include:
1. The test identifies the exact location and extent of leakage
2. It indicates the compression status of the rubber seal; if compression is good, the rubber will be able to compensate for movements at sea and maintain a tight seal
3. The equipment is quick and easy to operate. One person operation is possible
4. The test may be carried out in loaded or empty holds
5. There are no weather/temperature limitations, and the test may be carried out during the day or night, and
6. There is no pollution risk.

The procedure comprises placing a transmitter in the cargo hold, switching it on, and properly closing and securing the hatch covers or access equipment to seaworthy requirements. The ultrasonic waves emitted by the transmitter within the enclosed space will leak through the smallest of apertures. Any leakage of sound may be detected by a receiver or detector between frequencies of 36.7 and 40.7 kHz and converted into aural frequencies or into digitally reproduced information. The location of leaks can be precisely detected from outside the hold by moving a hand-held detector along the periphery and cross seams of the covers. Evaluation of the extent of leakage can be established from reading a digital scale.

(UK P&I Club Carefully to Carry CONSOLIDATED EDITION 2018)

The use of ultrasonic equipment is a modern, viable means of testing for watertight integrity of hatch covers, access hatches, doors, ventilators, etc. It is preferable to use Class approved equipment operated by qualified personnel and to follow approved test procedures.

(Steamshipmutual.com, 2004)

8.14 **Has the master been provided with clear instructions regarding any fumigation, prior to arrival at the load port? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Instructions regarding the fumigation, the type of fumigation, who has requested the fumigation and what company will carry out the operation, should be provided for the master. The master should check through the instruction and if everything is in order and it is safe for the operation to be carried out, the fumigation should be allowed to go ahead.

(Bulk Cargoes: A Guide to Good Practice, 2016)

The use of phosphine or any other fumigants is strictly forbidden by organic certification around the world. Currently, there are no organically approved fumigants that can be practically applied to organic bulk grain cargoes. As a result, all organic bulk cargoes must be transported without fumigation.

(Carriage of Organic Bulk Grain Cargoes, 2015)

Methyl bromide is an ozone-depleting chemical which was primarily used as a quarantine pesticide for soil, wood and grain. It is fast acting and fumigation exposure times can be as little as 24 hours, however in-transit fumigation with methyl bromide is prohibited due to safety concerns and the crew must also leave the vessel in the event that a methyl bromide fumigation is undertaken at berth. This can incur additional costs associated with accommodating the crew and lead to concerns for owners and charterers about the safety of their vessel during this time.

In 1992, the Montreal Protocol described the initial strategy to phase out the use of methyl bromide as a pesticide. The strategy was agreed by 160 countries. All developed countries agreed to a complete phase out of the chemical as a pesticide by 2005, while 2015 was the phase out date set for developing countries. Quarantine, pre-shipment, and critical uses of methyl bromide were totally prohibited in the USA, UK and EU by 2010. While the phase out of methyl bromide should be 100% effective in developing countries as of 1 January 2015, quarantine, pre-shipment, and critical uses of methyl bromide may be still permitted in certain circumstances.

(Carriage of Grain Cargoes, 2015)

The crew should remain ashore until fumigation has been completed and a gas freeing certificate has been issued by the fumigator-in charge of the operation or by another authorised person. Methyl bromide is only approved for fumigation in port and should never be used for fumigation continued in transit. Methyl bromide will be introduced into the cargo compartments as a gas and effective fumigation of the cargo is likely to be achieved within 24 hours to 48 hours. If it is proposed that methyl bromide is to be used for fumigation of cargo in transit, the master should not allow the operation to be carried out.
(Bulk Cargoes: A Guide to Good Practice, 2016)

The task of ensuring cargo hold(s) integrity should not be taken lightly as this operation is key to ensuring crew safety. The company should establish procedures, plans and instructions, including appropriate checklists, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel, and the vessel should have procedures in place in their safety management system on how to handle fumigation jobs onboard.

It is strongly recommended that special attention is given to potential leakages from and/or through:

- Cable locks
- Ventilation systems
- Ballast systems
- Duct keels
- Bilges
- Wiring ducts
- Dehumidifiers
- Compartments of the engine room
- Any other sort of piping arrangements connected to parts of the cargo hold

(Fumigants entering crew's spaces – a word of caution, 2020)

8.15 **Has the vessel been provided with procedures and contingencies regarding fumigation of cargo holds and are the master and chief officer familiar with the procedure? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The master should familiarise himself or herself with the recommendations set out in the procedures given in the SMS manual and with the guidance set out in section 3 of MSC.1/Circ.1264. In addition, some individual countries, for example the USA and Canada, have produced their own requirements which should be followed when fumigation is being carried out on board a ship within their territorial waters; the master should be familiar with these requirements if appropriate. (Bulk Cargoes: A Guide to Good Practice, 2016)

8.16 **Is crew familiar with major problems associated with fumigation of cargo in stowage on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
With respect to the use of phosphine, there are three major problems with the fumigation of cargo in stowage on board, these being its toxicity, its potential for fire or explosion and its effectiveness. The fumigation gas is toxic to insects but is also toxic to human and other animals. This being the case, safety of the crew, the operatives carrying out the fumigating operation, and other personnel on board must be ensured by following procedures strictly. After the pellets or tablets have been distributed within the cargo or cargo compartment, they will react with the atmospheric moisture to produce the fumigant gas. The chemical reaction will also produce heat. If the fumigant is not distributed correctly, for example, is placed in piles rather than being spread around, the heat produced might cause heating of adjacent cargo which may produce combustion and fire. Alternatively, in extreme case, an explosion might be the result of spontaneous heating of the fumigation gas as phosphine gas is explosive at levels above 1.7% v/v in air. If the pellets or tablets become wet, for example by sea water ingress, rain or condensation, they can spontaneously ignite. (Bulk Cargoes: A Guide to Good Practice, 2016)

8.17 **Do on-board safety requirements for fumigation comply with sub-section 3.3.2.7 of the IMO recommendation on the safe use of pesticides? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ship should carry: > Gas-detection equipment and adequate fresh supplies of service items for the fumigant(s) concerned as required by 3.3.2.12, together with instructions for its use and the occupational exposure limit values set by the Flag State regulations for safe working conditions. > Instructions on disposal of residual fumigant material. > At least four sets of adequate respiratory protective equipment; and > A copy of the latest version of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG), including appropriate medicines and medical equipment. (Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds, 2008) It is reported that phosphine gas can be detected because it smells of garlic. This is not a reliable method, and the absence of a garlic smell does not mean the absence of phosphine gas. The only reliable method of detecting phosphine gas is by the use of the gas detection equipment which is on board for the purpose. (Bulk Cargoes: A Guide to Good Practice, 2016)

8.18 **Are the master's appointed representatives for fumigation trained and is there evidence to show that they have been effectively performing duties associated with this task? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Before fumigation is conducted, one officer and one crew member, both of whom have been trained (i.e. shown the information on the fumigant Safety Data Sheet and the instructions for fumigant use), should be designated as the "trained representatives of the master". These representatives must: > Brief the crew before a fumigation takes place and satisfy the fumigator-in-charge that this has been done.

- Inspect and/or test empty cargo holds for leakage with instruments so that proper sealing can be done before or after loading. The fumigator-in-charge, accompanied by a trained representative of the master or a competent person, should determine whether the cargo holds to be treated are or can be made sufficiently gastight to prevent leakage of the fumigant to the accommodation, engine-rooms and other working spaces in the ship. Special attention should be paid to potential problem areas such as bilge and cargo line systems.
- Continue monitoring in the accommodation, engine room, etc. Though the initial check may not indicate any leaks, it is essential that monitoring is to be continued because concentrations may reach their highest levels after several days. Continue monitoring the gas levels in accommodation and working spaces after the fumigator has left the ship.

(Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds, 2008)

The master representatives should be trained with regard to gas concentration checks which must be carried out before departure and during the voyage, where and when those checks must be done and what records must be kept to comply with other parts of the requirements.

(Bulk Cargoes: A Guide to Good Practice, 2016)

8.19 **Have pre-fumigation and post fumigation statements been provided to the master by the fumigator-in-charge? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The fumigator-in-charge, together with a trained representative, should carry out inspections and/or tests of cargo compartments to determine whether the holds to be treated can be made sufficiently gas-tight to prevent leakage of the fumigant from the holds into other compartments. Following such inspections, further discussion should be held between the master and fumigator-in-charge, and the fumigator-in-charge should provide the master with a signed document stating the following:

- Details of inspections and tests conducted
- Details of provisions and preparations for fumigation made
- Confirmation that holds to be treated are or can be made satisfactorily gas tight for the fumigation.

If any holds cannot be made sufficiently gas-tight, a signed statement to this effect should also be supplied to the master. The fumigator-in-charge should notify the master, in writing, which cargo spaces are to be fumigated and which other spaces are considered to be unsafe.

The fumigator-in-charge, together with the trained representative of the master should make an initial check for any gas leaks, using the gas detection equipment, around the hatches and if any leaks are found they should be sealed using appropriate material.

At an appropriate time after application of the fumigant, the fumigator-in-charge, accompanied by a representative of the master, should check that accommodation, engine-rooms, and other working spaces remain free of harmful concentrations of gas.

(Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds, 2008)

When fumigators-in-charge are satisfied that the application of fumigation and the sealing of hatches has been completed, they should formally hand over to the master in writing responsibility for maintaining safe conditions in all occupied spaces. The signed written statement should include following:

- List of documents provided.
- Confirmation that all spaces adjacent to treated spaces have been found gas free.
- Confirmation that trained representative are fully conversant with the use of the gas detection equipment.
- Confirmation that gas detection equipment and the respiratory equipment is in full working order.
- Confirmation that adequate supplies of consumables for the equipment are available on board.

(Bulk Cargoes: A Guide to Good Practice, 2016)

The master and fumigator-in-charge, or their representatives, should complete and sign the model checklist for in-transit fumigation.

(Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds, 2008)

8.20 **Are visible means provided to prevent access to all entrances containing fumigant and other spaces that are considered unsafe to enter after fumigation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

On application of the fumigant, the fumigator-in-charge should post warning signs at all entrances to places notified to the master as in 3.3.2.8 of MSC.1/Circ.1264. These warning signs should indicate the identity of the fumigant and the date and time of fumigation.

(Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds, 2008)

8.21 **Has the Voyage Safety Plan (VSP), including the checklist for fumigation during the voyage, been discussed with and signed by the master prior to sailing to the discharge port? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The Voyage Safety Plan (VSP) including checklist confirming the following:

Before fumigant application
> The inspection required before loading has been performed.
> All the cargo spaces to be fumigated are satisfactory for fumigation.
> Spaces, where found not be satisfactory, have been sealed.
> The master or his trained representatives have been made aware of the specific areas to be checked for gas concentrations throughout the fumigation period.
> The master or his trained representatives have been made familiar with the fumigant label, detection methods, safety procedures and emergency procedures.
> The fumigator-in-charge has ensured that gas-detection and respiratory protection equipment carried on the ship is in good order, and that adequate fresh supplies of consumable items for this equipment are available to allow sampling.
> The fumigator-in-charge has ensured that the necessary medicines and medical equipment, and the latest version of the Medical First Aid Guide for Use in Accident Involving Dangerous Goods (MFAG) are available on board the ship.
> The master has been notified in writing of:
- The spaces containing cargo to be fumigated.
- Any other spaces that are considered unsafe to enter during the fumigation.

After fumigant application
Presence of gas has been confirmed inside each hold under fumigation.
> Each hold has been checked for leakage and sealed properly.
> Spaces adjacent to the treated cargo spaces have been checked and found gas-free.
> The responsible crew members have been shown how to take gas readings properly when gas is present and they are fully conversant with the use of gas-detection equipment provided;
> Methods of application are described.
> The master or trained representatives have been briefed fully on the method of application and the spread of the gas throughout the hold.
> The master or trained representatives have been made:
- Aware that even though the initial check may not indicate any leaks, it is essential that monitoring is to be continued in the accommodation, engine-room, etc. because concentrations may reach their highest levels after several days.
- Aware of the possibility of the spreading of gas throughout the duct keel and/or ballast tanks.
- Aware that the master is responsible for all aspects of the safety of the fumigation once the "fumigator-in-charge" has formally handed over responsibility to them and left the vessel.
> The fumigator-in-charge has supplied a signed statement to the master conforming to the provisions of IMO Recommendations.

(Code of Practice on Safety and Efficacy for Marine Fumigation, 2010)

Degassing and checking results at the discharge port – should be done according to the guidance given by the fumigator in charge at the load port and included with the VSP. For example, there should be clear written instructions on how to handle and dispose of any fumigant containers or fumigation residues.

(Carriage of Grain Cargoes, 2015)

8.22 **Have the air conditioning intakes for the accommodation, the engine room and other spaces been set to prevent the possibility of drawing in fumigant gas? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Ventilation procedures for accommodation, the engine room and other spaces should be reviewed to avoid the possibility of drawing fumigant gas into those spaces by incorrect ventilation. Further, it should be verified that ventilation flaps and closing devices are correctly set before the fumigation is carried out and they should be maintained in the correct arrangement throughout the fumigation period. A review of the ventilation regime should be completed before any ventilation of the cargo compartment is started and any necessary changes to those arrangements should be made.

(Bulk Cargoes: A Guide to Good Practice, 2016)

8.23 **Are procedures in place for entering any cargo holds sealed for fumigation in transit? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Except in extreme emergency, cargo holds sealed for fumigation in transit should never be opened at sea or entered. If entry is imperative, at least two persons should enter, wearing adequate protection equipment and a safety harness and lifeline tended by a person outside the space, similarly equipped with protective, self-contained breathing apparatus. (Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds, 2008)

8.24 **Has the master informed the appropriate authorities of the country of destination about the fumigation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Prior to the arrival of the ship, generally not less than 24 hours in advance, the master should inform the appropriate authorities of the country of destination and ports of call that fumigation in transit has been carried out. The information should include the type of fumigant used, the date of fumigation, the cargo holds which have been fumigated, and whether ventilation has commenced. Upon arrival at the port of discharge, the master should also provide information about use of the fumigant, e.g., on the fumigant label or package itself, such as the recommendations of the fumigant manufacturer concerning methods of detection of the fumigant in air, its behaviour and hazardous properties, symptoms of poisoning, relevant first aid, special medical treatment, emergency procedures and instructions on disposal of residual fumigant material. (Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds, 2008)

8.25 **Has the vessel been provided with a gas free certificate at the discharge port prior to commencement of discharge operation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Gas Free (or Clearance) Certificate issued by the IMFO member at the discharge port declares the area safe for workers to enter a fumigated space and/or handle a fumigated product. (Code of Practice on Safety and Efficacy For Marine Fumigation, 2010) Before discharge of grain cargoes can be approved, holds that have been subject to fumigation will have to be declared gas free. This is to ensure the holds are free from any gas that may make the holds unsafe. After the holds have been declared gas free, the surfaces of the cargo may be subject to visual inspection. This can be carried out by the receiver, port officials and/or government inspectors as the hatches are open, prior to the approval of discharge. (Carriage of Organic Bulk Grain Cargoes, 2015)

8.26 **Are records maintained of fumigation operations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Records for fumigation of cargo: > Communication relating to fumigation > Details of fumigation company, fumigator-in-charge, and operation > Fumigation plan > In the deck logbook record details of the operation > In a workbook record details of the operation including: - Details of the fumigator-in-charge and operatives. - Time of starting and finishing. - Holds involved. - Identity of the fumigant, application level and where and how applied. - All gas reading with location testing. > Plan and sketch for each hold fumigated, showing where the fumigant was applied and the amount of fumigant at each location. > Model checklist for in-transit fumigation signed by the master and the fumigator-in-charge. > Certificate of fumigation > Formal written handover of responsibility.

Records relating to fumigation for each day:
> Gas concentration readings obtained and location at which each reading was taken
> Gas concentration safety checks at all appropriate locations, which should at least include:
- Accommodation
- Engine-rooms
- Areas designated for use in the navigation of the ship
- Frequently visited working areas and stores, such as the forecastle head spaces adjacent to cargo holds being subject to fumigation in transit should be continued
- Throughout the voyage at least at eight-hour intervals or more frequently if so advised by the fumigator-in-charge. These readings should be recorded in the ship's logbook.
> Time readings taken
> Any action necessary because of high readings
> Results of action taken
> Details of ventilation holds after fumigation period

(Bulk Cargoes: A Guide to Good Practice, 2016)

8.27 **Are necessary instruments (with spares) to determine the dew point provided, maintained in good condition and are there records of the calibration of such instruments? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Dewpoint temperature may be measured by a variety of methods. Ships generally use a traditional wet and dry bulb arrangement consisting of two identical mercury thermometers, one of which has a damp muslin wick covering the bulb. These are normally housed in a protective marine screen on each bridge wing. The dewpoint temperature may then be determined by a "Dewpoint Table" to compare the wet and dry bulb temperatures. This figure is important when considering cargo ventilation requirements.

When using traditional wet and dry bulb thermometers, the accuracy of the dew point temperature will depend on the condition of the equipment. The muslin covering the wet bulb should be clean, the water in the reservoir should be distilled and the bulb itself should be wet. In order to ensure that the readings are correct, the device should always be positioned away from any exhaust vents, other draughts and all sources of heat. The readings should always be taken on the windward side of the vessel. (Cargo Ventilation and Precautions to Minimise Sweat, 2012)

8.28 **Are the master and / or chief officer familiar with the rules for deciding to ventilate the cargo holds during the voyage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a non-conformity when hygroscopic and non-hygroscopic products are stowed in one hold.

Hygroscopic products have a natural moisture content and are mainly of plant origin. They may retain, absorb, or release water vapour, and excessive amounts of inherent moisture may lead to significant self-heating and "moisture migration" within the cargo resulting in caking, mildew or rot. Examples of hygroscopic products include grain, rice, flour, sugar, cotton, tobacco, cocoa, coffee, and tea. (Cargo Ventilation and Precautions to Minimise Sweat, 2012)

Non-hygroscopic products have no water content. However, certain commodities (e.g., steel) may be damaged if stowed in a moist environment, and others may be harmed if packaged using a hygroscopic material (e.g., wood, paper). By way of illustration, a vessel loaded a parcel of glass packed with layers of paper between each sheet. At the discharge port it was found that the paper had absorbed moisture from the air during the voyage, making it impossible for the glass sheets to be separated. The cargo was rejected by the receiver. (Cargo Ventilation and Precautions to Minimise Sweat, 2012)

The cargo should be ventilated in accordance with carriage, voyage or fumigation instructions and when weather and sea condition permit.

The prevention of sweat is probably the most common reason for ventilating cargo compartments. Any such ventilation should be done in such a way as to ensure the air going into the holds from outside is drier than the air in the holds above the cargo; that is, the dew point of the outside air must be below that of the air in the hold. There are two simple rules for deciding if ventilation of a hold is appropriate:
> Dew-point rule: Ventilate when the dew point temperature of the outside air is lower than the dew point temperature of the air in the hold.
> Three-degree rule: Ventilate when the temperature of the outside air is at least 3°C below the temperature of the cargo, which was taken during loading.

(Bulk Cargoes: A Guide to Good Practice, 2016)

8.29 **Is ventilation of cargo holds, where required, being carried out and recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The following should be recorded on each day for each hold: > All temperatures taken and dew points calculated > Whether or not ventilation carried out > Reason for not ventilating > Weather and sea condition Ventilation rule applied (e.g., three –degree rule or dew point rule) (Bulk Cargoes: A Guide to Good Practice, 2016)

8.30 **Is there evidence of a satisfactory grain stability calculation for the last voyage? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector shall verify that the following has been considered during a grain loading calculation: > Using the stowage factor provided (and any ship's experience factor is appropriate), and using the full hold volumes with trimmed ends, determine the weight of cargo to be stowed in each full hold, and then determine the weight of cargo to be stowed in each slack hold, if applicable. > Determine the ullage or sounding of each slack hold > Using the volumetric heeling moment data, determine the volumetric heeling moment for each hold, assuming each full hold has untrimmed ends and using the ullage or sounding for each slack hold > Apply the stowage factor to the volumetric heeling moment and obtain the total grain heeling moment > Complete stability calculations to determine the ship's fluid GM, the displacement and draft, and then determine from the data the maximum permissible grain heeling moment for the ship's loaded condition > Ensure the total grain heeling moment at each stage of the voyage is less than the corresponding maximum permissible grain heeling moment, sometimes referred to as the maximum allowable grain heeling moment (Bulk Cargoes: A Guide to Good Practice, 2016) Appropriate grain stability calculations, as required by the International Grain Code, should be carried out prior to loading grain.

8.31 **Has a cargo loading/unloading plan providing detailed sequences of cargo and ballast transfer been prepared, understood, and signed off by the deck officers? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
General requirements: A cargo loading/unloading plan should be laid out in such a way that for each step of the cargo operation there is a clear indication of: > The quantity of cargo and the corresponding hold number(s) to be loaded/unloaded. > The amount of water ballast and the corresponding tank/hold number(s) to be discharged/loaded. > The ship's draughts and trim at the completion of each step in the cargo operation. > The calculated value of the still-water shear forces and bending moments at the completion of each step in the cargo operation. > Estimated time for completion of each step in the cargo operation. > Assumed rate(s) of loading and unloading equipment. > Assumed ballasting rate(s) The loading/unloading plan should indicate any allowances for cargo stoppage (which may be necessary to allow the ship to de-ballast when the loading rate is high), shifting ship, bunkering, draught checks, and cargo trimming. Bulk Cargo Loading and Discharging Guidance, 2012) Loading plan consideration: > The arrangements at the port, including the number of loaders and their range of movement, the least depth alongside and the air draft requirements. > The loading sequence, including the number of pours per hold, where loading should begin and where the final trimming pours should be loaded. > De-ballasting, including the timing of that operation to coincide with the loading sequence and the need for a substantial trim during stripping of the ballast tanks. > The shear force and bending moments and stability of the ship at all stages of the operation. > Trimming pours and the final draft requirements.

Unloading plan consideration:
- The port arrangements, including the number of unloaders available and their range of movement, the maximum draft available and the minimum draft available.
- The weight of cargo to be unloaded at the port or ports and its distribution on board.
- Ballasting, including the timing of that ballasting operation, which should coincide with the unloading sequence and trim of the ship.
- The shear forces, bending moments and stability of the ship at all stages of the operation.
- Final draft requirements and air draft requirements.

(Bulk Cargoes: A Guide to Good Practice, 2016)

The cargo loading/unloading plan should be completed by the responsible officer prior to arrival at port and commencement of cargo operations and verified and approved by the master.

8.32 **Are the hold bilges cleaned prior to loading and have all hold openings been made grain tight? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Hold bilges must be cleaned thoroughly to remove all residue, rust particles, and cargo stains etc. The filter (Rose Box) must be cleaned thoroughly. The bilge well sections shall be washed with continuous running of sea water to remove all odor and later rinsed with fresh water. The bilge well must be sponged dry to remove all trace of water and dried.

All tank-top and fuel tank sheathing must be grain tight. Where the condition of the sheathing renders this impracticable, the sheathing must be covered with hessian, polyethylene, paper, or other suitable material to prevent the ingress of grain.

Bilge spaces and bilge wells must be covered with hessian or similar porous material after inspection, in such a manner as to prevent the entry of grain into the bilge space or well, but to permit the entry of water.

Tween deck and other scuppers must be covered with hessian or similar porous material in such a manner as to prevent the entry of grain into the scupper opening but to permit the entry of drainage water.

(Bulk Cargoes Hold Preparation and Cleaning, 2011)

8.33 **Do records on board verify that cargo lights in holds, where fitted, were properly isolated before cargo was loaded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Many bulk carrier/general cargo holds have fixed cargo lights. These can easily ignite combustible cargoes such as grain, animal feed, wood chips, pulp, and paper if they are too close to the light. Cargo lights in holds need to be properly isolated before cargo is loaded. This is best done by removing fuses or other physical links in the electrical circuits so that the lights cannot be switched on by mistake.

(Fire! A Guide to the causes and prevention of cargo fire, 2017)

8.34 **Is an adequate record of all cargo operation activities maintained during loading and unloading? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The following should be recorded in the port logbook or deck logbook:
- Starting and stopping of work at each hold, times, and dates
- Tonnages loaded per pour into each hold, and a running total loaded; and in the case of unloading, tonnages offloaded per shift from each hold and a running total offloaded.
- Weather conditions at intervals – for example 6 hours.
- Use of ship's cranes, if appropriate
- Movement of shore cranes, loaders, or floating crane alongside
- Movement of barges alongside and of floating cranes or loaders if ship is at anchor
- Opening and closing of hatches
- Period of precipitation
- Draft readings
- Any delays caused on board
- Any delays caused ashore
- Any surveyors attending or boarding with reason for attendance
- Any stevedore's damage to ship's structure and/or fittings
- Cargo temperature in particular for grain, seed cake and coal

(Bulk Cargoes: A Guide to Good Practice, 2016)

8.35 **Are the dangers associated with oxygen depletion of grain cargo understood by officers and crew, and have reasonable precautions been taken during routine inspections of the cargo, when entering the holds and adjacent spaces? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Most grain cargoes may deplete the oxygen levels in cargo holds and possibly in adjacent spaces. All cargo holds and adjacent spaces must be treated as enclosed spaces and subject to controlled entry. (Carriage of Bulk Grain Cargoes, 2015)

Section 8C: Cargo operation - general cargo

Note: This section should only be completed if the vessel is a general cargo ship, a roll on roll off (Ro-Ro) ship, a timber carrier or a non-cellular ship fitted for the carriage of containers.

Poor planning, improper supervision of stowage and securing of cargo are the common causes of incidents on board multi-purpose ships. The safe stowage and securing of cargoes depend on proper planning, execution and supervision. All cargoes should be stowed and secured in such a way that the ship and persons on board are not put at risk.

Dangerous goods carried as cargo, which are listed or classified in the latest edition of the International Maritime Dangerous Goods (IMDG) Code as amended, are ascribed with the primary hazard characteristics of a class in the IMDG Code or as solid substances in Appendix B of the Code of Safe Practice for Solid Bulk Cargoes (BC) Code (also published in the Supplement to the IMDG Code), which would also be subject to the provisions of the IMDG Code when such goods are carried in packaged form.

Ships of the following descriptions:
1. All other ships of 500 tons or over constructed on or after 1 September 1984; and
2. All other ships of under 500 tons constructed on or after 1 February 1992.

which are intended for, or which have cargo spaces which are intended for, the carriage of dangerous goods on international voyages must carry a document of compliance. The document of compliance will certify that the ship complies with regulation 54 of Chapter II-2 of the International Convention for the Safety of Life at Sea 1974 and be limited to 5 years from the date of issue, in accordance with IMO MSC/Circ.1027.

In the case of ships carrying a document of compliance without an expiry date, vessels' managers are advised to seek renewal no later than the expiry date of the Cargo Ship Safety Construction Certificate, where carried. In other cases, owners are advised to seek a replacement certificate at a convenient survey, e.g. renewal of the passenger ship safety certificate or within five years. (MGN.36 (M), Document of Compliance for Ships Carrying Dangerous Goods in Packaged or Dry Bulk Form, 1997)

This section must not be used for cellular container ships.

8.1 **Are policy statements and relevant publications for the safe stowage, securing and handling of the cargo unit and timber available on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A list of on-board publication shall be incorporated in SMS. A nonconformity should be filed by inspector against ships not carrying publications in accordance with National requirements and the SMS. The ISM Code requires every ship's manager to have an SMS which covers instructions and procedures to ensure safe operation of ships and protection of the environment. This should include precautions that should be taken before accepting cargoes for shipment and the procedures that should be followed for safe loading and carriage, and details of the primary hazards associated with the different types of general cargo. The IMO codes of practice and conventions set out requirements which must be followed and complied with for safe handling and carriage of bulk cargo. The IMO codes of practice and conventions set out requirements which must be followed and complied with for safe handling and carriage of cargo units.

MSC-MEPC.2/Circ.2 of 1 June 2006, "IMO requirements on carriage of publications on board ships" provides the publications which are specifically required to be carried on board ships by IMO instruments.

IMO instruments such as the SOLAS, MARPOL, LL, COLREG and STCW Conventions deal with many operational aspects, inter alia, navigational responsibilities, safety-related training/drills on board, safe cargo handling, oil spill prevention, collision avoidance activities and watchkeeping standards.

Therefore, these publications, although not expressly required by IMO instruments, may need to be carried on board in order to improve the crew's knowledge and to enhance the implementation of IMO instruments. No non-conformity should be filed by the inspector against ships not carrying such publications on board unless otherwise required by the ships Safety Management System manual.

(IMO REQUIREMENTS ON CARRIAGE OF PUBLICATIONS ON BOARD SHIPS, 2006)

8.2 **Has appropriate cargo information been provided to the vessel prior to loading? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading, to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect. Such information shall be confirmed in writing and by appropriate shipping documents prior to loading the cargo on the ship.

In the case of general cargo, and of cargo carried in cargo units, a general description of the cargo, the gross mass of the cargo or of the cargo units, and any relevant special properties of the cargo units. For the purpose of this regulation, the cargo information required in sub-chapter 1.9 of the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organisation by resolution A.714 (17), as may be amended, shall be provided.

Prior to loading cargo units on board ships, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass declared on the shipping documents. (SOLAS 2014)

Prior to shipment the shipper should provide all necessary information about the cargo to enable the shipowner or ship operator to ensure that:

- The different commodities to be carried are compatible with each other or suitably separated
- The cargo is suitable for the ship
- The ship is suitable for the cargo, and
- The cargo can be safely stowed and secured on board the ship and transported under all expected conditions during the intended voyage.

The master should be provided with adequate information regarding the cargo to be carried so that its stowage may be properly planned for handling and transport.

(CSS code, 2011)

If the vessel is loading heavy lift cargo, the shipper should provide the following information to the master:

- A general description of the cargo
- The gross mass of the item or of each item if there are more than one
- The principle dimensions of the item or items and, if possible, scale drawings
- The location of the centre of gravity of each item
- Particulars of the bedding area of the cargo units and details of any precautions with regard to the bedding of the item(s)
- Details of lifting points or slinging positions and, if possible, information on how best to lift each item
- Details of securing points, including their strength and radius of strength.

(Bliault and North of England P & I Association, 2007)

- The following information as applicable for each parcel of timber cargo should be provided by the shipper and collected by the master or his representative:
- Total amount of cargo intended as deck cargo
- Typical dimensions of the cargo
- Number of bundles
- Density of the cargo
- Stowage factor of the cargo
- Racking strength for packaged cargo
- Type of cover of packages and whether non-slip type, and
- Relevant coefficients of friction, including covers of sawn wooden packages if applicable.

(Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2012)

8.3 **If dangerous goods are carried in packaged form, have appropriate documents been provided to the vessels? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The dangerous goods transport document shall include a certification or declaration that the consignment is acceptable for transport and that the goods are properly packaged, marked, and labelled, and in proper condition for transport in accordance with the applicable regulations.

(IMDG Code, 2020)

When dangerous goods are packed or loaded into any container or vehicle, those responsible for packing the container or vehicle shall provide a "container/vehicle packing certificate" specifying the container/vehicle identification number(s) and certifying that the operation has been carried out in accordance with the following conditions:

- The container/vehicle was clean, dry and apparently fit to receive the goods.
- Packages which need to be segregated in accordance with applicable segregation requirements have not been packed together onto or in the container/vehicle (unless approved by the competent authority concerned, in accordance with 7.3.4.1);
- All packages have been externally inspected for damage, and only sound packages have been loaded.
- Drums have been stowed in an upright position, unless otherwise authorised by the competent authority, and all goods have been properly loaded and, where necessary, adequately braced with securing material to suit the mode(s) of transport for the intended journey.
- Goods loaded in bulk have been evenly distributed within the container/vehicle.
- For consignments including goods of class 1 other than division 1.4, the container/vehicle is structurally serviceable in accordance with 7.1.2.
- The container/vehicle and packages are properly marked, labelled, and placarded, as appropriate; .8 When substances presenting a risk of asphyxiation are used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951)), the container/vehicle is externally marked in accordance with 5.5.3.6; and
- A dangerous goods transport document, as indicated in 5.4.1, has been received for each dangerous goods consignment loaded in the container/vehicle. Note: The container/vehicle packing certificate is not required for portable tanks.

(IMDG Code, 2020)

Each ship carrying dangerous goods in packaged form shall have a special list or manifest setting forth, in accordance with the classification set out in the IMDG Code, the dangerous goods on board and the location.

thereof. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organisation designated by the port state authority.

(SOLAS74, 2014)

8.4 **Are procedures for safe lashing and securing operations incorporated in the ship's SMS? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Procedures for safe lashing and securing operations should be included in the ship's Safety Management System as part of the ISM Code documentation.

(CSS code, 2011)

8.5 **Is an approved ship-specific Cargo Securing Manual available and are officers thoroughly familiar with the contents of the manual? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

In accordance with the SOLAS chapters VI, VII and the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), cargo units, including containers shall be stowed and secured throughout the voyage in accordance with a Cargo Securing Manual (CSM), approved by the Administration.

The CSM should be developed, taking into account the recommendations given in these Guidelines, and should be written in the working language or languages of the ship. If the language or languages used is not English, French or Spanish, a translation into one of these languages should be included.

- The guidance given in the CSM should by no means rule out the principles of good seamanship, neither can it replace experience in stowage and securing practice.
- The information and requirements set forth in the manual are consistent with the requirements of the vessel's trim and stability booklet, International Load Line Certificate (1966), the hull strength loading manual (if provided) and with the requirements of the International Maritime Dangerous Goods (IMDG) Code (if applicable).
- The CSM specifies arrangements and cargo-securing devices provided on board the ship for the correct application to and the securing of cargo units, containers, vehicles and other entities, based on transverse, longitudinal and vertical forces which may arise during adverse weather and sea conditions.

- It is imperative to the safety of the ship and the protection of the cargo and personnel that the securing of the cargo is carried out properly and that only appropriate securing points or fittings should be used for securing cargo.
- The cargo-securing devices mentioned in this manual should be applied so as to be suitable and adapted to the quantity, type of packaging, and physical properties of the cargo to be carried. When new or alternative types of cargo-securing devices are introduced, the manual should be revised accordingly. Alternative cargo- securing devices introduced should not have less strength than the devices being replaced.
- There should be a sufficient quantity of reserve cargo-securing devices on board the ship.
- Information on the strength and instructions for the use and maintenance of each specific type of cargo-securing device, where applicable, is provided in this manual. The cargo- securing devices should be maintained in a satisfactory condition. Items worn or damaged to such an extent that their quality is impaired should be replaced.
- The Cargo Safe Access Plan (CSAP) is intended to provide detailed information for persons engaged in work connected with cargo stowage and securing. Safe access should be provided and maintained in accordance with this plan.

(MSC.1/Circ.1353/Rev.1, Revised Guidelines for the Preparation of the Cargo Securing Manual, 2014)

Note: The Cargo Safe Access Plan (CSAP) is only required for containerships with keel-laying date on or after 1 January 2015. The Cargo Securing Manual should be updated as appropriate. Whenever the ship's outfit of portable cargo securing devices changes, those changes should be recorded in the appropriate section of the CSM. An appropriate record should be completed whenever routine visual examinations or periodic detailed examinations and re-testing of the devices are carried out.

(Bliault and North of England, P & I Association, 2007)

Lashing plans contained within the approved Cargo Securing Manual should be compatible with the current design of the ship and the intended container securing method is both safe and physically possible. The CSM, lashing plans and the CSAP are kept up to date.

Lashing plans and the CSAP are compatible with the design of the vessel and the equipment available.

(CSS code, 2011)

8.6 **Are records maintained of the regular inspection and maintenance of the cargo-securing devices on board the ship? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection

Equipment considered to be in poor condition is to be marked and not used. All relevant actions for replacement of such equipment are to be taken. The equipment in use should be in good condition and inspected as appropriate, in accordance with Class and/or maker's guidance.

It is important that each device used for securing cargo should be marked clearly with its SWL and a batch mark or number, where that mark can be verified by a test certificate. RightShip recommends that these test certificates be clearly labelled and kept in an easily accessible file. A method of correct identification and matching of individual certificates with the cargo-securing devices should be established on board. Cargo-securing devices without certificates must not be used on board.

The inspection and maintenance schemes of the cargo-securing devices on board the ship shall be carried out as specified in the Cargo Securing Manual.

Regular inspections and maintenance should be carried out under the responsibility of the master.

Inspection of cargo-securing devices should include as a minimum:
- routine visual examinations of components being utilised; and
- periodic examinations/re-testing as required by the Administration. When required, the cargo securing devices concerned should be subjected to inspections by the Administration.

The inspection and maintenance the ship's cargo-securing devices should be documented. Entries should be made in a record book, which should be kept with the Cargo Securing Manual. This record book should contain the following information:
- procedures for accepting, maintaining and repairing or rejecting cargo-securing devices; and
- record of inspections.

The record should contain information for the master regarding inspections and adjustment of securing arrangements during the voyage.

(MSC.1/Circ.1353/Rev.1, Revised Guidelines for the Preparation of the Cargo Securing Manual, 2014)

As with lashings, dunnage material that is part of the ship's outfit, and is not discarded at the end of a voyage, should be stored in a suitably clean and dry storage space, away from any chemicals or other items that might cause damage. At appropriate intervals, the dunnage materials should be visually examined to determine whether or not any damage has been sustained. Damaged pieces should be discarded. Whenever dunnage materials are brought into use, and when new dunnage is brought on board, the items should be thoroughly inspected for defects and for their suitability for the intended purpose.

Timber carriers
All equipment, lashings, hog wires, uprights, deck fittings etc should be in good condition when taken into use. Routine inspections of all loose equipment should be carried out. All moving parts should be lubricated as appropriate, in accordance with the requirements set out in the Cargo Securing Manual.

Uprights and their base-foundations, lashing points and all other fixed equipment should be routinely examined. Any defects, such as worn or damaged lashing points or wasted or deformed uprights, should be repaired to the satisfaction of classification society as appropriate. Appropriate inspection and maintenance record sheets should be completed and retain on board.
(Bliault and North of England, P & I Association, 2007)

The cell guides, loose lashing and securing equipment including twist locks should be in good condition and free of excessive wear and corrosion. The twist locks, lashing and securing equipment of the same type and number, as specified in the approved Cargo Securing Manual, should be available on board.

Twist locks can be rated for different tensile loads up to 20 or 25 tonnes. It is important not to use a mix of twist locks that have different strength ratings.
(A Master's Guide to: Container Securing, 2012)

8.7 **Are there procedures for the removal of damaged lashing devices from service? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.8 **Is there evidence to show that samples of the timber cargoes are being weighed during loading and what is the actual weight compared to the weight stated by the shipper? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

If deemed necessary, samples of the timber cargo should be weighed during loading and their actual weight should be compared to the weight stated by the shipper, in order to correctly assess the ship's stability.
(Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2012)

8.9 **If the vessel is a timber carrier, have up to date lashing plans for each stowage and securing arrangement been incorporated in the Cargo Securing Manual? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Lashing plan means a sketch or drawing showing the required number and strength of securing items for the timber deck cargo to obtain safe stowage and securing of timber deck cargoes.

In the Cargo Securing Manual, each stowage and securing arrangement should additionally be documented by a lashing plan showing at least the following:
> Maximum cargo weight for which the arrangement is designed.
> Maximum stowage height.
> Required number and strength of blocking devices and lashings as applicable.
> Required pretension in lashings.
> Other cargo properties of importance for the securing arrangement such as friction, rigidity of timber packages, etc.
> Illustrations of all securing items that might be used; and
> Any restrictions regarding maximum accelerations, weather criteria, e.g., for non-winter conditions only, restricted sea areas, etc.

(Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2012)

8.10 **If the vessel is a timber carrier, has a lashing plan according to the ship's Cargo Securing Manual been prepared? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A lashing plan according to the ship's Cargo Securing Manual should be prepared and the following calculated:
> Weight and height of stows per hatch.
> Number of sections in longitudinal direction per hatch.
> Required number of pieces of lashing equipment; and
> Required number of uprights, if applicable.

(Resolution A.1048 (27), Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2011)

8.11 **Is a Class-approved loading computer or programme in use and has its operational accuracy been regularly tested? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A stability instrument installed on board should cover all stability requirements applicable to the ship. The software is subject to approval by the Administration. An operation manual should be provided for the stability instrument. The language in which the stability calculation results are displayed and printed out as well as the operation manual is written should be the same as used in the ship's approved stability booklet. A translation into a language considered appropriate may be required. In case of modifications of the ship which cause alterations in the stability booklet, the specific approval of any original stability calculation software is no longer valid. The software should be modified accordingly and re-approved. Any change in software version related to the stability calculation should be reported to and be approved by the Administration. It is the responsibility of the ship's master to check the accuracy of the stability instrument at each annual survey by applying at least one approved test condition. If an Administration's representative is not present for the stability instrument check, a copy of the test condition results obtained by this check should be retained on board as documentation of satisfactory testing for the Administration's representative's verification. At each renewal survey this checking for all approved test loading conditions should be done in the presence of the Administration's representative. (Resolution MSC.267 (85), Adoption of the International Code on Intact Stability, 2008)

8.12 **Are officers aware of the strength limits of tank tops, tween decks, hatch covers and weather decks with regards to safe cargo stowage and is this information posted in the ship's office/ ballast control room? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The maximum permissible loadings, given in tonnes per square metre (t/m²) for each deck and the tank-top, and the hatch covers should be posted in the Ship's office. The maximum permissible load figures can be found in the capacity plan, the midship section plan and on-deck plans. This information is also quoted in the ship's trim and stability booklet and in the Cargo Securing Manual. If the maximum permissible loading is exceeded by cargo units, the deck, 'tween deck or tank-top plating, and the under-deck stiffening members will sustain damage. (Bliault and North of England P & I Association, 2007) (UK P&I CLUB, Carefully to Carry Consolidated Edition 2018, 2018) Strength of the inner bottom plating could be deteriorated due to corrosion wastage. The operational parameters and tank top strength(T/m2) of the effected vessels may be updated by the classification society.

8.13 **Have pre-stowage and stowage plans been prepared and completed effectively? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Consideration must be given to the ship's stability in advance of loading when planning a voyage. The stability condition should include the departure as well as arrival condition at discharge ports. The inspector should check that effort has been made to identify the point in the voyage when stability was lowest. The stability analysis should not just amount to a determination of the vessel's GM but must also consider the curve of righting levers (GZ). Both are to be checked for compliance with the criteria. **The ship's condition should be updated regularly by careful consideration of the weight and centres of all deadweight on board. Tanks' soundings should be checked regularly. The contents of tanks should be determined from soundings and the calculated stability condition is only valid if the tank status remains unchanged.** The pre-stowage plan should be prepared prior to vessel's arrival to load port. The pre-stowage plan shall contain the vessel's name, voyage number, date, name of loading ports, name of discharging ports, dimension of holds, capacity of cranes, total cargo on board, total cargo for each port and the signatures of chief officer and master. The following should be considered when preparing a pre stowage plan: > The complete cargo specifications, including description, weight and overall dimensions, special handling instructions, hazardous classifications, and deck option. > Weight of cargo in relation to permissible load of each decks including tank top; each of the decks has weight limitations. > proper weight distribution and load spreading measures to prevent the decks from being overloaded. > Securing arrangements for the particular cargo. > The intended load and discharge port rotation to avoid shifting of cargo and prevent possible damage as a result of shifting cargo. > Details of all heavy lifts and out of gauge units, including lifting instructions and the centre of gravity. > SWL of ship's cranes and availability of shore crane at the load port/discharge port if needed. > Weight distribution, trim, stability and stress levels throughout the voyage and measures preventing from becoming excessively stiff or tender. > Cargo compatibility - incompatible cargoes are not stowed next to one another.

The objectives of pre-stowage plan are to minimise broken stowage and to prevent overload of tank top/tween decks and hatch covers.

The final stowage plan should include details of the final cargo distribution, the total weight and cube in each compartment and the total weight and cube for each discharge port. The plan will show the location of all heavy lifts and hazardous cargo.

- Before loading a timber deck cargo: A pre-loading plan according to the ship's Trim and Stability Book should be done and the following should be calculated and checked:
- Stowage height.
- Weight per m².
- Required amount of water ballast; and
- Displacement, draught, trim and stability at departure and arrival.

When undertaking stability calculations, variation in displacement, centre of gravity and free surface moments due to the following factors should be considered:

- Absorption of water in timber carried as timber deck cargo according to special instruction, see annex C.
- Ice accretion, if applicable.
- Variations in consumables; and
- Ballast water exchange operations, in accordance with approved procedures.

(Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2012)

8.14 **Is there evidence to show that evaluation of forces acting on the cargo unit have been calculated, and correct cargo-securing devices are being used to secure the cargo to the ship? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Evaluation of forces acting on cargo units shall be incorporated in the Cargo Securing Manual and contain the following information:

- Tables or diagrams giving a broad outline of the accelerations which can be expected in various positions on board the ship in adverse sea conditions and with a range of applicable metacentric height (GM) values.
- Examples of the forces acting on typical cargo units when subjected to the accelerations referred to in paragraph 3.2.1 of MSC/Circ.745 and angles of roll and metacentric height (GM) values above which the forces acting on the cargo units exceed the permissible limit for the specified securing arrangements as far as practicable.
- Examples of how to calculate number and strength of portable securing devices required to counteract the forces referred to in 3.2.2 of MSC/Circ.745 as well as safety factors to be used for different types of portable cargo securing devices. Calculations may be carried out according to Annex 13 to the CSS Code or methods accepted by the Administration.
- It is recommended that the designer of a Cargo Securing Manual converts the calculation method used into a form suiting the particular ship, its securing devices and the cargo carried. This form may consist of applicable diagrams, tables, or calculated examples; and
- Other operational arrangements such as electronic data processing (EDP) or use of a loading computer may be accepted as alternatives to the requirements of the above paragraphs 3.2.1 to 3.2.4 of MSC/Circ.745, providing that this system contains the same information.

It is important that securing devices meet acceptable functional and strength criteria applicable to the ship and its cargo. It is also important that the officers on board are aware of the magnitude and direction of the forces involved and the correct application and limitations of the cargo-securing devices. The crew and other persons employed for the securing of cargoes should be instructed in the correct application and use of the cargo securing devices on board the ship. "Maximum Securing Load (MSL)" is a term used to define the allowable load capacity for a device used to secure cargo.

To a ship. "Safe Working Load (SWL)" may be substituted for MSL for securing purposes, provided this is equal to or exceeds the strength defined by MSL.

(MSC.1/Circ.1353/Rev.1, Revised Guidelines for the Preparation of the Cargo Securing manual, 2014)

8.15 **Have personnel engaged in cargo securing operations been provided with relevant training and familiarisation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

RightShip recommends that personnel engaged in cargo securing operations attend a formal training program.

Personnel engaged in cargo-securing operations should be trained in the lashing and unlashing of containers as necessary to carry out their duties in a safe manner. This should include the different types of lashing equipment that are expected to be used.

Personnel engaged in cargo-securing operations should be trained in the identification and handling of bad order or defective securing gear in accordance with each ship's procedures, to ensure damaged gear is segregated for repair and maintenance or disposal.

Personnel engaged in cargo-securing operations should be trained to develop the knowledge and mental and physical manual handling skills that they require to do their job safely and efficiently, and to develop general safety awareness to recognise and avoid potential dangers.

Personnel should be trained in safe systems of work. Where personnel are involved in working at heights, they should be trained in the use of relevant equipment. Where practical, the use of fall protection equipment should take precedence over fall arrest systems.

Personnel who are required to handle thermal cables and/or connect and disconnect temperature control units should be given training in recognising defective cables, receptacles and plugs.

Personnel engaged in containership cargo operations should be familiarise with the ship's unique characteristics and potential hazards arising from such operations necessary to carry out their duties.

(CSS code, 2011)

8.16 **If the vessel is carrying timber deck cargo, are relevant regulations of the applicable Load-Line Convention for stowage and securing of timber as prescribed in the ship's Cargo Securing Manual being followed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A complete stowage of tightly stowed timber will increase the ship's reserve of buoyancy. A ship with such a stowage of timber may be safely loaded to a deeper draught than would normally be allowed. If the ship does not have a timber load-line, then it cannot load deeper than the appropriate load-line or the load port and the voyage.

The timber deck cargo must be compactly stowed, lashed and secured. The timber deck cargo must not affect the safe navigation, day to day operation on board the ship and stability of the ship at any stage of the voyage. Due regard must be given to additions of weight, such as those due to absorption of water; and to losses of weight, such as those due to consumption of fuel and stores.

The height of the timber deck cargo above the weather deck on a ship within a seasonal winter zone in winter should not exceed one third of the extreme breadth of the ship. Otherwise, the height of the timber deck cargo should be restricted so that:

- Adequate visibility is assured.
- A safe margin of stability is maintained at all stages of the voyage.
- Any forward-facing profile does not present overhanging shoulders to a head sea, and
- The weight of the timber deck cargo does not exceed the designed maximum permissible load on the weather deck and hatches.

During the course of the voyage, if there is no convenient passage for the crew on or below the deck of the ship giving safe means of access from the accommodation to all parts used in the necessary working of the ship, guard lines or rails, not more than 330 mm apart vertically, should be provided on each side of the deck cargo to a height of at least 1 m above the cargo. In addition, a lifeline, preferably wire rope, set up taut with a tightening device should be provided as near as practicable to the centreline of the ship. The stanchion supports to all guardrails or lifelines should be spaced so as to prevent undue sagging. Where the cargo is uneven, a safe walking surface of not less than 600 mm in width should be fitted over the cargo and effectively secured beneath, or adjacent to, the lifeline.

(Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2012)

8.17 **If the vessel is carrying timber, are instructions for ballast water exchange operations for the intended voyage available in the Ballast Water Management Plan? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

All ballast tanks required for the voyage and included in the stability calculations should be filled before the commencement of loading on deck and it should be ensured that free surfaces are eliminated in all tanks intended to be completely full or empty. Proper instructions for ballast water exchange operations, if applicable for the intended voyage, should be available in the Ballast Water Management Plan.

(Code of Safe Practice for Ships Carrying Timber Deck Cargoes, 2012)

8.18 **Can timber deck cargo be jettisoned into the sea in a controlled manner in an emergency? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Crew going out on deck in the conditions that would possibly necessitate the need to jettison part or all of a cargo of timber put themselves in danger. Remotely operated jettisoning systems should be considered.

8.19 **If the vessel is a non-cellular ship, have the containers been stowed correctly on deck? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Containers carried on deck should be stowed one high only, preferably fore, and aft, prevented from sliding athwartships and securely lashed against tipping. At no time should deck-loaded containers overstress the hatch covers or the hatchway structure. In cases of doubt, details of stress limitations should be obtained from the Classification Society. (Merchant Shipping Notice No, M.1167 Carriage of Containers and Flats in Ships Not Designed or Modified for the Purpose, 1985) > Containers carried on deck or on hatches of such ships should preferably be stowed in the fore-and-aft direction. > Containers should not extend over the ship's sides. Adequate supports should be provided when containers overhang hatches or deck structures. > Containers should be stowed and secured so as to permit safe access for personnel in the necessary operation of the ship. > Containers should at no time overstress the deck or hatches on which they are stowed. > Bottom-tier containers, when not resting on stacking devices, should be stowed on timber of sufficient thickness, arranged in such a way as to transfer the stack load evenly on to the structure of the stowage area. > When stacking containers, use should be made of locking devices, cones, or similar stacking aids, as appropriate, between them. > When stowing containers on deck or hatches, the position and strength of the securing points should be taken into consideration. (CSS code, 2011)

8.20 **Is there a procedure for monitoring the temperature of refrigerated containers and are records maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Regular monitoring and recording of the temperatures of the reefer containers should be carried out and properly documented. In the event of a claim these can be compared against the reefer unit download data and shipper's mobile temperature devices. (Refrigerated Containers, 2013) The inspector shall record in comments if the reefer containers had been equipped with IoT Device. For additional information, reference should be made to the DCSA IoT data standard for remote Reefer container monitoring on board a vessel. Click here.

8.21 **If refrigerated containers are carried, are sufficient spare parts available on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
In the event of reefer container breakdowns, ships should have adequate spares onboard and the relevant skills to carry out emergency repairs to the reefer onboard. The ship should also give prompt notification of reefer problems or malfunctions that cannot be repaired on board. (Refrigerated Containers, 2013

8.22 **If refrigerated containers are carried, is the electric power supply permanently installed from the engine room and are the ship's electrical distribution system and electric container sockets in good condition and undamaged? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ship's electrical distribution system and container supply sockets should be in good working order and undamaged. (Refrigerated Containers, 2013)

8.23 **Are pre-loading/acceptance procedures for the carriage of vehicles on board a ro-ro cargo ship incorporated in the SMS? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A well-documented pre-loading/acceptance procedure should cover basic checks for the carriage of new and used vehicles. This may include, but not be limited to:

- Ignition switched off and the key removed to an agreed location. Consideration should be given to keeping the keys inside the vehicle in a visible place to avoid the potential of delays resulting from the loss of keys
- Disconnection of all battery cables; isolation of battery terminals
- Inspection of battery for visible signs of damage
- Prohibiting the carriage of spare/excess fuels or flammable liquids
- Checking the integrity of seals and pipelines in order to ensure there are no visible leaks - are there visible signs of leaking oils or fuels? Is the engine bay lagging oil-soaked? Is the engine bay relatively clean?
- Checking interior to ensure that flammable material such as oily rags spare fuel, undeclared chemicals etc. aren't stored inside a vehicle.

(Ro-Ro Fires, 2017)

8.24 **Is the ro-ro cargo ship equipped with CCTV remote monitoring to monitor the vehicle decks? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

It is vitally important that alarms are treated seriously, and the appropriate action taken to establish the current condition of the space where the alarms have been activated. This may involve the use of CCTV equipment or sending someone to go to the area to investigate further. Whilst the use of a lookout offers a valuable first-hand onsite appraisal, it has a number of limitations that should be understood, amongst which are:

- The time taken to get onsite, especially on large vessels, may add considerable time to a first response for fighting any potential fire
- You may be placing the lookout in a potentially dangerous situation where they may be overcome by smoke or heat
- It is essential that if using a lookout then they are briefed about the situation and equipped with functioning two-way communications with the OOW.

(Ro-Ro Fires, 2017)

8.25 **Is the ro-ro cargo ship drainage system in good order, tested regularly and are effective measures in place to prevent blocking of drains? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Resolution MSC.256 (84) introduced changes to SOLAS Chapter II-2, Regulation 20 concerning the drainage of fire-fighting water from fixed pressure water-spraying systems within vehicle, special category and ro-ro spaces. For cargo and passenger ships constructed on or after January 1, 2010, which have vehicle, ro-ro or special category spaces fitted with a fixed pressure water-spraying system, there are requirements for the drainage of the spaces.

For closed vehicle and ro-ro spaces and special category spaces, where fixed water-spraying systems are fitted, effective measures should be in place to ensure floating debris does not block drains in spaces.

- An easily removable grating, screen or other means should be installed over each drain opening in the protected spaces to prevent debris from blocking the drain. The total open area ratio of the grating to the attached drainpipe should be at least 6 to 1. The grating should be raised above the deck or installed at an angle to prevent large objects from blocking the drain. No dimension of the individual openings in the grating should be more than 25 mm.
- No grating or screen is required when a fixed mechanical system is provided to unblock the drainage system, or when other than a gravity drain system is provided with its own filter.
- A clearly visible sign or marking should be provided not less than 1,500 mm above each drain opening stating, "Drain opening – do not cover or obstruct". The marking should be in letters at least 50 mm in height.

In-service examination requirements:

- Drainage systems should be visually examined periodically for blockage or other damage. If obstructions are noted, then they should be flushed with hoses to confirm that the system is functional.

(MSC.1/Circ.1320, Guidelines for the drainage of firefighting water from closed vehicle and ro-ro spaces and special category spaces of passenger and cargo ships, 2009)

8.26 **Is the ro-ro cargo ship provided with an approved Operating and Maintenance Manual (OMM)? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The requirement for an Operating and Maintenance Manual (OMM) is applied to shell doors such as bow doors with the associated inner doors, side shell doors and stern doors with respect to the IACS Unified Requirements S8, S9, S15 and S16 as well as SOLAS 74 as amended. In addition to common operating instructions, the OMM shall provide full information to the ship's staff for maintaining and monitoring the sound condition of all elements of the shell door systems, relevant for the safety of the vessel. Detailed information on the procedures of maintenance and function tests are to be incorporated in the OMM. The OMM is applicable to: > Ro-Ro passenger ships > Ro-Ro cargo ships with bow door, and keel laid on or after 01 July 1996, if the bow door/inner door gives access to an enclosed superstructure > Ro-Ro cargo ships with side or stern door, and keel laid on or after 01 July 1997, if the side or stern door gives access to enclosed spaces. The OMM is subject to Class approval. The OMM must be prepared in a language understood by the users. If this language is not English, a translation into English is to be included. Operational instructions for the master: Special safety precautions shall emphasize the importance of closed openings for granting seaworthiness of the vessel. It shall be pointed out that special care must be taken when opening of shell doors at sea becomes necessary e. g. for embarkation of pilots or in case of emergency. The operating panels for the operation of doors are to be inaccessible to unauthorised persons. (SOLAS 74, 2014) (IMO A. 793(19) Strength and securing and locking arrangements of shell doors on ro-ro passenger ships, 1995)

8.27 **Are procedures in place to carry out function and tightness testing of bow, inner, side shell, stern doors and main to lower deck cargo elevators of ro-ro cargo ships and is there evidence of regular testing? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
In comments, record the date and frequency of function and tightness testing of the doors, and function testing of the indicator system and tightness test. Also, record the opening and closing time of the doors. It is recommended that recorded inspections of the door supporting and securing devices be carried out by the ship's staff at monthly intervals or following incidents that could result in damage, including heavy weather or contact in the region of side shell and stern doors. Any damage recorded during such inspections is to be reported to the Classification Society. Maintenance, function, and tightness tests of the doors shall be incorporated in the PMS system as per manufacturer's recommendation. The following shall be incorporated in the function test procedures. Function test of the doors: > Proper working of the hinging arms and hinges > Proper engagement of the thrust bearings > Device for locking the door in the open position > Securing, supporting and locking devices > Proper sequence of the interlock system for the opening/closing system and the securing and locking devices > Mechanical lock of the securing devices > Proper locking of hydraulic securing devices in the event of a loss of the hydraulic fluid, according to the procedure provided by the OMM > Correct indication of open/closed position of doors and securing/locking devices at the navigation bridge and other control stations > Isolation of the hydraulic securing/locking devices from other hydraulic systems > Confirmation that the operating panels are inaccessible to unauthorised persons > Verification that a notice plate giving instructions to the effect that all securing devices are to be closed and locked before leaving harbour is placed at each operating panel and supplemented by warning indicator lights > Examination of electrical equipment for opening, closing and securing the doors.

Function test of the indicator system – indicator systems where fitted should be incorporated in the procedure and tested regularly:

- Proper visible indication and audible alarm on the navigation bridge panel, according to the selected function "harbour/sea voyage" and on the operating panel
- Lamp test function on both panels
- Verification that it is not possible to turn off the indicator light on both panels
- Verification of failsafe performance, according to the procedure provided by the OMM
- Confirmation that power supply for indicator system is supplied by the emergency source or other secure power supply and independent of the power supply for operating the doors
- Proper condition of sensors and protection from water, ice formation and mechanical damage.

Where fitted, the water leakage detection system is to be tested, including proper audible alarm on the navigation bridge panel and on the engine control room panel, according to the procedure provided by the OMM.

Tightness test: A hose test or equivalent is to be carried out at regular interval.

8.28 **Is an operation manual for the ventilation system in a ro-ro cargo space provided and do records on board verify that the air quality is tested? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Maintenance of the ventilation system shall be incorporated in the PMS system as per manufacturer's recommendation.

An operation manual should be supplied and should include a plan of the ventilation system, showing fans, air supply and exhaust air openings and doors, ramps, hatches, etc.

The location of the control panel for the ro-ro cargo space ventilation system should also be marked. The plan should show the various options for operation of the ventilation system. It should include details of the air flow design and of the estimated number of different types of vehicles in the different ro-ro cargo spaces under various loading and unloading conditions.

The plan should be periodically revised and/or supplemented on the basis of the experience gained from the normal vehicle loading and unloading conditions. A number of blank drawings should therefore be kept on board. On the basis of such experience, it should also be possible to draw up guidelines for the maximum number of vehicles that should be allowed to operate simultaneously. Whenever possible, places which are sheltered from the air flow should be indicated on the plans.

The operation manual should include guidance for the service and maintenance of the systems.

Shipowners and operators should consider testing the air quality in conjunction with tests of the ventilation system to ensure proper maintenance and functioning of the ventilation system. Situations which indicate the necessity to conduct air-quality monitoring include worker complaints (e.g. headache, dizziness, stinging of the eyes or respiratory system), indications that the ventilation system itself has deteriorated, and changes in vessel operation which are substantially different from that for which the original ventilation system was verified.

(MSC.1/Circ.1515, Revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces, 2015)

8.29 **Is the ro-ro ship fitted with an automatic system to control air quality in the cargo holds and are records of inspection, testing, calibration, and maintenance of the system being maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Ro-ro ships to be fitted with an automated system to control air quality in ro-ro cargo holds by analysing the hold atmosphere and varying the ventilation rate accordingly. The air-quality control system should comply with the revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces contained in MSC.1/Circ.1515.

Inspection, maintenance, and repairs should be carried out in a professional manner. Owners should ensure that this is done and that the necessary skills, equipment and spares are available.

Annual testing of the vehicle space ventilation system should be conducted by the ship's safety delegate. Third-party testing of the vehicle space ventilation system should be undertaken before entry into service of a new ship and at periodical intervals of five years thereafter.

(MSC.1/Circ.1515, Revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces, 2015)

8.30 **Are vehicles on the ro-ro car decks safely stowed and secured? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
All vehicles should be secured to the ship as per the approved ship specific cargo-securing manual and the condition of lashings should be monitored regularly. Before being accepted for shipment, vehicles should be inspected externally by a competent and responsible person or persons to check that they are in satisfactory condition for shipment. Second-hand vehicles may be transported on top of or within other second-hand vehicles. These vehicles, carried as cargo, should be subject to the same rigorous checks as other vehicles being shipped. Labels, placards and marks that indicates the carriage of dangerous goods should be properly displayed. Details of hazardous units should be reflected on the stowage plan and the crew should be aware of the location of and be vigilant against the carriage of dangerous goods. All vehicles should be secured to prevent movement. Contact between vehicles during a voyage may damage and rupture the fuel tanks or damage the electrical systems. Vehicles should, so far as possible, be aligned in a fore and aft direction. They should not be parked on permanent walkways or in such a way as to obstruct fire-fighting equipment or scuppers. If water spray fire curtains are installed, then vehicles should not be parked across them. (Ro-Ro Fires, 2017)

8.31 **Has the vessel been provided with procedures and contingencies with regards to fumigation of cargo holds and are the master and chief officer familiar with the procedure? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The master should familiarise himself or herself with the recommendations set out in the procedures given in the SMS manual and with the guidance set out in section 3 of MSC.1/Circ.1264. In addition, some individual countries, for example the USA and Canada, have produced their own requirements which should be followed when fumigation is being carried out on board a ship within their territorial waters; the master should be familiar with these requirements if appropriate. (Bulk Cargoes: A Guide to Good Practice, 2016)

8.32 **Have the air conditioning intakes for the accommodation, the engine room and other spaces been set to prevent the possibility of drawing in fumigant gas? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Ventilation procedures for accommodation, the engine room and other spaces should be reviewed to avoid the possibility of drawing fumigant gas into those spaces by incorrect ventilation. Further, it should be verified that ventilation flaps and closing devices are correctly set before the fumigation is carried out and they should be maintained in the correct arrangement throughout the fumigation period. A review of the ventilation regime should be completed before any ventilation of the cargo compartment is started and any necessary changes to those arrangements should be made. (Bulk Cargoes: A Guide to Good Practice, 2016)

8.33 **Are necessary instruments (with spares) to determine the dew points provided, maintained in good condition and are there records of calibration of such instrument? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Dewpoint temperature may be measured by a variety of methods. Ships generally use a traditional wet and dry bulb arrangement consisting of two identical mercury thermometers, one of which has a damp muslin wick covering the bulb. These are normally housed in a protective marine screen on each bridge wing. The dewpoint temperature may then be determined by a "Dewpoint Table" to compare the wet and dry bulb temperatures. This figure is important when considering cargo ventilation requirements. When using traditional wet and dry bulb thermometers, the accuracy of the dew point temperature will depend on the condition of the equipment. The muslin covering the wet bulb should be clean, the water in the reservoir should be distilled and the bulb itself should be wet. In order to ensure that the readings are correct, the device should always be positioned away from any exhaust vents, other draughts and all sources of heat. The readings should always be taken on the windward side of the vessel. (Cargo Ventilation and Precautions to Minimise Sweat, 2012)

8.34 **Are master and/or chief officer familiar with the rules for deciding when to ventilate the cargo holds during the voyage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record a non-conformity when hygroscopic and non-hygroscopic products are stowed in one hold. Hygroscopic products have a natural moisture content and are mainly of plant origin. They may retain, absorb or release water vapour, and excessive amounts of inherent moisture may lead to significant self-heating and "moisture migration" within the cargo resulting in caking, mildew or rot. Examples of hygroscopic products include grain, rice, flour, sugar, cotton, tobacco, cocoa, coffee, and tea. (Cargo Ventilation and Precautions to Minimise Sweat, 2012) Non-hygroscopic products have no water content. However, certain commodities (e.g. steel) may be damaged if stowed in a moist environment, and others may be harmed if packaged using a hygroscopic material (e.g. wood, paper). By way of illustration, a vessel loaded a parcel of glass packed with layers of paper between each sheet. At the discharge port it was found that the paper had absorbed moisture from the air during the voyage, making it impossible for the glass sheets to be separated. The cargo was rejected by the receiver. (Cargo Ventilation and Precautions to Minimise Sweat, 2012) The cargo should be ventilated in accordance with carriage, voyage, or fumigation instructions and when weather and sea condition permit. The prevention of sweat is probably the most common reason for ventilating cargo compartments. Any such ventilation should be done in such a way as to ensure the air going into the holds from outside is drier than the air in the holds above the cargo; that is, the dew point of the outside air must be below that of the air in the hold. There are two simple rules for deciding if ventilation of a hold is appropriate: > Dew-point rule: Ventilate when the dew point temperature of the outside air is lower than the dew point temperature of the air in the hold. > Three-degree rule: Ventilate when the temperature of the outside air is at least 3°C below the temperature of the cargo, which was taken during loading. (Bulk Cargoes: A Guide to Good Practice, 2016)

8.35 **Is ventilation of cargo holds being carried out and recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The following should be recorded on each day for each hold: > All temperatures taken and dew points calculated. > Whether or not ventilation carried out. > Reason for not ventilating. > Weather and sea condition. > Ventilation rule applied (e.g., three –degree rule or dew point rule) (Bulk Cargoes: A Guide to Good Practice, 2016)

8.36 **Are the hold bilges cleaned prior to loading and are cleaning and checks being recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.37 **Do records on board verify that cargo lights in holds were properly isolated before cargo was loaded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Many bulk carrier/general cargo holds have fixed cargo lights. These can easily ignite combustible cargoes such as grain, animal feed, wood chips, pulp and paper if they are too close to the light. Cargo lights in holds need to be properly isolated before cargo is loaded. This is best done by removing fuses or other physical links in the electrical circuits so that the lights cannot be switched on by mistake. (Fire! A Guide to the causes and prevention of cargo fire, 2017)

8.38 **Is an adequate record of all cargo operation activities maintained during loading and unloading? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The following should be recorded in the port logbook or deck logbook: > Starting and stopping of work at each hold, times, and dates > Tonnages loaded per pour into each hold and a running total loaded and in the case of unloading, tonnages offloaded per shift from each hold and a running total offloaded > Weather conditions at intervals, for example 6 hours > Use of ship's cranes, if appropriate > Movement of shore cranes, loaders, or floating crane alongside > Movement of barges alongside and of floating cranes or loaders if ship is at anchor > Opening and closing of hatches > Period of precipitation > Draft readings > Any delays caused on board > Any delays caused ashore > Any surveyors attending or boarding with reason for attendance > Any stevedore's damage to ship's structure and/or fittings > Cargo temperature in particular for grain, seed cake and coal (Bulk Cargoes: A Guide to Good Practice, 2016)

Section 8D: Cargo Operation - Cellular Container Ships

Note: There have been incidents in recent years in which the stowage of containers did not comply with the approved arrangements. Such practices compromised the effectiveness of cargo stowage and securing arrangements and increased the risk of cargo being lost overboard while at sea. The impact of such events on safety and the environment was often significant.

The nature and practices of the container-ship trade i.e. pre-planning of the stowage positions of containers by terminal, tight operating schedules, the short turnaround time of ships, constantly changing information, containers arriving up to the last minute , all in all shall not release the master from the duty of care for the vessel's safety.

This chapter can only be completed if the vessel is a cellular container ship and must not be used for non-cellular ships that carry containers.

8.1 **Is the vessel provided with operator's policy statements and relevant publications for the safe stowage, securing and handling of the container? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A list of on-board publication shall be incorporated in SMS. A nonconformity should be filed by inspector against ships not carrying publications in accordance with National requirements and the SMS. Every Company should develop, implement, and maintain a Safety Management System (SMS) which includes instructions and procedures to ensure the safe operation of ships and protection of the environment in compliance with relevant international and Flag State legislation. There should be a manual which sets out all the various procedures and guidelines to be adopted for safe working practices for all tasks and operations carried out on board during an ordinary voyage. The IMO codes of practice and conventions set out requirements which must be followed and complied with for safe handling and carriage of cargo units. MSC-MEPC.2/Circ.2 of 1 June 2006, "IMO requirements on carriage of publications on board ships" provides the publications which are specifically required to be carried on board ships by IMO instruments.

IMO instruments such as the SOLAS, MARPOL, LL, COLREG and STCW Conventions deal with many operational aspects, inter alia, navigational responsibilities, safety-related training/drills on board, safe cargo handling, oil spill prevention, collision avoidance activities and watchkeeping standards.

Therefore, these publications, although not expressly required by IMO instruments, may need to be carried on board in order to improve the crew's knowledge and to enhance the implementation of IMO instruments. No non-conformity should be filed by the inspector against ships not carrying such publications on board unless otherwise required by the ships Safety Management System manual.

(IMO REQUIREMENTS ON CARRIAGE OF PUBLICATIONS ON BOARD SHIPS, 2006)

8.2 **Has appropriate cargo information been provided to the vessel prior to loading? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The shipper shall provide the master or the master's representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect. Such information shall be confirmed in writing and by appropriate shipping documents prior to loading the cargo on the ship.

In case of general cargo, and of cargo carried in cargo units, this information shall include a general description of the cargo, the gross mass of the cargo or of the cargo units, and any relevant special properties of the cargo units. For the purpose of this regulation, the cargo information required in sub-chapter 1.9 of the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organisation by resolution A.714 (17), as may be amended, shall be provided.

Prior to loading cargo units on board ships, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass declared on the shipping documents.

(SOLAS 2014)

8.3 **If dangerous goods are carried in a container, have appropriate documents been provided to the vessel, and is safety in relation to stowage of declared dangerous goods and higher risk cargoes being considered? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The dangerous goods transport document shall include a certification or declaration that the consignment is acceptable for transport and that the goods are properly packaged, marked, and labelled, and in proper condition for transport in accordance with the applicable regulations.

(IMDG Code, 2018)

Each ship carrying dangerous goods in packaged form shall have a special list or manifest setting forth, in accordance with the classification set out in the IMDG Code, the dangerous goods on board and the location thereof. A detailed stowage plan, which identifies by class and sets out the location of all dangerous goods on board, may be used in place of such a special list or manifest. A copy of one of these documents shall be made available before departure to the person or organisation designated by the port State authority. (

SOLAS74, 2014)

These safety considerations include the following measures in relation to stowage of declared dangerous goods and higher risk cargoes:

- Dangerous goods which cannot be extinguished by CO2 should be stowed on deck.
- Dangerous goods which cannot be extinguished by either water or CO2 should be stowed on deck.
- Dangerous goods prone to fire or explosion should be segregated from known ignition sources.
- Explosives should be stowed furthest from the accommodation and primary life-saving appliances.

The Cargo Incident Notification System (CINS) document" Safety Considerations for Ship Operators Related to Risk-Based Stowage of Dangerous Goods on Containerships" provides information related to safe stowage of dangerous good on container ships.

(Safety Considerations for Ship Operators Related to Risk-Based Stowage of Dangerous Goods on Containerships, 2019)

8.4 **Is there a procedure for checking the container's seals and is there documented evidence of compliance? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The master should be satisfied that the Company has in place a procedure for checking the container seals in compliance with the SSP. Any irregularities should be notified immediately to the stevedores or terminal operators responsible for the loading, as well as the vessel's agent and the Company. Seals should likewise be checked at discharge to evidence that they have remained intact whilst on the vessel.

(Guidance to Masters, 2006)

8.5 **Is cargo on flat racks, where applicable properly secured? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
If flat racks are loaded, the master should ensure that the cargo on these units is properly lashed, secured, and protected against external elements. This includes locating a suitable stowage position to avoid damage by the impact of waves. If the master is in any doubt as to whether the cargo on the flat racks is sufficiently lashed, the master should call the Company to arrange for a surveyor to attend and check the securing of the cargo on the flat racks. Tarpaulins, if in use, should be tight and not torn and need to be checked and adjusted at regular intervals during the voyage. These checks should be recorded. (Guidance to Masters, 2006)

8.6 **Is the verified gross mass communicated in shipping documents sufficiently in advance to the master? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The master or master's representative and the terminal representative should enter into arrangements to ensure the prompt sharing of verified container gross mass information provided by shippers. Existing communication systems may be used for the transmission and sharing of such verified container gross mass information. A container packed with packages and cargo items should not be loaded onto a ship to which the SOLAS regulations apply unless the master or master's representative and the terminal representative have obtained, in advance of vessel loading, the verified actual gross mass of the container. (GUIDELINES REGARDING THE VERIFIED GROSS MASS OF A CONTAINER CARRYING CARGO, 2013)

8.7 **Have containers carried on deck or on hatches been stowed in the fore-and-aft direction? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record an N/C if any containers were loaded in an athwartships direction. Containers carried on deck or on hatches of such ships should preferably be stowed in the fore-and-aft direction. This stowage method is sensible regarding the interplay of stresses in rough seas and the loading capacity of containers. Stresses in rough seas are greater athwartships than fore and aft and the loading capacity of container side walls is designed to be higher than that of the end walls. However, on many ships the containers are stowed in athwartships bays or are transported athwartships for other reasons. This must be taken into consideration when packing containers and securing cargo.

8.8 **Are containers stowed in block stowage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record an N/C if containers were stowed in isolated stacks, especially in outboard locations. Generally, container stacks do not depend on each other for support. However, they do provide protection to each other from wind and waves, so stowage in isolated stacks, especially in outboard locations, should be avoided. Making block stowage may be difficult for coastal container ships when limited containers are available for loading. The question shall be answered YES, where isolated stowage is loaded on board a coastal container ship, provided that the calculated lashing stress is within allowable range. The inspector shall record in comments if the isolated stowage is loaded on board a coastal container ship.

8.9 **Are procedures for safe lashing and securing operations of containers being incorporated in the ship's SMS? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Procedures for safe lashing and securing operations should be included in the ship's Safety Management System as part of the ISM Code documentation. (CSS Code, 2011)

8.10 **Is an approved ship's specific Cargo Securing Manual available, and are officers thoroughly familiar with the contents of the manual and is the lashing plan compatible with the design of the vessel? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a N/C if the vessel has deviated from the approved lashing arrangements shown in the Cargo Securing Manual, except to add additional lashings.

In accordance with the SOLAS chapters VI, VII and the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), cargo units, including containers shall be stowed and secured throughout the voyage in accordance with a Cargo Securing Manual (CSM), approved by the Administration.

The CSM should be developed, considering the recommendations given in these Guidelines and should be written in the working language or languages of the ship. If one of the working languages is not English, French, or Spanish, a translation into one of these languages should be included.

- The guidance given in the CSM should by no means rule out the principles of good seamanship, neither can it replace experience in stowage and securing practice.
- The information and requirements set forth in the manual should be consistent with the requirements of the vessel's trim and stability booklet, International Load Line Certificate (1966), the hull strength loading manual (if provided) and with the requirements of the International Maritime Dangerous Goods (IMDG) Code (if applicable).
- The CSM should specify arrangements and cargo-securing devices provided on board the ship for the correct application to and the securing of cargo units, containers, vehicles, and other entities, based on transverse, longitudinal and vertical forces which may arise during adverse weather and sea conditions.
- It is imperative to the safety of the ship and the protection of the cargo and personnel that the securing of the cargo is carried out properly and that only appropriate securing points or fittings should be used for securing cargo.
- The cargo-securing devices mentioned in the manual should be suitable and adapted to the quantity, type of packaging, and physical properties of the cargo to be carried. When new or alternative types of cargo-securing devices are introduced, the manual should be revised accordingly. Alternative cargo- securing devices introduced should not have less strength than the devices being replaced.
- There should be a sufficient quantity of reserve cargo-securing devices on board the ship.
- Information on the strength and instructions for the use and maintenance of each specific type of cargo-securing device, where applicable, should be provided in the manual. The cargo- securing devices should be maintained in a satisfactory condition. Items worn or damaged to such an extent that their quality is impaired should be replaced.
- The Cargo Safe Access Plan (CSAP) is intended to provide detailed information for persons engaged in work connected with cargo stowage and securing. Safe access should be provided and maintained in accordance with this plan.

(MSC.1/Circ.1353/Rev.1, Revised Guidelines for the Preparation of the Cargo Securing Manual, 2014)

Note: The Cargo Safe Access Plan (CSAP) is only required for containerships with keel-laying date on or after 1 January 2015.

- The Cargo Securing Manual should be updated as appropriate. Whenever the ship's outfit of portable cargo securing devices changes, those changes should be recorded in the appropriate section of the CSM. An appropriate record should be completed whenever routine visual examinations or periodic detailed examinations and re-testing of the devices are carried out.

(Bliault and North of England, P & I Association, 2007)

- Lashing plans contained within the approved Cargo Securing Manual should be compatible with the current design of the ship and the intended container securing method must be both safe and physically possible. The CSM, lashing plans and the CSAP must be kept up to date.
- Lashing plans and the CSAP are compatible with the design of the vessel and the equipment available.

(CSS code, 2011)

8.11 **Are records maintained of the regular inspection and maintenance of the cargo-securing devices on board the ship? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Equipment considered to be in poor condition is to be marked and not used. All relevant actions for replacement of such equipment are to be taken. The equipment in use should be in good condition, inspected as appropriate in accordance with Class and/or maker's guidance.

It is important that each device used for securing cargo should be marked clearly with its SWL and a batch mark or number, where that mark can be verified by a test certificate. RightShip recommends that these test certificates be clearly labelled and kept in an easily accessible file. A method of correct identification and matching of individual certificates with the cargo-securing devices should be established on board. Cargo-securing devices without certificates must not be used on board.

Portable fittings should be certified by some form of type-approved system, usually coming from manufacturer (when approved), a Classification Society or other accepted testing body.

The inspection and maintenance schemes of the cargo-securing devices on board the ship shall be carried out as specified in the Cargo Securing Manual. Regular inspections and maintenance should be carried out under the responsibility of the master.

Inspection of cargo-securing devices should include as a minimum:
> Routine visual examinations of components being utilised; and
> Periodic examinations/re-testing as required by the Administration. When required, the cargo-securing devices concerned should be subjected to inspections by the Administration.

Inspection and maintenance of the ship's cargo-securing devices should be documented. Entries should be made in a record book, which should be kept with the Cargo Securing Manual. This record book should contain the following information:
> Procedures for accepting, maintaining, and repairing or rejecting cargo-securing devices; and
> Record of inspections.

The record should contain information for the master regarding inspections and adjustment of securing arrangements during the voyage.

(MSC.1/Circ.1353/Rev.1, Revised Guidelines for the Preparation of the Cargo Securing Manual, 2014)

The cell guides, loose lashing and securing equipment including twist locks should be in good condition and free of excessive wear and corrosion. Twist locks, lashing and securing equipment of the same type and number as specified in the approved Cargo Securing Manual should be available on board.

Twist locks can be rated for different tensile loads up to 20 or 25 tonnes. It is important not to use a mix of twist locks that have different strength ratings.

(A Master's Guide to: Container Securing, 2012)

8.12 **Is there a sufficient quantity of reserve cargo- securing devices on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

There should be a sufficient quantity of reserve cargo-securing devices on board to deal with unexpected circumstances as per the Cargo Securing Manual.

8.13 **Is the Cargo Safe Access Plan (CSAP) prepared and was it followed on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Applicable to ships with keel laid on or after 01 January 2015.

8.14 **Are appropriate securing points being used for cargo securing and is there recorded evidence of regular inspection and maintenance of them? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Deck securing points must provide effective leads in terms of the axes of the forces being resisted and be so arranged to avoid chafing. The securing points must not be overloaded by holding more lashings than they can safely take, and, if necessary additional points are to be welded. Securing points on deck to be marked as appropriate. Safe Working load to be measured as per Class instructions. Maintenance to be conducted as required. Regular inspection of fixed deck fittings is essential to establish whether progressive wear has undermined their integrity.

(Container carriage- A selection of articles previously published by Gard AS, 2014)

8.15 **Are there procedures for reporting and removal of damaged lashing devices from service and are there records to demonstrate that damaged lashing devices have been removed from service? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A container ship master must be prepared to use all available tools in the ISM system in order to report defective stowage to the vessel operators and designated person ashore. It is a fundamental requirement of ISM that defects of this type are reported.

(Container lashing and stowage, 2004)

8.16 **Is a Class-approved loading computer or programme in use and has its operational accuracy been regularly tested? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record an N/C if the class approved container stowage calculations for lashing, stack weight and visibility were not incorporated in the shipboard loading computer or program.

A stability instrument installed on board should cover all stability requirements applicable to the ship. The software is subject to approval by the Administration. An operation manual should be provided for the stability instrument. The language in which the stability calculation results are displayed and printed out as well as the operation manual is written should be the same as used in the ship's approved stability booklet. A translation into a language considered appropriate may be required. In case of modifications of the ship which cause alterations in the stability booklet, the specific approval of any original stability calculation software is no longer valid. The software should be modified accordingly and re-approved. Any change in software version related to the stability calculation should be reported to and be approved by the Administration.

It is the responsibility of the ship's master to check the accuracy of the stability instrument at each annual survey by applying at least one approved test condition. If an Administration's representative is not present for the stability instrument check, a copy of the test condition results obtained by this check should be retained on board as documentation of satisfactory testing for verification by the Administration's representative. At each renewal survey this checking for all approved test loading conditions should be done in the presence of the Administration's representative.

(Resolution MSC.267 (85), Adoption of the International Code on Intact Stability, 2008)

8.17 **Was the pre-loading plan forwarded to the ship prior to loading and is there evidence to show that the ship's loading plan was updated and reviewed by the chief officer prior to loading? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The pre-loading plan received from the terminal planner should be entered into the shipboard loading computer. The draft ballast plan should also be entered, and an initial evaluation of the ship's condition should be performed and consequential corrective action identified.

Stack weight limitations and lashing limitations should be identified. Any corrective actions or changes that need to be taken to ensure compliance should be discussed with the terminal planner and stowage co-ordinator as required.
Bridge visibility rules in accordance with SOLAS must be observed and checked.

(Safe Transport of Containers by Sea-Guidelines on Best Practices, 2008)

Ships' staff should not allow loading operations to commence until they have received a copy of the proposed stowage plan. It may be the case that a full stowage plan has not been completed, but a loading terminal should be able to give the plan for the bays about to be worked. A relatively quick inspection should show whether heavy containers have been planned over light ones; and whether the stack and tier weights are within the permissible limits.

A reason for this is that the system for container loading is entirely driven from ashore by the planner, who creates a stowage plan and has the ability to vary and modify it right up to the moment a particular unit is picked up by a crane. It is frequently the case that the final bay plan, received after work has been completed, bears only passing resemblance to the pre-load plan which was received just as work was commencing.

(UK P&I CLUB, Carefully to Carry Consolidated Edition, 2018)

In November 2014, the IMO Maritime Safety Committee adopted an amendment to SOLAS to require that shippers obtain the 'verified gross mass' (VGM) of packed containers and communicate it to the ocean carrier sufficiently in advance of the ship's stowage planning. Ocean carriers are obliged to use the VGM in the stowage plan and, together with the terminal operator, ensure that any container that does not have a VGM is not loaded on a ship. The revised regulation entered into effect on 1 July 2016.

8.18 **Is there recorded evidence to show that the pre-loading plan has been checked for 'heavy' container stacks? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Container stacks are containers which are stacked vertically and secured horizontally by stackers, lashing etc. Prior to loading cargo, stacking weights of containers must be checked against the allowable stack weights on board the vessel, both on deck and under deck. Neglecting this procedure may cause serious damage to the ship's structure, hull and eventually overall stability of the ship may be affected. Maximum allowable stack weights of tank tops, hatch covers, and decks shall not be exceeded at any time.

Ships' staff should always check the pre-loading plan for 'heavy' container stacks. These should be identified and, if possible, the container numbers in these stacks checked during loading. If a different container appears in the upper tier then it may be a heavy unit stowed by mistake and of sufficient weight to overload the stack and the lashing system.

(UK P&I CLUB, Carefully to Carry Consolidated Edition, 2018)

8.19 **Has the vessel avoided loading of heavy containers over light or at the top of a stack in a deck stow? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Heavy on light can only be accepted when specifically permitted in the Cargo Securing Manual. It is essential to avoid loading heavy containers over light, or at the top of a stack in a deck stow, unless specifically permitted in the Cargo Securing Manual. This is because the securing system would normally have been designed on the assumption that light containers are stowed on top. Stowage may allow for 'heavy-heavy-light'; however, loading 'heavy-medium-medium' may result in the same stack weight but would produce different strain on the securing system, especially if the GM is high. (A Master Guide to: Container Securing, 2012) Loading heavy containers top stow may cause stability problem and excessive lashing strains during ship's motions at sea.

8.20 **Is there recorded evidence to show that the lashing pattern from the Cargo Securing Manual has been provided to the terminal and is the information for the lashing pattern posted at the ship's access? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.21 **Had the Ballast Water Management Plan for the present port stay been executed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Based on pre-loading plan information, the ship shall execute a ballast water management plan for the coming port stay. This includes optimisation of ballast water distribution to allow for minimal discharges in port. (Safe Transport of Containers by Sea - Guidelines on Best Practices, 2008)

8.22 **Is there documented evidence of carrying out a spot check of actual loading against loading plan? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
During the loading operation, spot checking of the actual loading compared to the loading plan should be undertaken throughout the cargo area, with particular attention paid to OOG, DG and reefer containers. Discrepancies should be resolved with the terminal planner and stowage coordinator, paying due regard to the health and safety implications of any solution. (Safe Transport of Containers by Sea - Guidelines on Best Practices, 2008)

8.23 **Is there documented evidence of signing off completed lashing per bay and is all lashing gear used compatible with the lashing plan? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The lashing arrangement of each bay should be inspected and adjusted if necessary, by the crew following completion of work by the terminal personnel. (Safe Transport of Containers by Sea-Guidelines on Best Practices, 2008) All gear should be uniformly compatible with the lashing plan, i.e., all twist locks of the same type, semi-automatic twist locks used with suitable lashing bars.

8.24 **Is the bridge visibility condition for the next port confirmed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Bridge visibility rules accordance with SOLAS must be observed and checked. In order to confirm sufficient visibility conditions, a check of the arrival conditions for the next port should also be made. (Safe Transport of Containers by Sea - Guidelines on Best Practices, 2008)

8.25 **Is there evidence to show that evaluation of forces acting on the containers have been calculated and the correct cargo-securing devices are being used to secure the containers to the ship (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

An evaluation of forces acting on cargo units shall be incorporated in the Cargo Securing Manual and contain the following information:

- Tables or diagrams giving a broad outline of the accelerations which can be expected in various positions on board the ship in adverse sea conditions and with a range of applicable metacentric height (GM) values.
- Examples of the forces acting on typical cargo units when subjected to the accelerations referred to in paragraph 3.2.1 of MSC/Circ.745 and angles of roll and metacentric height (GM) values above which the forces acting on the cargo units exceed the permissible limit for the specified securing arrangements as far as practicable.
- Examples of how to calculate number and strength of portable securing devices required to counteract the forces referred to in 3.2.2 of MSC/Circ.745 as well as safety factors to be used for different types of portable cargo securing devices. Calculations may be carried out according to Annex 13 to the CSS Code or methods accepted by the Administration.
- It is recommended that the designer of a Cargo Securing Manual converts the calculation method used into a form suiting the particular ship, its securing devices and the cargo carried. This form may consist of applicable diagrams, tables, or calculated examples; and
- Other operational arrangements such as electronic data processing (EDP) or use of a loading computer may be accepted as alternatives to the requirements of paragraphs 3.2.1 to 3.2.4 of MSC/Circ.745, providing that this system contains the same information.

It is important that securing devices meet acceptable functional and strength criteria applicable to the ship and its cargo. It is also important that the officers on board are aware of the magnitude and direction of the forces involved and the correct application and limitations of the cargo-securing devices. The crew and other persons employed for the securing of cargoes should be instructed in the correct application and use of the cargo securing devices on board the ship. 'Maximum Securing Load (MSL)' is a term used to define the allowable load capacity for a device used to secure cargo to a ship. 'Safe Working Load (SWL)' may be substituted for MSL for securing purposes, provided this is equal to or exceeds the strength defined by MSL.

(MSC.1/Circ.1353/Rev.1, Revised Guidelines for the Preparation of the Cargo Securing Manual, 2014)

8.26 **Is there documented evidence that lashings were tightened after departure once the lashings and containers settled in? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

It is good practice to verify the tightening of the lashing after departure once the lashing and containers have settled in. This is especially the case before ocean crossings, after receipt of bad weather outlooks, and after bad weather has been encountered

(Safe Transport of Containers by Sea - Guidelines on Best Practices, 2008)

Lashings should be checked and tightened within 24 hours after leaving port and regularly thereafter. This is especially true before the onset of bad weather.

8.27 **Have personnel engaged in cargo securing operations been provided with relevant training and f amiliarisation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

RightShip recommends that personnel engaged in cargo securing operations attend a formal training course.

Personnel engaged in cargo-securing operations should be trained in the lashing and unlashing of containers as necessary to carry out their duties in a safe manner. This should include the different types of lashing equipment that are expected to be used.

- Personnel engaged in cargo-securing operations should be trained in the identification and handling of bad order or defective securing gear in accordance with each ship's procedures, to ensure damaged gear is segregated for repair and maintenance or disposal.
- Personnel engaged in cargo-securing operations should be trained to develop the knowledge and mental and physical manual handling skills that they require to do their job safely and efficiently, and to develop general safety awareness to recognise and avoid potential dangers.
- Personnel should be trained in safe systems of work. Where personnel are involved in working at heights, they should be trained in the use of relevant equipment. Where practical, the use of fall-protection equipment should take precedence over fall-arrest systems.
- Personnel who are required to handle thermal cables and/or connect and disconnect temperature control units should be given training in recognising defective cables, receptacles, and plugs.
- Personnel engaged in containership cargo operations should be familiar with the ship's unique characteristics and potential hazards arising from such operations necessary to carry out their duties.

(CSS code, 2011)

8.28 **Is the vessel equipped with sufficient portable radio equipment for use and has a direct radio communication capability been stablished between the terminal (planner, foreman, and watchman) and the ship duty's officer? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.29 **Has an IMDG spotting plan been prepared, updated, and made available for emergency preparedness? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The IMDG spotting plan should be updated for emergency preparedness. Segregation requirements should be confirmed in accordance with the IMDG Code. (Safe Transport of Containers by Sea - Guidelines on Best Practices, 2008)

8.30 **Is there a procedure for monitoring the temperature of refrigerated containers and are records maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Regular monitoring and recording of the temperatures of the reefer containers should be carried out and properly documented. In the event of a claim these can be compared against the reefer unit download data and shipper's mobile temperature devices. (Refrigerated Containers, 2013) The inspector shall record in comments if the reefer containers had been equipped with IoT Device. For additional information, reference should be made to the DCSA IoT data standard for remote Reefer container monitoring on board a vessel. Click here.

8.31 **If refrigerated containers are carried, are sufficient spare parts available on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ship's electrical distribution system and container supply sockets should be in good working order and undamaged. (Refrigerated Containers, 2013) The vessel's manager shall use a Power Pack Unit (PPU) if the loading quantity of refer cargo exceeds the ship's power capacity as indicated in the drawing and charter party. The PPU has an independent power supply and will not require the electric power supply permanently installed from the vessel's engine room. The generator set shall be maintained in good working condition and free of oil leaks.

8.33 **Are officers familiar with the exothermic chain reaction and the stowage and segregation requirements for calcium hypochlorite in containers? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
An exothermic reaction is a chemical reaction that releases energy through light or heat. An example of an exothermic reaction is a reaction between water and calcium chloride. The incorrect stowage of exothermic dangerous goods such as calcium hypochlorite caused many fires in recent years. Calcium hypochlorite or calcium hypochlorite mixtures shall be transported in compliance with the stowage and segregation requirements set out in the IMDG Code. IMDG Code Special Provision 314, under Part 3, Chapter 3.3, of the Code applies to calcium Hypochlorite. The International Group of P&I Clubs and the Cargo Incident Notification System (CINS) document 'Guidelines for the Carriage of Calcium Hypochlorite in Containers' provides information for the carriage of calcium hypochlorite in containers. (Guidelines for the Carriage of Calcium Hypochlorite in Containers, 2018)

8.34 **Is an adequate record of all cargo operation activities maintained during loading and unloading? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Section 8E: Cargo Operation - Self-Unloading Transhipment

Note: This section is only applicable to gravity-based self-unloading and/or hybrid self-unloading vessels discharging bulk cargo on shore or offshore.

This section shall be completed along with 'section 8:-cargo operation - solid bulk cargo other than grain' and/or section 8:-cargo operations grain ', as appropriate, for gravity-based self-unloading and/or hybrid self-unloading vessels.

For the purpose of uniformity in this section, the generic term" self-unloading system" has been used instead of 'gravity-based self-unloading' and/or 'hybrid self-unloading 'system.

8.1 **Is the vessel provided with operator's procedures for safe operation of the self- unloading system? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Every Company should develop, implement, and maintain a Safety Management System (SMS) which includes instructions and procedures to ensure safe operation of ships and protection of the environment in compliance with relevant international and Flag State legislation. The company should identify equipment and technical systems the sudden operational failure of which may result in hazardous situations. The SMS should provide for specific measures aimed at promoting the reliability of such equipment or systems. These measures should include the regular testing of standby arrangements and equipment or technical system that are not in continuous use. (ISM code 2018) Details of the following should be included in the SMS > Starting procedure > How to avoid overloading the self-unloading system > Stopover procedure –Prevent forging material that may in the cargo hold hopper gates and damage the belt > Selecting a variable speed and discharge rate > Electric and hydraulic controls > Hold discharge gate, conveyors, and elevator > Boom conveyor > Energy isolation permits and isolation/lock - Gate problems including: - Gate blockage - Gate off-track - Loss of gate power - Foreign object in way of a gate - Actuation of emergency stops

8.2 **Is the vessel provided with self-unloading isolation procedures? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The objectives of the ISM Code are to ensure safety at sea, prevention of human injury or loss of life, and avoidance of damage to the environment, in particular to the marine environment and to property. (ISM Code 2018) Rightship recommends that the isolation procedures should be about the need to isolate, de-energise, lockout and tag-out the system, with the aim of reducing the risk of death or injury during system inspections, repairs, maintenance, assessments, adjustments, or cleaning. The isolation procedures shall incorporate the followings: > The isolation procedure, check list and risk assessment documented and accessible to the relevant crew on board. > Providing information, instruction and training to crew involved with the system. > Appointing a person as a supervisor to make sure the crew strictly follows isolation procedures. Rightship recommends the vessel's manager provide ship-specific procedures, detailing steps for isolating cargo equipment prior to maintenance.

8.3 **Have personnel engaged in operation of the self-unloading system been provided with relevant training and familiarisation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Rightship recommends officers and engineers attend a combined on-board/shore-based training course consisting of theoretical and practical training. Theoretical training shall include the mechanical system, hydraulic system, electrical system, maintenance, spare parts, function, trouble-shooting and normal and emergency operation. Practical training shall include hands-on training sessions and trouble-shooting different components.

8.4 **Are the ship's crew aware of the safe operating requirements of tunnel conveyor watertight bulkhead doors and/or watertight doors in shuttle conveyor room, where applicable, and is a record of inspections and maintenance available on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Doors provided to ensure the watertight integrity of internal openings which are used while at sea are to be sliding watertight doors capable of being remotely closed from the bridge and are also to be operable locally from each side of the bulkhead. Indicators are to be provided at the control position showing whether the doors are open or closed, and an audible alarm is to be provided at the door closure. The power, control and indicators are to be operable in the event of mains power failure. Particular attention is to be paid to minimising the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism. It shall be possible to open and close the door by hand at the door itself from both sides. (SOLAS 2014) Access doors and access hatch covers normally closed at sea, intended to ensure the watertight integrity of internal openings, shall be provided with means of indication locally and on the bridge showing whether these doors or hatch covers are open or closed. A notice is to be affixed to each such door or hatch cover to the effect that it is not to be left open. (SOLAS 2017) Woodchip carrier are installed shuttle conveyor and shuttle conveyor room. The shuttle conveyor swings out from ship's side hull through opened watertight doors. There should be evidence of watertightness test of the watertight doors at regular intervals.

8.5 **Are the officers and ratings aware of the location of the emergency stop devices; are the emergency stop devices in good order and is there recorded evidence of regular testing? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The emergency stop devices at each operator-controlled stations should be tested regularly to ensure that they are functioning correctly, and the result of these tests should be recorded.

8.6 **Are light fittings in the tunnel conveyor Ex'd' rated and in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Ex 'd' ex-proof type of protection, which responds to the European standard EN 60079-1, is based on the concept of containment. In this mode of protection, the electrical equipment is enclosed in special boxes, designed to contain a possible internal explosion and to prevent its transmission to the outside atmosphere. The manufacturers or Administration's certificate approving the fittings for use in gas-hazardous areas will be invalidated if the correct bolts for securing the cover, or the correct light bulb size, are not used. Particular attention should be paid to the following: > Cracks in metal, cracked or broken glass or failure of cement around cemented glass in flameproof or explosion-proof enclosures > Covers of flameproof enclosures to ensure that they are tight, that no bolts are missing, and that no gaskets are present between mating metal surfaces > Each connection to ensure that it is properly connected > Possible slackness of joints in conduit runs and fittings

8.7 **Are lights and warning devices of the self-unloading system regularly tested and the result recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector shall witness the testing of lights and warning devices where possible. Tunnel rate lights, tunnel horn, deck horn, tunnel warning beacon, deck warning beacon and boom lighting and the end light (red flashing) of boom conveyor where applicable should be, tested regularly. The electrical equipment inside the tunnel shall be intrinsically safe/explosion proof.

8.8 **Is there a procedure for suppression of dust during cargo operations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record an N/C if the method of dust suppression in the conveyor tunnel is not effective. **Record the type of suppression system that is employed on-board the ship.** There is always an element of dust produced by the product during cargo operation. Procedures, personnel protection and effective methods to supress dust in the conveyor tunnel and on the boom conveyor shall be provided by the ship's manager. Example of methods used to suppress dust are: > Dry fog system > Water mist-spray system > Dust extraction system > Foam dust suppression system > Belt conveyors and boom conveyors were protected by cover– steel plates across the conveyors or portable ones for example tarpaulin made. Maintenance of dust suppression systems shall be incorporated in the PMS as per manufacturer recommendation.

8.9 **Is the belt cleaning system/scrapper in good order and maintained as per manufacturer recommendation and is there evidence to show that the belt cleaners have been inspected regularly for proper function? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The necessary maintenance and repairs as per manufacturer recommendation shall be incorporated in the PMS

8.10 **Are the belt speed- sensors, belt scales and slip detecting device, where applicable, in good order and maintained as per manufacturer recommendations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A belt scale is used to measure the flow rate of the cargo. The vessel's manager shall provide guidelines for selecting various belt speed and discharge rates and precautions to avoid overloading the self-unloading system.

8.11 **Are the cargo hold discharge gates and water-tight doors clearly marked to indicate the hold and spaces they serve? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Rightship recommends that the ship shall be provided with the hold discharging gates and water-tight doors identification numbers used in the loading or unloading plan. The location, size and colour of these numbers should be chosen so that they are clearly visible to the cargo-gate operators.

8.12 **Has the hydraulic oil of the self-unloading system been tested regularly for contamination and deterioration as per manufacturer recommendation? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Monitoring hydraulics with oil analysis is the only way to establish whether the hydraulic fluid is impacting the anticipated performance. Contamination is the main cause of failure, typically water contamination or dirt ingression.

8.13 **Are the tunnel-conveyor emergency stop, speed switch, and belt misalignment switch in good order and inspected regularly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.14 **Is the tunnel-conveyor hydraulic system arrangement in good condition and free from oil leakage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The pipelines, valves and shafts should be in good condition. If there is evidence of oil leakage this must be recorded as an N/C.

8.15 **Are boom dust cover, spill tray and telescopic chute arrangements, where applicable, adequate? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The belt and boom conveyors shall be covered by fixed and/or portable means, i.e. fixed steel plate across the conveyors or portable type, for example made of tarpaulin.

8.16 **Has the sequence of the cargo plan been followed by the cargo-gate operators, and is the movement of the cargo-gate operators reported to the duty officer and is there evidence to confirm that movement of cargo-gate operators has been monitored to ensure compliance with the cargo plan? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.17 **Is the vibrator system in good order and is there recorded evidence of regular inspection as per manufacturer recommendations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.18 **Is the lift conveyor in good order, free of corrosion, damage and leakage and is the spillage chute of the lift conveyor, where applicable, collecting the cargo spillage effectively? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Any cargo spillage from the cleats shall be collected in the spillage chute, located near the base of the vertical belt, and directed back onto the belt.

8.19 **Are walk-rounds of the entire system carried out regularly, recorded and are the staff conducting the rounds aware of their duties? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A walk around checklist that covers the most important aspect of the check should be incorporated in the SMS. There should be a field inspection patrol schedule developed to detect any conditions or components that need attention.

8.20 **Is the condition of belts' tension checked during cargo operations and is there evidence to show that the belt tension and alignment is inspected regularly for proper function? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Material spillage from the loop belt may be as a result of incorrect belt alignment and low belt tension. The belt shall not move in a zigzag direction.

8.21 **Are the tunnel trash pumping and disposal arrangements in good order and is the overboard valve provided with a notice warning against discharge of oil or oily mixture? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The trash pumps are provided at the tunnel bilge wells and are also capable of pumping out trash. The accumulated water inside the tunnel may be contaminated. The water may consist of oil from hydraulic oil leaks that may occur at each unloading or contain cargo residue. Adequate arrangements should be in place for the disposal of water from the tunnel conveyor. The bilge strum box shall be clean and free of cargo residue. Care must be taken to ensure that the water is free of contamination. Before disposal.

8.22 **Is a water-level alarm system provided for the tunnel bilge well, and is the alarm system regularly tested and the result recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector should test the bilge-well high-water-level audible and visual alarms when possible.

8.23 **Are the emergency stop switch, misalignment switch and speed switch for the boom conveyor and/or shuttle conveyor, where applicable, in good order and are the switches regularly inspected and the result recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.24 **Is the boom conveyor in good order, free of corrosion, damage, and oil leakage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The maintenance and inspection of slewing and luffing components shall be incorporated in the PMS as per manufacturer recommendation. Baffle plates should be intact, in good condition and free of damage, deformation and holed. The boom platform and railing should be maintained in good order.

8.25 **Are the boom conveyor and /or shuttle conveyor, where applicable, walkway lights and, floodlights in good working condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

8.26 **Is all electric equipment including cable box, cable run and cable tray and shore interlock connection system on the boom conveyor in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The shore connection system links to shore conveyor and it makes the ship's conveyor to stop if shore or ship's conveyor stop.

8.27 **Are the officers aware of the slewing/swing out limits of the boom conveyor/shuttle conveyor and is there recorded evidence of verification of function of slew/luff limit switch? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Inspector shall review the evidence of regular testing and maintenance of the limit switches.

8.28 **Are the idlers and return rolls of the self-unloading system free from build-up material and are they rotating freely? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Idlers and return rolls should be checked for material build-up and freeness of rotation. Rollers can be overheated due to either a bearing failure or to being jammed with refuse and overheating causing and sustaining a fire for a period of time. The vessel should carry a sufficient quantity of spare parts. The rollers grease fittings should be in place and in good order. The recommendation of manufacturer for selection, application and replenishment of correct lubricant shall be followed.

8.29 **Is the ventilation system of the tunnel area in order, and is there documented evidence to confirm that the ventilators are working to their operational capacity? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The wearing of paper face masks by operators inside the tunnel proves poor air quality. Record an N/C if the quality of air inside the tunnel was poor. Record in comments whether the vessel was equipped with dust- removal or air-filtration system. RightShip recommends that capacity of ventilation system checked regularly, and fans were operating to capacity.

8.30 **Is the tunnel area clean free from refuse and is the overall standard of housekeeping satisfactory? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Particular attention should be paid to any loose items which may fall on the belt and damage the belt or hoppers between the belts.

8.31 **Is the vessel is provided with guidelines for 'the prevention, early detection and suppression of fire in the cargo conveyor tunnel' and are the crew familiar with the guidelines? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Rightship recommends shipowners consider fitting a remote fire-fighting system in the tunnel and associated areas. **Record in comments whether the cargo conveyor tunnel was protected with a fixed fire detection and fire extinguisher system.** Risk of fire shall be controlled by regular monitoring to ensure effectiveness of control measures taken with respect to potential ignition sources. If the vessel was provided with a fixed fire-detection and firefighting system, the inspector shall review the documented evidence of regular checks. Except for ro-ro and vehicle spaces, cargo spaces on cargo ships of 2000 gross tonnage and upwards shall be protected by a fixed carbon dioxide or inert gas fire-extinguisher system complying with the provisions of the Fire Safety System Code, or by a fire-extinguishing system which gives equivalent protection. The administration may exempt from the requirements of paragraphs 7.1.3 and 7.2 cargo spaces of any cargo ship if constructed, and solely intended, for the carriage of ore, coal, grain, unseasoned timber, non-combustible cargoes or cargoes which, in the opinion of the Administration, constitute a low fire risk. Such exemptions may be granted only if the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to cargo spaces. When such exemptions are granted, the administration shall issue an Exemption Certificate, irrespective of the date of construction of the ship concerned, in accordance with regulation 1/12(a)(vi) and shall ensure that the list of cargoes the ship is permitted to carry is attached to the Exemption Certificate. (SOLAS 2017)

8.32 **Does the vessel stability information provide guidance for shipboard personnel on the effect of flooding the tunnel? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The introduction of water into the tunnel in order to submerge the conveyor system in case of fire creates a free surface area which, under the sheltered conditions of the harbour where there is no motion of the ship, presents little danger of significant stability loss. Under different circumstances, where motion could be imparted by external forces, such as wind and seas or by a cargo shift, and particularly if at sea when subject to rolling and pitching, the dynamic surging of the water will not only cause massive adverse effects on stability but can also cause considerable structural damage.

8.33 **If the electric voltage power of vessel is greater than 1000 volts (high voltage), is staff suitably trained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record in comment which officers have undergone Shipboard High Voltage Training and the nature of such training. A vessel equipped with high voltage systems above 1,000 volts should have on board certificated engineer officers as per STCW Table A-III/2 of chapter. Holders of a Certificate of Competency of Electro-technical officer according to regulations III/6 of the annex to the STCW-Convention fulfil this requirement.

8.34 **Is the vessel equipped with sufficient intrinsically safe portable radios for use inside the tunnel and, are the radio 'dead zones' within tunnel identified and safeguards put in place? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Section 9A: Hatch Cover and Lifting Appliances

9.1 **Are the cargo holds, including the underside of hatch covers, free of loose rust scale and paint flakes? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Underside and internal structure of hatch panel should be free of loose rust scale, paint flakes or blistering of paint coatings. Hatch covers with a double skin, in the form of a closed box, are filled with inert gas. After structural repair, the inner spaces must be re-inerted. This is done by inserting special tablets (available from the hatch cover manufacturer) into the space and welding shut. Never allow water to penetrate the box construction. (A master's guide to hatch cover maintenance, 2002) In general, the holds should be cleaned so that there are no residues of previous cargoes, no loose rust scale, paint flakes or blistering of paint coatings.

9.2 **Is the master/chief officer suitably trained in the inspection and maintenance of hatch covers? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
RightShip recommends that master and chief officer attend formal Hatch Cover Inspection and Maintenance training (shore-based and/or onboard) course. The onboard training course shall be conducted by a manufacturer's representative and shall be properly documented. **Record which officers have undergone Hatch Cover Inspection and Maintenance Training and the nature of such training.** The master and / or chief officer shall be able to produce appropriate documentation that Hatch Cover Inspection and Maintenance Training has been undertaken. The training should provide the ship's staff with some useful information on the role of key elements, such as what to look for, how to undertake a proper inspection prior to sea passage and make corresponding entries in the logbook as ultimate proof of due diligence, which would greatly contribute to ship and cargo safety.

9.3 **Are adequate procedures in place for carrying out hose and / or ultrasonic testing of hatch covers and is documented evidence of such testing available? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
RightShip recommends that the weather tightness of hatch covers should be checked at least once every 3 months. Record the date and type of last test in comment. **In case of steel cargo shipment, weather tightness of hatch cover should be carried out by means of ultrasonic testing, before loading and in the presence of the loading surveyor.** The "means for securing weather-tightness" of hatch covers is defined in regulation 16.4 of the load line convention which states: "The means for securing and maintaining weather-tightness shall be to the satisfaction of the Administration. The arrangements shall ensure that the tightness can be maintained in any sea conditions, and for this purpose tests for tightness shall be required at the initial survey and may be required at periodical surveys and at annual inspections or at more frequent intervals." (Load Lines, 2005) The following parameters can be used for a hose test: Water pressure 2 bar, Nozzle size 15 - 18 mm, Spraying distance 1 - 1.5 m. (Wet Damage on Bulk Carriers, 2018) When carrying out an ultrasonic test, the instructions of the manufacturer should be followed. The transmitter is first placed in the cargo compartment, an open hatch value (OHV) is then obtained, after which the detector is passed along each seal in turn to find any leakage of ultrasonic sound. When the test is completed, any area giving reading in excess of 10% OHV, indicates a point where water ingress is possible. The use of ultrasonic testing equipment operated by a certified person is widely recommended when weather tightness testing of hatch covers is required. (Bulk Cargoes: A Guide to Good Practice, 2016) The tests are only part of the loss-prevention process. Well-maintained seals, cleats, supports, drains and other hatch cover components are the key to achieving weather tightness.

9.4 **Are the compression bars and the coaming tops' water channels clean, free of corrosion and maintained in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Effective sealing is only possible with a straight, undamaged, and non-corroded compression bar. Compression bars which are not in this condition should be repaired or replaced, taking care to align the bars properly. Hatch coaming tops and the double drainage channels should be clean, free of corrosion and obstructions. (Hatch Cover Maintenance, 2015)

9.5 **Are the drain holes of coaming clean, the inboard coaming faces free from any vertical rust staining and are the non-return valves in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Damaged, missing, or defective non-return drain valves should be repaired or renewed. Where applicable, the fire cap of the drain valve should be firmly connected by a lanyard to the valve and maintained in good condition. Check that the drainpipes and drain valves are not clogged. Maintenance of non-return valve should be incorporated in the plan maintenance system. Any rust stains on the inboard coaming could be a sign of water leakage, especially at the cross-joints or split-joints. (Hatch Cover Maintenance, 2015)

9.6 **Are quick-acting cleats and holders all in place and in good working condition with the rubber washers flexible and free from paint and crack? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Quick acting cleats should be fitted at their original positions free of any corrosion or bending. The rubber washers that are fitted to the cleats should have proper elasticity. Other component parts to which cleats are welded or acting on such as coaming table, crutches, snugs, panel side plating should be in good condition. (Hatch Cover Maintenance, 2015)

9.7 **If the hatch panel side and end plates are in steel-to-steel contact with the coaming tops when closed, are the coaming tops free from grooving or wear? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

9.8 **If the hatch covers are supported by bearing pads, chocks, or support blocks, are they free from wear or damage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Bearing pads are fine pieces of engineering and replacing them with non-original spares or non-compatible steel could result in serious problems. Often bearing pads are replaced or repaired by the ship's crew with only one thing in mind, i.e., restoring the height of the bearing pads, whereby the correct size and use of appropriate material for the mating surfaces is overlooked. For bearing pad adjustment it is strongly recommended that manufacturers or specialists are called in for advice.
(Hatch Cover Maintenance, 2015) (Vervloesem, 2017)

9.9 **Are the side and cross-joint rubber seals in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Packing rubbers are designed to be compressed to a certain depth, which is generally referred to as the design compression (rule of thumb for estimating the design compression of ordinary box-type packing rubbers is as follows: design compression = 25% of the nominal thickness of the packing rubber). Depending on the type of rubber packing, design compression will generally be in the range of 4-20mm, and this is either specified in the maker's manual or indicated in the drawing.

The minimum length of replaced rubber packing should be one metre.

Rubber packing and adhesive has a limited shelf life, so check the date stamp and discard if beyond the use-by date. Manufacturers approved spare parts should be used.

The corner pads, joints and end pieces of rubber sealing should be intact, properly glued and in the correct position.

Whenever packing rubbers need replacing, it is extremely important to ensure that not only are the dimensions compatible, but also that the alternative product will meet with the required performance criteria.
(Hatch Cover Maintenance, 2015) (Vervloesem, 2017)

9.10 **Are hatch cover panels free of misalignment? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The permanent deflection of rubber seals should be in the centre of the rubber and not to one side. Non-central permanent set may indicate misalignment of panel.
(Hatch Cover Maintenance, 2015)

9.12 **Are the cross-joint seal retaining channels and the cross-joint compression bar straight, free of corrosion and damage, and are the channel supports and brackets in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

9.13 **Are the following parts of the hatch covers, where applicable, all in good order and do they appear to be well maintained? (V)**

- **Wheels/bearings or trackway**
- **Hydraulic system including hoses**
- **Chains**
- **Link pin and safety pin**
- **Cargo holds' ventilator on the side and end of hatch panel**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection
The purpose and function of a hatch cover and its coamings is to prevent the ingress of water into a cargo hold after a large opening has been cut in the deck for cargo access. Hatch covers are a moveable structure designed to a weathertight standard. The hatch cover should be maintained in a weathertight condition. Sealing tape can accelerate corrosion and give a false sense of security, as it may be washed away by heavy seas. It can also prevent water draining from cross joints and promote deterioration of the panel edges. High expansion foam may also be found around the edge of the covers. There is usually very little adhesion to the coaming bar so that it can be washed away, again giving a false sense of security. There is also a risk that it could damage the hatch cover seals. The use of such tape or foam is acceptable as an additional precaution on well-maintained weathertight hatch covers but is not acceptable as an alternative to proper permanent repairs. (Hatch Cover Maintenance, 2015) The maintenance of hatch covers should be incorporated into the planned maintenance system.

9.14 **Are cross-joint wedges and their wedge bridge (where fitted) in place, operational and effective? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

9.15 **If hatch covers are hydraulically operated, has the hydraulic oil been tested regularly for contamination and deterioration? (V & M)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection
The oil tank of the hydraulic system should be kept filled to the operating level and with hydraulic oil recommended by the manufacturer. The cleanliness and viscosity of hydraulic oil must be checked. Samples of the oil should be sent to a chemist for testing as per manufacturer recommendation. The hydraulic system is provided with bleed points from which samples can be taken. Hydraulic oil should be changed every five years or after there have been significant repairs, such as piping or cylinder replacement. Hydraulic oil filters should be changed every twelve months or as per manufacturer recommendation. (A MASTER'S GUIDE TO: HATCH COVER MAINTENANCE, 2002)

9.16 **Are officers familiar with emergency hatch cover operation arrangements and is there evidence of effective training of personnel available on board? (V)**

☐ **Yes** ☐ **No** ☐ **N/A** ☐ **N/V**

Guide to Inspection
The emergency hatch cover operation procedure should be incorporated in the ship's manual. Emergency or auxiliary operation of hatch covers can be executed either by traditional hand pumps and wire pullers or by portable electric pump units, connected either to the on-board electric power system or to shore. The portable electric pump unit makes the operation easy, swift and safe, as the unit is connected directly to the control stand with quick couplings including all safety enhancing valves active. Rightship recommends vessels to carry an emergency portable pump unit (portable electric and/or hydraulic type) for situations when the standard pump unit cannot be used. The manufacturers' instructions for the maintenance and test of the emergency portable pump unit shall be incorporated in the PMS.

9.17 **Has a thorough examination and load test of lifting appliances been carried out and is the record of the test and examination being maintained properly? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
All lifting appliances and every item of loose gear shall be thoroughly examined by a competent person at least once in every twelve months and five yearly load testing shall be carried out when the safe working load (SWL) of the lifting appliance is more than one tonne. Flag State may impose the quadrennial load test for the lifting appliances. The term "competent person" means a person possessing the knowledge and experience required for the performance of thorough examinations and tests of lifting appliances and loose gear and who is acceptable to the competent authority. (Register of Lifting Appliances and Items of Loose Gear, 1985) The lifting appliance maintenance records should be updated and available on board.

9.18 **Are the hoist and luffing wires of cranes, where fitted, reported in good order and is there recorded evidence of regular inspection and maintenance? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Poor maintenance of wire leads to weakening of the wire over time. Inappropriate operation of the crane and incorrect use of the wire leads to damage being sustained by the wire. Wire ropes should be examined for defects, and if those defects are excessive, advice should be obtained and/or the wire should be discarded. Example of defects that may be found on the wires are: 1. Broken wires and fractured strands 2. External and internal wear/corrosion 3. Decrease in elasticity 4. Kinks and other mechanical damages There should be an appropriate test certificate for all wire ropes on board; that is for all of those in use and for all spare wire ropes. The certificates should give the date of manufacture, the material strength, the construction of the wire and the breaking load test of a sample. There should be an inventory of all wire ropes on board and records of the dates of renewal of the wires in use on all cranes. (Cranes, Their Operation and Reasons for Failures, 2015) Such inspection should be included under the PMS system. Crane wires and sheaves should be in apparent satisfactory condition.

9.19 **Are the main structures, foundation structures and mountings of the cargo cranes free of apparent defect or damage? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The main structures, foundation structures and mountings should be inspected to determine whether any defects or damage are present and, if any such defects/damages are present, appropriate repairs should be carried out. (Cranes, Their Operation and Reasons for Failures, 2015) The holding down bolts and slewing ring should be free of significant corrosion and crane access ladders and platforms in apparent satisfactory condition. Such routine inspections should be included under the PMS system. Apart from the greasing routine and bolt inspection of the slew ring a rocking test or tilting test should be carried out on a periodic basis, every six months on board and annually by the competent person or class society. A rocking test is undertaken to check the wear of the slew ring ball bearings. The test shall be carried out as per manufacturer's instructions. Measurement usually includes taking readings with a clock gauge externally and / or internally of the slew ring housing to check for even wear, a note of the backlash measurement between the gear teeth may also be recorded. A record should be kept on board to note rates of wear on every cargo crane on board and identify cranes that may require attention. Manufacturers will state clearance and wear down limits and once the check has been completed on board, they should be checked against the manufacturers prescribed limits. Lubrication, seal integrity and bolting arrangements should be checked. (Lifting Plant (Cargo Handling), 2014)

9.20 **Is the machinery of the cargo crane, including controls in the operator's cab inspected, tested, and maintained as per manufacturer's recommendations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The machinery of a crane includes all electrical control equipment and systems, all motors, hydraulic oil pumps, filters and coolers, and winches, together with winch brakes and control gear, all limit switches, cut-out switches and other pieces of equipment. Routine maintenance of these various pieces of machinery is essential for their continuing correct operation. Such routine inspection, testing and maintenance should be included under the PMS system as per manufacturer recommendation. (Cranes, Their Operation and Reasons for Failures, 2015) Operating instructions for use of a crane shall be posted inside the operator's cab. The crane / derrick safety devices should be in apparent operation and regularly tested.

9.21 **Are the ship's grabs being maintained as per manufacturer recommendation and have the maintenance requirements been incorporated in the PMS? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ship's grabs should be part of the ship's planned maintenance system and routine inspections and maintenance should be carried out. That routine maintenance and inspection regime should include the thorough inspection of all structures of the grabs and their mechanical parts and of any associated equipment, including any umbilical cables and control systems to ensure: 1. All parts are without defect or damage 2. Hydraulic oil reservoirs are filled to the appropriate level 3. All machinery and control systems are functioning correctly, and 4. All moving parts are free and well-greased. Before each ship's grab is taken into use for cargo operations, it should be rigged to the cargo hoist wire of the ship's crane and should be carefully tested to demonstrate its full functioning capability. A record of that testing should be kept. The technical specification for a clamshell grab will include its capacity in cubic metres, its weight in tonnes, its dimensions in metres and details of its operation. The capacity might be a single figure, or might be two or more figures, if spill plates or moveable panels are fitted to the grab, which can be removed or put in place to alter the capacity of the grab when closed. The capacity of typical grabs used for the loading and discharging of bulk cargoes using ship's cranes ranges from about 4m³ to about 16m³. The weight of the grab might be about 2 tonnes or as much as 12 tonnes. This should be shown on the name plate attached to the grab. The weight of cargo which can be lifted by a grab depends upon the capacity of the grab and the density, or the stowage factor, of the commodity. When calculating the weight of cargo lifted by a grab, it should be remembered that it is likely that the surface of the cargo in the grab will be slightly peaked or crowned; such that a greater weight than the volume of the grab might indicate will be lifted. An allowance for this of 25% should be included in any calculation. If the crane is designed for both hook operation and for grab operation, it is likely to be given two different SWL ratings by the manufacturer – one for hook operations and one for grab operations. It is usual for the grab operation rating to be 20% less than the hook operation rating. The two SWL ratings should be stated on the plate on the crane jib. (Cranes, Their Operation and Reasons for Failures, 2015)

9.22 **Are the loose gears of lifting appliances marked clearly and are the certificates of the loose gears available and traceable on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
It is important that the loose gears used for lifting appliances (including deck cranes and the engine room crane) are marked clearly with its SWL and a batch mark or number, where that mark can be verified by a test certificate. RightShip recommends that these test certificates are clearly labelled and kept in an easily accessible file. A method of correct identification and matching of individual certificates with the loose gears should be established on board. Loose gears without certificates must not be used on board.

Section 9B: Gantry Cranes

Note: This section only applies to a vessel equipped with gantry cranes that can travel along the main deck and be used for handling of general cargo like containers, paper bales and bulk cargo and/or opening of the hatch cover.

This section shall be completed along with "section 9- Hatch cover and Lifting appliance".

9.1 **Has the vessel been provided with procedures for the safe operation of the gantry crane? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector should randomly check the implementation of the procedures. Every company should develop, implement, and maintain a Safety Management System (SMS) which includes instructions and procedures to ensure safe operation of ships and protection of the environment in compliance with relevant international and Flag State legislation. The company should identify equipment and technical systems the sudden operational failure of which may result in hazardous situations. The safety management system should provide for specific measures aimed at promoting the reliability of such equipment or systems. These measures should include the regular testing of standby arrangements and equipment or technical systems that are not in continuous use. (ISM code 2018) Details of the following should be included in the SMS: > On-board training in the operation (driving) of the gantry cranes. > On-board training of companion persons to guide crane drivers when attaching and landing each load. > A familiarisation process and associated checklist related to safe operation of the gantry cranes. > Safety features that can be used to stop a gantry crane in an emergency. > Familiarisation of new crew members and contractors with the gantry cranes. > Permit to work system related to the gantry cranes. > Precautions required when working on deck while the gantry cranes are in operation. > Crane-handling operation (preparation, during operation and work after crane operation)/or > Hatch cover lifting and travelling operation. > Emergency travelling operation of gantry cranes. > Appropriate checklists.

9.2 **If gantry cranes are used for lifting hatch covers, are the hydraulic cylinders used for lifting the hatch covers free from leaks and are the hatch covers being marked correctly for precise positioning of the lifting beams and hooks where applicable? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record a N/C if a person rides on a hatch cover when it is being lifted by crane. The hatch cover lifting devices consists of lifting frames and hydraulic cylinders. The maintenance of hydraulic cylinders shall be incorporated in the PMS in accordance with the manufacturer's recommendations.

9.3 **Are check lists in place and being used to cover the check before use, starting the crane and releasing the crane from sea stowage? Is a procedure in place for safe travelling of the gantry crane on deck and are crew familiar with the procedure? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Trained companion persons on the ship and yard should be used to guide the crane driver when attaching and landing each load. Poor communication is one of the factors that contribute to the root cause of incidents related to gantry cranes. There must be enough persons on each side of the deck with adequate means of communication when intending to travel the gantry crane. The crane operator must not start moving the crane until receiving confirmation that the crane rail is clear. Installation of a track sweeper can minimise the risk of injury in event of collision.

9.4 **Is the vessel provided with a specific isolation procedure for the gantry cranes? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The objectives of the ISM Code are to ensure safety at sea, prevent human injury or loss of life, and avoid damage to the environment, in particular to the marine environment, and to property. (ISM Code 2018) RightShip recommends that the isolation procedure should cover the need to isolate, de-energise, lockout and tag out systems, with the aim of reducing the risk of death or injury during operation, inspection, repair, maintenance, and assessment of gantry cranes. The isolation procedures shall incorporate the following: > Isolation procedure, check list and risk assessment documented and accessible to the relevant crew on board. > Information, instruction, and training provided to crew involved with the system. > Supervisor appointed to make sure the crew strictly follows isolation procedures.

9.5 **Are the visual and audible warning signals provided for gantry cranes in the deck area in good order and tested regularly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Locating the alarm bell near the wheels reduces the risk of collision, as it makes it easier to hear the alarm at the point of danger. All necessary warning signs shall be located on the crane legs. Gantry cranes must be fitted with an acoustic warning device, such as horn that can be sounded by the crane operator, that: (i) emits an audible sound before travelling motion is commenced; and (ii) continues to sound until travelling motion has ceased. (Marine Order 32 (Cargo handling equipment) 2016, 2017) Gantry cranes and similar cranes shall be provided with a horn or other audible warning device operated by the crane operator to warn or attract the attention of any personnel within the operational area. In case of travelling cranes moving at ground level, a continuous audible warning shall automatically be given when the crane is to move/is moving along the track/rails. The warning signal shall be distinctly different from other audio signals on the installation. (Code for Lifting Appliances in a Marine Environment, 2009) To alert personnel of gantry movement, the crane shall be equipped with four flashlights and warning bells mounted at each corner of the gantry. A signal horn operated from the driver's cab shall be provided. Red indicator lights shall be fitted on the extremes of the jibs and be automatically actuated when the jibs are in operation position.

9.6 **Are the safety devices of gantry cranes in good order and is there recorded evidences of regular testing? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A list of safety devices shall be incorporated in the PMS and maintenance intervals as per manufacturer's recommendation shall be followed. The inspector should verify whether these tests have been included within the PMS. **Crane emergency stop pushbuttons/trip wires:** The emergency stops should be located at all control positions and local panels around the cranes, clearly marked to indicate the crane they serve, and within easy reach. **Cow catchers:** The cow catchers are mechanical switches mounted on each corner of the gantry operated by a collision bar mechanism. **End stop limit switches:** Each gantry has hardwired slow down and end stop limits at both sides of its movement range. Hoist, trolley and shift trolley movements have software limit switches called smart slow down. Hardwired end stop limits are activated only in fault situations. **The over hoisting/lowering end stop limit switches** will activate if the main hoist would rise/lower over its normal stop position. Main trolley traversing and shift trolley shifting end stop limit are rotating limit switches mounted on the machinery. Gantry travelling has a rotating limit switch, after crane backward direction has also proximity limit switch as end position. **Overspeed protection:** The main hoist, main trolley traversing and gantry travelling motions are protected against overspeed during operation. A gantry crane shall be fitted with a clearly labelled emergency stop switch that can easily be operated by persons at deck level. (Marine Order 32 (Cargo handling equipment) 2016, 2017)

9.7 **Are the main hoist overload protection and unbalance detection systems in good order and tested as per manufacturer's recommendation? Are officers aware of the safe operation parameters of gantry cranes and is this information posted in the ship's office/ ballast control room? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ship's condition during load handling, hatch cover lifting, jib turning and crane sea stowing as well as the wind speed during crane operation shall be posted in the ship's office/ballast control room. The overload protection is designed to prevent lifting loads that exceeds the lifting capacity of the crane. The chief officer shall be aware of the maximum load that the main hoist can load at all possible places and the heaviest load that must be loaded at the centre position. This information shall be posted in the cargo control room. The load unbalance detection system shall prevent movement of eccentric loads. During storm wind events, the gantry cranes and their associated structures are exposed to loading which may not have been considered in the design and construction or during the operation of the crane. Crew should be familiar with and understand the design/operating limitations of the gantry cranes with regards to wind speed criteria.

9.8 **Is each gantry cranes provided with a storm locking arrangement and, does the arrangement appeared to be well maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The gantry cranes shall be fitted with devices that lock the crane in position when exposed to wind pressure. (Marine Order 32 (Cargo handling equipment) 2016, 2017) If a hydraulically operated locking system has been provided, the components of the system, i.e., hydraulic cylinder actuation and hydraulic hoses, shall be in good condition and the system shall be free of oil leaks.

9.9 **Are the gantry cranes electrically bonded and earthed to the vessel's structure? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A bridge or gantry crane used in loading or unloading must be electrically bonded and earthed to the vessel's structure. (Marine Order 32 (Cargo handling equipment) 2016, 2017) ANSI/NFPA 70 National Electric Code within Article 610, Cranes and Hoists, section 610.61:" The trolley frame and bridge frame shall not be considered electrically grounded through the bridge and trolley wheels and its respective tracks. A separate bonding conductor shall be provided."

9.10 **Are the mechanical brakes for the gantry crane motions in good order, tested regularly, and recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Mechanical brakes for the crane movements are primarily designed as holding brakes. Deceleration forces are normally provided by the electrical braking of the drive motors. During an emergency stop, the mechanical brakes are engaged immediately, but without the deceleration force from the motor. The condition of the brake linings should be checked regularly. Procedures for checking the air gap and the thickness of the brakes' lining materials should be incorporated in the PMS as per manufacturer's recommendation.

9.11 **Are the anti-collision and deceleration devices of the gantry cranes in good order and tested regularly, and are track wheels at the deck level fitted with foot guards? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
If there is more than one crane on the same trackway — each must be fitted with a device to prevent collision. Any track wheels at deck level shall be fitted with foot guards. (Marine Order 32 (Cargo handling equipment) 2016, 2017) The Anti-collision system will stop the cranes if the fore crane and aft crane would come too close each other. Deceleration devices, such as limit switches and two-stage decelerators, slow the gantry crane down regardless of what control is being pressed when a travelling crane is approaching the end of the runway, to prevent end stop collision or overrun.

9.12 **If the operator's cabin of a gantry crane travels with the horizontal movement of a load, is the crane operator able to leave the cabin safely in case of power failure or another emergency? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
If the operator's cabin of a track-mounted crane travels with the horizontal movement of a load, the structure must enable the operator to leave the cabin safely if there is a power failure or other emergency. Example of an appropriate structure: A mobile or portable access or means of returning the cabin from the track to the point of access. (Marine Order 32 (Cargo handling equipment) 2016, 2017) The emergency escape routes shall be clearly marked.

9.13 **Are portable fire extinguishers located around the gantry cranes and in good condition, and are they maintained regularly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

9.14 **Are the driver's cabs and local operating stations of the gantry cranes maintained in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The cabin panel shall be labelled, and the function lights shall be in working condition. The window wiper, window's glass and driver's chair should be maintained in good condition. The local operating stations are used for the purpose of the gantry drive, hatch cover and JIB operation. The switches, instruments such as controllers, telephone, microphone, speaker, heater, air-conditioner, electric window wiper, fire extinguisher, rotating chair and cabin's lights should be in good condition. The maintenance of driver's cab should be incorporated into the PMS.

9.15 **Are the retractable jib roofs, sides' curtains and their securing arrangement being maintained in good condition, are checklists for the operation of the jib roof and curtains available and is the evidence of their consistent use? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The jib roof end limit switches and emergency stop pushbutton shall be function tested regularly and evidence of such tests shall be recorded. The gantry cranes are fitted with retractable roofs, which cover the whole working area including the outreach area which enables operation in unfavourable weather. Some vessels are also equipped with curtains on the sides that enable work in the event of most adverse weather conditions. The side curtains are roller mounted horizontally on the outside of the main girders. At the bottom, the curtains are equipped with counterweights and supported by the girder. The jib roofs' locking arrangements shall be maintained in good condition.

9.16 **Is the telephone system provided for communication between driver's cab, electrical control room, hatch cover control station and deck level in good order and is there evidence of regular testing and maintenance? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

9.17 **If a platform has been provided on the top of the crane roof for helicopter winching operations, does the area comply with the requirements of ICS guidelines? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The positioning and marking of the winching operations shall comply with the requirement of section 4.4.1 and 4.4.3 of the Guide to Helicopter/Ship Operations.

9.18 **If the gantry crane is equipped with a pilot ladder hoist, is the system being by-passed and not in use? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
In December 2010 IMO MSC 88 adopted MSC.308(88), which contains amendments to SOLAS regulation V/23 and IMO resolution A.1045(27). This amendment provides additional recommendations for pilot ladder arrangements and pilot transfer arrangements. Amendments and changes to SOLAS chapter V/23 and IMO Resolution A.1045(27) have banned the use of mechanical pilot hoists.

9.19 **Have a Crane Monitoring System and a port/crane performance logger been provided, are they in good condition and regularly monitored? Are faults recorded in the fault log, verified and fault-finding rectification procedures recorded appropriately? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Crane Monitoring System gives more detailed information about faults. All defects must be repaired before the crane is taken back into operation.

9.20 **Is the emergency pump for the operation of the crane maintained in good condition, are crew familiar with their duties in the using the emergency pump and are emergency drills being carried out? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The crane is equipped with an emergency pump that can be used instead of the main hydraulic pumps. In case of electric fault, driving of hydraulic cylinders with a manually controlled valve is possible. However, the person operating the manual controlled valve will not be able to see the crane's operation clearly enough. To prevent accidents there must be an assistant(s) observing the motion of the hydraulic cylinders and all working parts. The assistant(s) must have phone communication with the person operating the emergency pump.

9.21 **Is the steel structure of girders and trolleys free of deformation? Are the access and service platforms of the gantry cranes, including vertical ladders, ladders cages, rungs, stations and platforms being maintained, free of corrosion and in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Random checks of following should be made by inspector to ensure that the gantry crane is free of apparent structural defects. > Cracks in the welds, > Deformed structural members, > Any negative camber in the bridge beam, > Operational damage due to collision with another crane, > Excessive structural corrosion

9.22 **Are the cranes' transverse rail, rack, tooth-rack, travelling pinion and travelling wheel free of cracks, misalignment, and abnormal wear; and is there evidence of regular inspection and maintenance? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Parts of a crane are subject to wear by operation and deformation due to vibration. If wearing or deformation of any part have reached the prescribed limit, the part must be renewed. This limit is called the wearing limit. A procedure shall be in place for measuring the wear and comparing the measurements with the manufacturer's recommendation. The inspector should randomly check whether the wearing of parts is within the acceptable limit, as recommended by the manufacturer. **The travelling rail and rack** shall be free of 1- obstructions on the rail, 2-cracks, 3-damage of the rail brackets, 4-deformation of the rail and 5-have adequate clearance at rail joint, as per manufacturer's recommendation. **The travelling wheel** shall run smoothly without any abnormality in bearing revolution, free from 1-abnormal wearing on the wheel surface, 2-cracks, and 3- the fitting bolts should be tightened. **The travelling pinion** shall be free of 1-cracks, 2-abnormal wearing or pitching and 3-abnormal engaging with travelling rack. The gear boxes' oil level shall be maintained at normal level.

9.23 **Is there evidence to show that regular maintenance has been conducted on the AC motors, electromechanical brake, gear reducer and the blower motors? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector shall check if the maintenance of main hoist machinery, turntable slewing machinery, shift-trolley shifting machinery, main trolley traversing machinery, gantry travelling machinery and hydraulic unit are incorporated in the PMS and being carried out as per manufacturer's recommendation.

9.24 **Has the hydraulic oil of the gantry crane system been tested regularly for contamination and deterioration as per manufacturer recommendation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Monitoring hydraulics with oil analysis is the only way to establish whether the hydraulic fluid is impacting the anticipated performance. Contamination is the main cause of failure, typically water contamination or dirt ingression.

Section 10: Mooring Operations

The Mooring Equipment Guidelines Edition 4 (MEG4) has been written for oil tankers and gas carriers. It is based on the Oil Companies International Maritime Forum (OCIMF) environmental criteria, which is additional to IACS standard environmental criteria. However, there are many principles in these guidelines that can be considered for other types of ships, i.e. Section 5 (Mooring lines), Section 6 (Mooring winch) and appendix B (Guideline for the purchasing and testing of mooring lines and tails). The aim of the MEG4 is to minimize the risk of the failure of mooring lines and all other mooring components, to ensure the highest possible level of safety (OCIMF, 2019).

Rightship would urge vessel's manager to consider the great benefits of the implementation of elements of MEG 4 across their fleets.

10.1 **Has the company established guidelines and procedures for the inspection, maintenance and wear zone management of the mooring lines and are they being implemented? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Inspectors should check that the ship's mooring lines are being inspected / maintained in line with the vessel manager's guidelines and procedures. Record a non-conformity if the management of mooring lines is not in line with the company's procedure. Line Management Plan (LMP) is used to manage the operation and retirement of mooring lines and tails. The LMP also documents the requirements, assumptions and evaluation methods used in determining the line retirement criteria. The LMP is specific to a vessel's manager, ship type, and trade route; however, Oil Companies International Maritime Forum (OCIMF) has given general guidance on establishing a LMP in the Mooring Equipment Guideline Edition 4(MEG4). The vessel's manager is responsible for the development and implementation of the ships Line Management Plan (LMP). The LMP will contain the vessel's manager requirement for the management of mooring line maintenance, inspection, and retirement during the operational phase of the mooring line lifecycle. The LMP can be a standalone tool, or it may be integrated into existing safety or maintenance management systems. It can be available as hard or electronic copy, or both. Whatever the format, the LMP should be capable of being updated. It should be accessible for internal and external compliance verification, ship personnel training and communication with manufacturers. LMP information should be stored in a location that is easy for all users to access, e.g., on a computer system that can be accessed from both the ship and shore or compiled in a single physical location. It should be easy for the system users to access the LMP information from a single physical or virtual location.

Table 5.2 of the Mooring Equipment Guideline (MEG4) gives an overview of the type of information that could be included in the LMP for maintenance, inspection, and retirement, as well as general considerations that apply to the safe use and maintenance of mooring lines. Operators can use the table as a starting point for the development of their LMP but should recognise that this list it is not considered exhaustive.

All types of mooring lines experience localised fatigue and damage caused by common line routeing and deployment processes. The location and extent of localised damage on the mooring line can vary due to various factors, i.e., trading patterns, berth layout and design, mooring pendent length and material, ship's movements while at the port, environmental condition, and laden and ballast ship.

The wear zone management should be incorporated in the LMP. Section 5.4.4 of MEG4 has provided further guidance about the wear zone management.

(Mooring Equipment Guidelines (MEG4), 2018)

Conventional fibre lines: At routine intervals, the entire length of line should be inspected by a competent person*. Attention should be paid to those sections of line that are proven by experience to be the main areas of deterioration, such as spliced eyes and interface area with winches, capstans, bollards, fairleads, and rollers. In the absence of sufficiently detailed inspection processes from the line manufacturer, the vessel's manager should refer to the Cordage Institute guideline, "Fiber Rope Inspection and Retirement Criteria – The Guideline that can Provide Enhanced Fiber Rope Durability and Important Information for the Safer Use of Fiber Rope".

(Mooring Equipment Guidelines (MEG4), 2018)

*Personnel assigned the responsibility for rope inspections should be properly trained to recognise rope damage and to understand the rope inspection procedures and retirement criteria.

10.2 **Does the vessel's manager carry out regular safe mooring campaigns, learning from near misses and accidents related to mooring operations and are these shared with the fleet? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

There are different ways of recording and ranking the lessons learned from incidents. OCIMF has categorise them in three levels as follow:

- Immediate incident notification and interim update
- Lessons learned from an incident investigation
- Lessons learned from a review of incident trends

The OCIMF information paper "Sharing Lessons Learned from Incidents (First Edition 2018)" provides further information on the levels of sharing the lessons learned from incidents.

10.3 **Are the certificates of mooring lines and mooring tails available on board? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

It is important that all ropes and wires used for mooring have a certificate. It is considered good practice for these certificates to be clearly labelled and kept in an easily accessible file. A method of correct identification and matching of individual certificates with the mooring ropes and wires should be established on board. Mooring ropes, mooring pendants and wires without certificates must not be used on board.

An example of a mooring line base design certificate, mooring tail base design certificate, mooring line certificate and mooring tail certificate as developed by OCIMF and the template documents can be found on the website here.

The mooring line and mooring tail data sheet shall be provided by the line manufacturer. The recommended contents of data sheet can be found in B4 of appendix B of MEG4.

10.4 **Do mooring lines and mooring tails comply with industry guidelines and are they in good order? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a N/C if the vessel was equipped with HMPE mooring lines but without mooring tails fitted.

The Line Design Break Force (LDBF) of mooring lines fitted on board should be at least 100-105% of the ship design MBL. The ship designed minimum breaking strength of each mooring line is available in the mooring arrangement plan.

Nylon (polyamide) mooring lines should be specified as break tested wet, because nylon lines change strength characteristics once exposed to water and generally do not fully dry to their original construction state.

Mooring tails experience more wear in services than lines, and for this reason the Tail Design Break Force (TDBF) should be higher than the LDBF. The TDBF of tails should be 125% - 130% of the ship's design MBL. The increase in TDBF will not necessarily increase tail fatigue life and may undermine the integrity of the mooring system by reducing system compliance.

The standard recommended overall length for mooring tails is 11 metres, however for exposed mooring a 22-metre tail provides additional elongation in the mooring arrangement. Mooring tails should be inspected before every use and according to the requirements of the LMP.

The vessel's manager shall plan to retire the mooring tails when their residual strength reaches 75% of the ship design MBL.

Tails can be attached directly to HMSF mooring lines using a cow hitch. A cow hitch is a method of joining two fibre ropes without using connection devices. Worked cow hitch connection can be become very tight and the inclusion of a pigtail is recommended to help separate the tail and mooring line for replacement or inspection.

(Mooring Equipment Guidelines (MEG4), 2018)

10.5 **Is there a procedure for testing the winch brake rendering setting and is it being tested regularly? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Rightship recommends the vessel's manager to set the brake at 60% of the ship's design MBL as per OCIMF guidelines in section 6.4.6 of the MEG 4. RightShip recommends that tests are conducted at least annually.

Each winch manufacturer will have their own test equipment and procedure, which should be followed by the operator. Details of the equipment and procedures should be in the instruction manual for the mooring winch.

The winch test procedure should include:

- Preparing the winch for testing
- Setting up the test gear and applying the test load
- A curve or table relating hydraulic jack test pressure to line pull
- Hydraulic Jack pressure at which the brake is designed to render
- Setting of the winch brakes including the values for torque wrench or pressure gauge fitted for setting up the brakes
- Recording the test results and ensuring markings on the drum are correct and visible

For an undivided winch drum, OCIMF recommended asking the manufacturer for guidance on maintaining the OCIMF recommendations for brake rendering. This may require ship operational experience to identify the normal layer in use for most mooring operations.

The main purpose of brake testing is to verify that the brake will render at a lower load than the ship design MBL. For conventional screw brakes, a tag should be attached stating the torque value. For spring applied brakes the spring compression distance should be recorded, and the mechanisms secured with a seal. A stopper arrangement, i.e. locking nut on the threaded end, should not be used on the tightening screw. Stopper arrangement can impede the brake setting and reduce the brake holding load. (Mooring Equipment Guidelines (MEG4), 2018)

The stall load or stall heaving capacity of a winch is the maximum short term or instantaneous pull of the winch, and the stall setting is used to set the maximum heave power of the winch hydraulic motor. The stalling hydraulic pressure is controlled by a proportional valve, however over a period of years this can drift and change the winch setting. The winch stalling load should never exceed 50% of ship design MBL.

The Rightship Lessons Learned and Best Practice circular " What is Mooring Winch Brake Render Testing? must be taken in to account when performing mooring winch brake rendering test.

Please CLICK HERE to download the document.

10.6 **Are mooring lines correctly deployed and tended? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
To minimise the occurrence of line failures and risks of injury or loss of life from a resulting snapback, lines of the same lead should be made of the same material/rope type. As an example, if a vessel runs four headlines, all four lines must be constructed with the same material/rope type. Lines should be led, so far as possible, without sharp changes of direction. Wires and synthetic fibre ropes need to be kept separate and not allowed to cross or be led through the same lead. > Breast lines should be run, so far as practicable, from as far forward and aft and at right angles to the fore and aft line of the vessel > Spring lines should be run, so far as practicable, parallel to the fore and aft line of the vessel > Where synthetic fibre ropes and wires are available, the same type and size of lines should be used for the same service > The mooring operations must be properly planned. For large ships on tidal berths, mooring plans are developed and agreed prior to vessel arrival, and the roles and responsibilities of each crew and officers are explained. > The vertical angle of the mooring lines should be kept to a minimum. The flatter the mooring line angle, the more effective the line will be in resisting horizontally- applied loads on the ship. > Mooring lines of the same size and material should be used for all leads. If this is not possible, all lines in the same service, i.e., breast lines, spring lines, etc. should be the same size and type. > The mooring tails should be the same material and size.

10.7 **Are there sufficient crew members on board to assist in the mooring operation, check and tend the mooring lines at regular intervals? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
There must be sufficient personnel standing by to assist in the mooring operation both forward and aft, with an officer in attendance. All crew should be trained and be familiar with bights, snap-back zones, connecting tug line, let go tug line and the hazards associated with mooring operations.

10.8 **Are all mooring lines on winches correctly reeled on drums, and if made fast ashore, are winch brakes secured and winches out of gear? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The effectiveness of the brake is dependent upon the rope being correctly reeled onto the drum. The direction of reeling the mooring line on the drum in accordance with manufacturer's instructions is important to ensure that the brake will hold or render at the correct load. The winch brake should be applied, and the winch motor should be out of gear after the mooring operation. (Mooring Winch Brake Holding Capacity, 2015)

10.9 **On split drum winches, have the split drums been set up correctly after the completion of mooring operation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Split drum winches are designed so that the line under tension is on the first wrap on the drum, providing maximum holding power. Excessive turns should not be left on the working side of a split mooring winch (tension drum). (Safe Mooring Practice, 2009) Guidance on the minimum number of turns on the tension drum should be obtained from the line manufacturer and documented in the Line Management Plan. Split-drum winches should not have more than one layer of mooring line on the tension section of the drum because it can reduce the brake holding capacity of the mooring winch. (Mooring Equipment Guidelines (MEG4), 2018)

10.10 **If the mooring tails are used, have they properly connected to the main mooring lines in accordance with industry guidance? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
It is critical that the mooring tails are to be connected to the primary mooring line by cow hitch or by shackle or link as per manufacturer's instruction. The SWL of the joining shackle should always be equal to or greater than the Working Load Limit (WLL) of the lines in the mooring system, so that the SWL will never be exceeded within the working load range of the lines to which they are attached. Although WLL values for wires and synthetic lines are slightly different (55% and 50% of ship design MBL respectively) it is not intended that joining shackle manufacturers or ship operators attempt to match the SWL of the shackle to the WLL. The eye of the mooring pendants (tails) should be covered with chafe protection.

10.11 **Are the mooring ropes stowed clear of the deck and are mooring stations well lit, clean and free from oil leaks? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The mooring station should be well lit, clean, and free from oil leaks and the deck suitably prepared to prevent slips or trips. The mooring ropes should be stowed clear of the deck, preferably on a pallet. The area should also be free of any obstructions which could hinder the view of the mooring deck. The mooring stations so far as possible should be painted with a non-slip treatment. Mooring areas naturally contain many trip hazards, and all surfaces are painted the same colour, hiding trip hazards such as save-alls, windlass platforms, forecastle access hatch and bitts. Physical hazards such as bulkhead frames, mooring bits, pedestal fairleads and cleats, platforms, and hawse pipe covers are to be highlighted. (Safe Mooring Practice, 2009)

10.12 **Have heaving lines been constructed with a monkey's fist at one end and are they free of any added weighting material? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The "monkey's fist" should be made with rope only and must not contain added weighting material. Safe alternatives include a small high-visibility soft pouch, filled with fast-draining pea shingle or similar, with a weight of not more than 0.5 kg. Under no circumstances is a line to be weighted by items such as shackles, bolts or nuts, or twist locks. (Code of Safe Working Practices for Merchant Seafarer's, 2019) There may be alternative, for example throwing rings of soft material, however under no circumstances shall the weight of monkey fist exceed 0.5 KG.

10.13 **Is the whole mooring deck area marked with clearly visible signage and considered a danger? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The entire area of the mooring deck should be considered a potential snap-back zone. All crew working on a mooring deck should be made aware of this with clearly visible signage. The painting of snap-back zones on mooring decks should be avoided because they may give a false sense of security. In effect, the whole mooring deck may be considered a danger zone. (Code of Safe Working Practices for Merchant Seafarer's, 2019)

10.14 **Are appropriate stoppers in use and are the mooring ropes turned up to bitts correctly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
With fibre ropes, the stopper used should ideally be of the same material as the rope being stoppered, with synthetic stoppers for synthetic lines and natural fibre stoppers for natural fibre lines. The MBL of the stopper should be around 50% of the MBL of the line being stoppered. Polyamide (nylon) stoppers should not be used on polyamide lines due to the low coefficient of friction of the material. (Safe Mooring Practice, 2009) When laying up the line onto the mooring bitts, the first one or two turns should be taken directly around the first post of the bitts before the rope is laid up in a figure eight around the bitts. Once a rope is laid up on the bitts the stopper should be released from the rope. Drum ends are not designed to have mooring ropes secured to them for long periods of time. Ropes should never be left on drum ends when not tensioned; they must always be laid up on the bitts.

10.15 **Do controls, linkages, operating levers, brake drums, brake linings and pins of winches appear to be in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The brake drum should be free of corrosion, pitting and rust scale. The grease nipples should be free of rust, salt, and grit. Check the brake lining for significant wear. Brakes should be closely examined to ensure all linkages are working correctly, brake band material thickness is adequate, and the condition of the brake lining is satisfactory. Equipment manufacturer's manuals will provide details of the permitted minimum brake band thickness. Clutches should operate smoothly and pins for securing the clutches should be attached to the clutch control levers ready for use. Winch control levers must be marked with the direction of operation for both paying out and heaving in. Drum ends should be kept free from damage, rust, and paint. The bed plates of winches should be regularly inspected for deterioration or damage.

10.16 **Are the pedestal fairleads, roller fairleads and other rollers free of grooving, well-greased and free to turn? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Regular visual inspections of all types of fairleads should be incorporated in the Plan Maintenance System. Excessive clearance between roller and pedestal table is an indication that the roller pin is worn, meaning it will have lost part of its original strength and may fly back when under tension. Grooving over part of the surface of the roller indicates that the roller is frozen and that the line/wire is always chafing against the roller in the same area. Grooving or corrosion and scale accelerates damage to the mooring lines/wires. If the fairlead is subsequently used for lines with a different diameter, the sharp edges of the groove will damage the line through abrasion and chafing.

10.17 **Are the fairleads, rollers, bitts chocks and other items of mooring equipment clearly marked with the relevant SWL? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The SWL of each shipboard fitting should be marked (by weld bead or equivalent) on the deck fittings used for mooring. The SWL should be expressed in tonnes (letter 't') or in kilo newtons (letter 'KN').

10.18 **Are the windlasses, anchors, locking bars and cables in good order, operating effectively and is their maintenance incorporated in the plan maintenance system? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The following should be incorporated in the plan maintenance system:

> Inspection of the anchor, anchor shackle, enlarged links, swivel, joining shackles (Kenter / Baldt / Lugless), anchor D shackles, shackle pins, crown pin, joining shackles, flukes, and shanks for damage, wear down and missing items.
> Inspection of the cable for damage, wear down and loose studs. IACS class societies require anchor cable replacement when wear down exceeds 12% diameter.
> Inspection of cable markings, both permanent and painted.
> Brake band thickness and condition of mating surface, brake functionality – periodically test brake holding capacity.
> Maintenance of hoist motors in accordance with manufacturer's recommendations.
> Gypsy for wear down.
> Ranging of cables for inspection at routine dry dockings in line with Class requirements.
> Check wear down of guillotine bar, hinge and securing pin.
> Inspection of devil's claw – if the devil's claw is damaged it should be replaced. Repair of devil's claw is not an acceptable practice.
> Renewal of wire lashings periodically when damaged / corroded.

10.19 **Have the anchors been tightly secured in the hawse pipe? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Whilst moored alongside and anchors are not in use, they should be properly secured by brake and guillotine. The anchors should be housed in hawse pipes properly.

Tight securing of the anchor in the hawse pipe during voyage will avoid excessive vibrations and prevent possible detachment of D-shackle.

(Anchor loss-technical and operational challenges and recommendations, 2016)

10.20 **Are the chain locker doors firmly battened down and are the bitter end securing arrangements located outside the chain locker and accessible? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The bitter end should be inspected regularly; the tools for quick release should be available.

The fastening should be provided with a means suitable to permit, in case of emergency, an easy slipping of the chain cables to sea, operable from an accessible position outside the chain locker. A specially marked (red painted) sledge hammer should always also be installed in an accessible position to allow the release of the cable in any emergency.

(Anchoring, Mooring and Towing Equipment, 2016)

10.21 **Is the master aware of the limitations of anchoring equipment? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Anchoring equipment is only to be used for the temporary mooring of a vessel, within a harbour or a sheltered area, when awaiting berth, tide, etc. It is particularly emphasised that the equipment is not designed to hold a ship off a fully exposed coast in bad weather or to stop a vessel from drifting.

The rules for anchoring equipment, including the grade, length and size of chain, the number and weight of the anchors, the strength of the chain stoppers and the power of the anchor windlasses and the brakes are established by the class societies.

They can be found in the rules of the individual societies, or in the unified rules of IACS, the International Association of Class Societies. It is important to be aware that these are minimum requirements, and to know the assumptions made in the calculations.

For each vessel, the class society will calculate an equipment number by using a formula, which includes the displacement of the vessel, the breadth of the ship and the height from the summer load waterline to the top of the uppermost house, as well as the profile view area of the hull, superstructures, and houses above the summer load waterline.

Thus, the forces on the ship by current and wind from both the front and the sides are taken into account.
The formula is based on an assumption that the speed of the current may reach 2.5 m/sec, and wind speed of 25 m/sec (which represents quite high forces), but it is also assumed that the vessel can use a scope between 6 and 10 – the scope being the ratio between lengths of chain paid out and water depth.

However, large ships at deep anchorages do not have sufficient chain on board to reach scopes of such magnitude. If a ship is at anchor in ballast condition, the Master should also bear in mind that wind forces acting on the ship may be much larger than the calculations have accounted for, as larger ship side areas are now exposed while the measurements entered in the formula were taken from the summer load water line.

(Limitations of a vessels' anchoring equipment, 2010)

10.22 **Has the vessel been provided with a ship-specific emergency towing booklet? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Applicable to cargo ships constructed on or after 1st January 2010; and cargo ships constructed before 1st January 2010, with effect from 1st January 2012.

> The Emergency Towing Booklet (ETB) should be ship-specific and presented in a clear, concise, and ready-to-use format (booklet, plan, poster etc.).
> A minimum of three copies should be kept on board and located in:
1. The Bridge
2. A forecastle space
3. The ship's office or cargo control room

> The emergency towing procedure shall include:
1. Drawings of fore and aft deck showing possible emergency towing arrangements
2. An inventory of equipment on board that can be used for emergency towing
3. Means and methods of communication
4. Sample procedures to facilitate the preparation for and conduct of emergency towing operations.

(SOLAS 74, 2014)

10.23 **If the vessel's deadweight is 120,000 or more, does it meet the Pilbara Ports Authority (PPA) requirements for towing?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The requirement for Capsize with deadweight of 120,000 or more calling the Port Hedland to have a set of 120 T SWL bitts and leads came into force as of 01 February 2021.

Pilbara Ports Authority (PPA) requires all vessels deadweight 120,000 or more to have at least one set of bitts and Panama leads / roller fairleads on the vessel's aft deck at or near the centreline to be rated to a minimum of 120 T safe working load (SWL).

Rightship recommends that the PPA Towing Arrangement, associated foundation and supporting structure should be subject to periodic survey, at least once every 5 years, and maintained in good order. PPA Towing Arrangement should be permanently marked with their SWL and appropriate serial number so that certificates can be easily cross referenced. The ships should also hold a certificate attesting to the strength of the PPA Towing Arrangement foundations and associated ship supporting structure substantiated by detailed engineering analysis or calculation. The classification society should issue the certificates.

Section 11: Radio and Communication

11.1 **Has a qualified person other than the master been designated to handle distress and safety radio communication? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Every ship shall carry personnel qualified for distress and safety radio communication purposes to the satisfaction of the Administration. The master is assumed to be qualified for GMDSS operation, but as the captain is not expected to take the primary responsibility for radio communications during distress incidents, a second qualified operator is required.

11.2 **Is communication equipment, listed in the Record of Equipment attached to the Safety Radio Certificate or Safety Certificate (Form R or Form C), in good condition and has the GMDSS Logbook (the Radio Log) been maintained correctly and are daily, weekly and monthly tests being carried out? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The master must nominate one or more crew members, normally the person/s qualified for distress and safety radio communications, to maintain the radio log and to carry out the tests and checks of the equipment. **Daily test:** > The proper functioning of the Digital Selective Calling (DSC) facilities without radiation of signals, by the use of the equipment's internal test facility. > Battery voltage checks. Mainly the battery ON LOAD and OFF LOAD voltages should be checked by a voltmeter connected to the charger. > Check that all printers are in a working condition. **Weekly test:** > Proper operation of the DSC facilities by means of a test call when within the communication range of a coast station fitted with DSC equipment. > If batteries are not the reserve source of energy for the GMDSS equipment, the reserve source shall be tested. **Monthly test:** > The EPIRB should be examined by carrying out a self-test function without using the satellite system. > The Search and Rescue Transponder (SART) is equipped with a self-test mechanism to test the operational function of the beacon. The SART to be tested using the ship's X band radar. > Each survival craft should carry two-way VHF equipment to ensure proper operation in case of a distress situation. It should be tested on a frequency other than vhf channel 16 (156.8 MHz). The expiry date of the battery needs to be checked and changed when required. > Battery: The battery connections and compartment should also be checked. The level of the electrolyte and the specific gravity of each cell should be checked and recorded. > All antennas for security of mounting and visible damage to the cables and insulators.

11.3 **Has the Satellite EPIRB been correctly installed, tested and maintained? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Satellite EPIRBs shall be tested at intervals not exceeding 12 months for all aspects of operational efficiency, with particular emphasis on frequency stability, signal strength and coding. Satellite EPIRBs are subject to shore-based maintenance at intervals not exceeding five years. (SOLAS 74, 2014) 406 MHz EPIRBs are to be physically examined and the self-test function checked at least once per month. Check that the EPIRB ID and other information (include call sign and MMSI of the ship) is clearly marked on the outside of the equipment. Check for the presence of beacon operating instructions.

11.4 **Is the most current edition and up to date List of Radio Signals available on board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The record of Equipment for Cargo Ship Safety (Form E) attached to the Cargo Ship Safety Equipment Certificate should be endorsed, if electronic nautical publications are provided.

11.5 **Is the vessel equipped with sufficient portable two-way UHF radios, for use in general on-board operations? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The GMDSS portable survival craft UHF units are designed for emergency use only. These radios are not for use in general on-board operations. Sufficient portable radios with chargers and spare batteries should be available to allow communications between the chief officer, deck officer in charge of cargo operations, the deck watch, and the master.

11.6 **Are Search and Rescue Radar Transponders (SARTs) in good order and tested regularly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Search and Rescue Radar Transponder as a part of GMDSS is subject to annual testing (IMO Resolution A.802 (19). One SART is required for ships of between 300 and 500 gross tons. Two SARTs are required for ships 500 gross tons or greater. Each SART should have self-test capability (Resolution A.802 (19) Performance Standards for Survival Craft Radar Transponders for use in Search and Rescue Operations, 1995) Check that the battery expiry label shows sufficient battery life to cover the next routine voyage.

11.7 **Are survival craft portable VHF radios in good order and charged? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Equipment for which the source of energy is intended to be user-replaceable should be provided with a dedicated primary battery for use in the event of a distress situation. This battery should be equipped with a non-replaceable seal to indicate that it has not been used. (Resolution A.809 (19) Performance Standards for Survival Craft Two-Way Radiotelephone Apparatus, 1995)

11.8 **Is the AIS static, dynamic and voyage data up to date and has an AIS annual test been performed and the record avilable on board? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Automatic Identification System (AIS) shall be subjected to an annual test by an approved surveyor or an approved testing or servicing facility. A copy of the test report shall be retained on board and should be in accordance with a model form set out in the annex to MSC.1/Circ.1252. (SOLAS 74, 2014) (MSC.1/Circ.1252, Guidelines on Annual Testing of the Automatic Identification System (AIS), 2007) Static data that is set up during equipment installation and includes information such as MMSI, IMO Number, International call sign, beam, and ship type. Dynamic data that is current navigation information including position, course, speed, and navigational status (at anchor, moored, underway or special condition); and Voyage data relates to the specific voyage and include information on draft, destination, ETA and hazardous cargo. It is important that the AIS is operated correctly and that watch keepers are familiar with the equipment, including how to check that all information being transmitted by AIS is both accurate and update. (Bridge Procedure Guide, 2016) According to IMO guidelines provided by Resolution A.917(22), AIS should always be in operation when ships are underway or at anchor. Only if the master believes that the continual operation of AIS might compromise the safety or security of the ship, the AIS may be switched off. The master should report the switch-off and the reason for doing so to the competent authority. Actions of this nature should always be recorded in the ship's logbook together with the reason for doing so. Rightship recommends that the date and time of switching on (and off as per above) should be recorded in the deck logbook. Deliberately turning off the transmitter signal without legitimate reason represents a breach of SOLAS and puts the ship in breach of flag state regulations.

11.9 **Is there a Shore-Based Maintenance Agreement in place to fulfil the maintenance requirements? (M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
A shore-based maintenance agreement / certificate is needed on board to fulfil the maintenance requirements as mentioned in the "SOLAS GMDSS" regulations (CHAPTER IV Reg. 15) and the Radio Maintenance Guidelines (RES. A702-17), for GMDSS equipment sailing in Sea Area A2-A3-A4.

Section 12: Security

The inspector should not sight the sensitive security materials.

12.1 **Is access to the ship being controlled by an adequate deck watch? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Even if it is not applicable under local regulations for some vessels to comply with the ISPS Code, it must be borne in mind that it is good practice to have a member of the vessel's crew permanently stationed at the gangway for safety purposes. They will be able to assist persons transiting the gangway as required and to monitor any dangerous practices. The watchman must keep in mind that he is the first point of contact on the vessel for the person boarding. If a vessel is alongside a berth affected by tidal conditions, constant reassessment of the situation should be carried out. In addition, the watchman must have access to the times of high and low waters and be aware of any cargo operations which may affect the vessel's trim. If a watchman is not present at the gangway and an incident occurs, the vessel's crew may carry on with their duties unaware of the situation.

(Gangways, 2014)

The deck watch has a responsibility to make all visitors aware of any specific hazards of the cargo or operations onboard the vessel and point out instructions to visitors what to do in the event of an emergency.

12.2 **Has a Ship Security Officer (SSO) been appointed and trained adequately to perform the duties of SSO and have all crew received security-related training and instructions? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The duties and responsibilities of the SSO shall include, but are not limited to:

- Undertaking regular security inspections of the ship to ensure that appropriate security measures are maintained
- Maintaining and supervising the implementation of the SSP, including any amendments to the plan
- Coordinating the security aspects of the handling of cargo and ship's stores with other shipboard personnel and with the relevant PFSOs
- Proposing modifications to the SSP
- Reporting to the company's security officer (CSO) any deficiencies and non-conformities identified during internal audits, periodic reviews, security inspections and verifications of compliance and implementing any corrective actions
- Enhancing security awareness and vigilance on board
- Ensuring that adequate training has been provided to shipboard personnel, as appropriate
- Reporting all security incidents
- Coordinating implementation of the SSP with the CSO and the relevant PFSO
-
- Ensuring that security equipment is properly operated, tested, and calibrated, and ensuring the occurrence of ship security drills and exercises.
- Ensuring the proper maintenance of all records pertaining to the ship's security
- Notifying the CSO of ship security incidents and any breaches of this regulation. In the absence of a CSO, notify law enforcement agencies and other law enforcement respondents of ship security incidents and any breaches of this regulation, and
- Ensuring that all security measures set forth in this regulation are implemented and enforced.

(ISPS Code, 2003)

In accordance to the revised STCW 2010 Code as of 1st January 2014 all seafarers must receive approved security awareness training.

(STCW code Reg A-VI/6-1)

12.3 **Are deck officers familiar with the function and use of the Ship Security Alert System and is the Ship Security Alert System being tested regularly? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The inspector shall not ask for the details and location of the ship's Security Alert System. All ships constructed after 1st July 2004 shall be fitted with a ship security alert system. The ship security alert system shall, when activated, initiate, and transmit a ship-to-shore security alert to a competent authority, which in these circumstances may include the Company, identifying the ship, its location and indicating that the security of the ship is under threat or it has been compromised. It shall not send the security alert to other ships or raise the alarm on board, and it shall continue until deactivated or reset. The ship security alert system shall be capable of being activated from the navigation bridge, and in at least one other location. (SOLAS 74, 2014)

12.4 **If the vessel transits or may transit a high-risk piracy area, are updated security charts and publications being provided? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
ADMIRALTY Maritime Security Charts contain safety-critical information to assist bridge crews in the planning of safe passages through high-risk areas. All information has been gathered by the UKHO through work with NATO and other government organisations, ensuring each chart has the most accurate, up-to-date, and verified information available. Each Maritime Security Chart includes: > Information about dangers to the security of navigation including piracy, terrorism, embargoes, mine warfare, exclusion zones, blockades, and illegal fishing. This information, when used alongside official navigational charts, can help to ensure the safety of ships, crew, and cargo. > General security advice, self-protective measures, security procedures and regional contacts, as well as routeing and reporting requirements implemented by military or security forces. > Weekly updates and new editions to help maintain high levels of accuracy and safety. Guides also include ADMIRALTY Quick Response (QR) codes for quick access to a list of all Notices to Mariners (NMs) that affect the specific chart or publication. > Maritime Security Charts should be kept up to date with the latest security-critical navigational information. The Security Related Information to Mariners (SRIM) service provides all the data needed to maintain your charts from official government sources. (Admiralty.co.uk, 2018)

12.5 **If the vessel transited or may transit an area with a high risk of piracy, has a voyage risk assessment been produced? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The company's security officer (CSO) and the vessel's master have the combined responsibility to produce a voyage risk assessment. The procedure for this should be outlined in the vessels SMS. The risk assessment should include: > Highlighting areas of increased threat to the vessel. Identify the high-risk areas for that region > Identifying methods often used by pirates in these areas, and vulnerable areas where pirates could board > The ships own characteristics including handling, freeboard, speed, and general arrangement > Military or official organisation cooperation and reporting requirements > Existing guidelines and information sources > Ship and company procedures, communication, and chain of command. The vessel's manager should implement appropriate measures to meet the threat of piracy by adopting IMO and other industry-recommended practices suitable for the circumstances of the voyage and ship type. (Maritime Security – General Recommendations, 2017)

12.6 **Have preventive measures been taken by the master and crew during the stay in port and prior to departure to prevent stowaways? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The issue of stowaways is one which has existed ever since vessels began to trade. Procedures for the prevention of stowaways should be incorporated in the Safety Management System and should be effectively implemented by the master and the crew on board the ship.

12.7 **Are cyber security policies and procedures being incorporated in the safety management system and was the cyber security management system evaluated and certified by Class? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record N/C if cyber risk management has not been incorporated into the vessel's SMS by the company's first annual verification of the DOC after January 1, 2021. The cyber security management shall: > Identify the roles and responsibilities of users, key personnel, and management both ashore and on board > Identify the systems, assets, data and capabilities, which if disrupted, could pose risks to the ship's operations and safety > Implement technical measures to protect against a cyber-incident and ensure continuity of operations. This may include configuration of networks, access control to networks and systems, communication and boundary defence and the use of protection and detection software > Implement activities and plans (procedural protection measures) to provide resilience against cyber incidents. This may include training and awareness, software maintenance, remote and local access, access privileges, use of removable media and equipment disposal > Implement activities to prepare for and respond to cyber incidents. (The Guidelines on Cyber Security On board Ships, 2017) The cyber security management system shall be evaluated and certified based on international standards such as ISA 62443 4-2, IEC 61162-460.

12.8 **Are measures in place for controlling the use of removable media such as USB memory sticks, CDs, DVDs, and diskettes on shipboard computers? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Removable media is a collective term for all methods of storing and transferring data between computers. This includes laptops, USB memory sticks, CDs, DVDs, and diskettes. Transferring data from uncontrolled systems to controlled systems represents a major risk of introducing malware. Removable media can be used to bypass layers of defences and can be used to attack systems that are otherwise not connected to the internet. A clear policy for the use of such media devices is essential; it must ensure that media devices are not normally used to transfer information between un-controlled and controlled systems. To avoid unauthorised access, removable media blockers should be used on all physically accessible computers and network ports. (The Guidelines on Cyber Security on board Ships, 2017) Critical equipment such as ECDIS should be protected from malware and virus attack. Access to USB and RJ-45 ports shall be controlled – i.e., disable or lock the ports.

Section 13: Machinery Space

13.1 **Are adequate engineering procedures, instructions and guidelines included in the SMS? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The following engineering procedures / instructions shall be provided: > Organisation in Engine Room and operation > Operation of machinery space in UMS (Unmanned Machinery Space) mode, when applicable > Reporting damage or defect to machinery or equipment > Engine room emergency response and action > Plan Maintenance System (PMS) > Recovery after blackout shall be incorporated in the SMS > Spare parts inventory

13.2 **Is an engineer manning matrix in place and are the responsibilities of watch standing engineers and engine ratings clearly defined and posted in the Engine Control Room? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record the manning level in the engine room during berthing, unberthing and long manoeuvring. The engineer manning matrix shall clearly define the manning level in the engine room when the engine is on standby during long manoeuvring, critical operations, berthing and unberthing. The composition of the engineering watch shall, at all times, be adequate to ensure the safe operation of all machinery affecting the operation of the ship, in either automated or manual mode, and be appropriate to the prevailing circumstances and conditions. When deciding the composition of the engineering watch, which may include appropriately qualified ratings, the following criteria shall be amongst those considered: > The type of ship and the type and condition of the machinery > The adequate supervision, at all times, of machinery affecting the safe operation of the ship > Any special modes of operation dictated by conditions such as weather, ice, contaminated water, shallow water, emergency conditions, damage containment or pollution abatement > The qualifications and experience of the engineering watch > The safety of life, ship, cargo and port, and protection of the environment > The observance of international, national, and local regulations, and > Maintaining the normal operations of the ship. (STCW, 2010)

13.3 **Have specific standing orders been prepared by the chief engineer and have these orders along with the night order book been read, understood, and signed by the watch standing engineers, engine crew and electrical engineer, where applicable? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The standing orders shall give basic direction and guidance on the basis of the specific requirements of the ship's management, as well as the chief engineer's own requirements, for the specific vessel, the trade and experience of engineers on board at the time. Night orders should be written when required to supplement the standing orders for night watch engineers. Night order is not required for the period the machinery space is unmanned.

13.4 **If the vessel has been certified for periodically unattended machinery spaces (UMS), is the machinery space being operated in that mode? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record a N/C if the machinery space is not being operated in UMS mode, as result of defective equipment/machinery or unreliability of the UMS system. The N/C shall not be raised if the machinery space of the vessel is manned for operational reasons, such as transiting high-risk of piracy areas, hold cleaning and manoeuvring, provided there are sufficient engineers and crew on board to man the machinery space safely.

13.5 **If the engine room is not being operated in UMS mode, are there sufficient engineers and crew on board for safe operation of the machinery space? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
In case the Engine Room (ER) is not suitable for unmanned operation, the composition of the crew should be adapted for manned ER services.

13.6 **Have the entry requirements to the engine room when operating in UMS mode been documented, posted at the entrance to the engine room and understood by all crew? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Seafarers should never enter or remain in an unmanned machinery space alone unless they have received permission from or been instructed by the engineer officer in charge at the time. They may only be sent to carry out a specific task that they may be expected to complete in a comparatively short time. Before entering the space, at regular intervals whilst in the space and upon leaving the space, they must report by telephone, or other means provided, to the duty deck officer. Before they enter the space, the method of reporting should be clearly explained. If it is the engineer officer in charge who enters the machinery space alone, they too should report to the deck officer before entry, at regular intervals whilst in the space and upon leaving the space. Notice of safety precautions to be observed by seafarers working in unmanned machinery spaces should be clearly displayed at all entrances to the space. Warning should be given that in unmanned machinery spaces there is a likelihood of machinery suddenly starting up. If there is a personnel alarm system in place, reporting at regular intervals may be omitted. A personnel alarm is a system that will indicate a person's presence and their well-being in unmanned machinery spaces. Vessels without a personnel alarm system should have additional guidance recorded in the safety management system. (Code of Safe Working Practices for Merchant Seafarer's, 2020)

13.7 **If an engine room dead man alarm (personnel alarm) is provided, is it being set correctly and in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The personnel alarm should automatically give an alarm on the navigating bridge or in the officers' quarters as appropriate, if it is not reset from the machinery spaces in a period satisfactory to the Administration, but not exceeding 30 minutes. A pre-warning signal should be provided in the machinery spaces which operates 3 minutes before the alarm required by the above paragraph is given. The alarm system is to be put into operation: > Automatically when the engineer on duty has to attend machinery spaces in case of a machinery alarm, or > Manually by the engineer on duty when attending machinery spaces on routine checks. The alarm system is to be disconnected by the engineer on duty after leaving the machinery spaces. When the system is brought into operation automatically, disconnection should not be possible before the engineer has accepted the alarm in the machinery spaces. The personnel alarm may also operate the engineers' alarm. (Code on alerts and indicators 2009, 2010)

13.8 **Is an engineer's calling alarm system fitted and is it tested regularly, in good order and the results recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

When it is safe and agreeable by the master, the inspector shall test the engineer call alarm.
Engineers' alarm.

In addition to manual operation from the machinery space, the engineers' alarm on vessels with periodically unattended machinery spaces should operate when the machinery alarm is not accepted in the machinery spaces or control room in a specified period of time, e.g., two minutes.

(Code on alerts and indicators 2009, 2010)

13.9 **Is the engine room logbook being properly maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

In the absence of the engine room alarm logging printer, manual records shall be kept on board.

The followings should be recorded correctly in the engine logbook:
- Readings and parameters of main propulsion engine
- Readings and parameters of auxiliary engines
- Readings and parameters of other running machineries
- Main engine RPM and load on the engine
- Daily entry for all the lube oil ROB
- Daily entry for all grade of fuel oil ROB
- ROB value of sludge and bilge
- Running hour counter for important machinery
- Record of any major breakdown and reason for the same
- Record of all bunkering operation (time, place, and quantity)
- Record of soot blow for the boiler tube (Soot blowing should be performed when the vessel is at sea and/or outside the port limit)
- Record the start and stop times of UMS mode

The engineer watch keeper should sign the logbook after completion of watch and the chief engineer should sign the logbook on a daily basis.

Errors made in the log should be struck through with a single line and initialled and dated. Correction fluid must not be used for correction of error made in the logbook.

13.10 **Are procedures to recover essential equipment documented and posted in the engine room? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The inspector shall check if the engineers are familiar with the equipment which is shed on the operation of the preferential trip.

A ship's specific procedure should be readily available and posted in the engine control room and at the local position near equipment which, where applicable, covers the following:
- Restoring power from the emergency to the main switchboard
- Charging the air receivers and starting the main diesel generators in order to provide electrical power to all auxiliaries (fuel and lubricating oil pumps and the boiler supply)
- Restarting all auxiliaries
- Restarting the main engine

Use of schematic diagram or photograph along with instructions is an example of effective procedure/instructions.

The preferential trip is a part of the ship's generator protection system. It is the electrical arrangement on ships which is designed to disconnect the non-essential circuits (i.e. supplying non-essential load) from the main bus bar in case of partial failure or overload of the main supply. The non-essential circuits or loads on ships are air conditioning, exhaust and ventilation fans, and galley equipment which can be disconnected momentarily and can be connected again after fault finding. The main advantage of preferential trip is that it helps in preventing the operation of main circuit breaker trip and loss of power on essential services and thus prevents blackout and overloading of the generator. The preferential trip operates at timed intervals and the load is removed accordingly. If the overload persists, then an audible and visual alarm is sounded. The preferential trip is an important electrical circuit which helps remove excessive load from the main bus bar, thus preventing a blackout.

The crew should be familiar with the equipment which is shed on the operation of the preferential trip. This is often a multi-stage process with first and second stage tripping arranged to shed load. The items are usually indicated on the switchboard to show what is shed for each level of trip.

(Reducing the Risk of Propulsion Loss, 2017)

13.11 **Is an effective and up to date planned maintenance system available and being followed on board the vessel? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

RightShip recommends a computer-based planned maintenance system on board the vessel.
Record N/C if:

- The vessel is not equipped with a computer-based planned maintenance system
- The officers and engineers are not familiar with the use of software and have not received formal training
- The automatic data feed in almost real time cannot be take place between the vessel and the ship's manager.

The planned maintenance system is mandatory as per the International Safety Management Code (ISM) Section 10.1 and the best practices set out in Dry Bulk Management Standard (DBMS). The planned maintenance system (PMS) shall be a paper or software-based system which allows ship owners or the vessel's manager to carry out maintenance in intervals according to manufacturers and classification society requirements.

An effective PMS streamlines the planning, documentation and implementation of maintenance work and surveys on board ship. The followings minimum requirement shall be incorporated in an effective PMS:

- The description and documentation of the planned maintenance system are to be in the English language and/or working language of the crew
- Planned maintenance program must include equipment manufacturers' requirements
- Inventory content, i.e., items/systems
- Maintenance time intervals, i.e., time intervals at which the maintenance jobs are to take place
- Maintenance instructions, i.e., maintenance procedures to be followed
- Maintenance documentation and history, i.e., documents specifying maintenance jobs carried out and their results
- Reference documentation, i.e., performance results and measurements taken at certain intervals for trend investigations from delivery stage
- Document flow chart, i.e., chart showing flow and filling of maintenance documents such as planning cards, job cards etc
- Signing instructions, i.e., who signs documents for verification of maintenance work carried out

In addition to the above, the computerised planned maintenance systems shall provide:

- A unique login ID and password for each person performing the maintenance/inspection
- Adequate backup – either backup copy on board or a regular exchange of data between ship and office
- Automatic Data Transfer – synchronisation of data between the fleet of vessels and ship's management office using the import/export functionality automatically or manually when required, enabling the vessel's manager to monitor the status of maintenance on board the ship.

The planned maintenance system must be approved when the vessel entered the planned maintenance scheme of a classification society. A type approval certificate for the software of the planned maintenance system is required.

If the is vessel accepted by the classification society for an approved planned maintenance scheme for machinery (PMS), as an alternative to the continuous machinery survey (CMS), it considers surveys to be carried out on the basis of intervals between overhauls recommended by manufacturers, documented operator's experience and a condition monitoring system, where fitted. Access to computerized systems for updating the maintenance documentation and maintenance program shall only be permitted by the chief engineer or other authorised person. A computerised and approved planned maintenance system shall be provided. Computerised systems shall include back-up devices, such as CDs which are to be updated at regular intervals.

Condition Monitoring System:
Machinery or technical installations, which are subject to a condition monitoring system, shall be surveyed in line with the requirements described in the "Guidelines for Machinery Condition Monitoring" of the classification society. Prerequisite for this special survey arrangement CM is the existence of a computerized planned maintenance system (PMS). The elements of the PMS considering the machinery components or part of them covered by condition monitoring shall be approved by the classification society. When a vessel entered the condition monitoring scheme of the classification society, the vessel manager shall consider following:

- The maintenance strategy adopted must be clearly documented in the PMS / SMS – the full scope must be documented and fully understood by all engineers and shore-based technical
- CBM/CBO inspection intervals must be adhered to and proper records must be maintained (measurements, observations, clearances, oil/fuel analysis, performance reports and photos)
- There must be evidence that CMB/CBO reports are factored in to determining predictions of revised next full overhaul hours, and these should be clear in the PMS
- There must be evidence that the maker's instructions for CBM/CBO strategy are complied with
- The maker's associated Service Letters must be readily at hand to support the CBM/CBO strategy as associated reference guides
- There must be objective evidence to show that shore technical are actively involved in the ongoing review of inspection records/results
- CMB/CBO does not absolve the ship from maintaining a sufficient number of spare parts on board if overhaul is unexpectedly required

When PMS notation was assigned to the vessel, the latest version of the PMS shall be installed on board, and the Type Approval certificate for the specific PMS version should be available on board.

13.12 **Is critical equipment identified and are a sufficient spare part available as per the manufacturers' recommendations? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Company should determine critical spare part list for ECDIS and make them available on board. List of minimum spares related to ECDIS should be included in the vessel's Plan maintenance system to ensure reinstatement of ECDIS in the event of a failure. This should be done in consultation with ECDIS maker and identifying spares to be replaced during preventive maintenance should also contribute toward increasing ECDIS reliability. (Recommendations on Usage of ECDIS and Preventing Incident, 2020) The Company should develop and implement a formal procedure which defines the process to produce a list of equipment and technical systems which may result in hazardous situations in the instance of sudden operational failure. The responsibilities for the identification of critical equipment should be defined and indicated in the procedure. As guidance, the company should consider the following measures that may assist in generating a useful list of critical equipment: > Identification of shipboard operations which are vital to safety and to the protection of the environment > Assessment of risks, especially during critical shipboard operations, and > Root cause analysis in the case of near miss/accident investigation. (ISM code and guidelines on the implementation of the ISM code, 2010) The OCIMF information paper "Safety Criteria Equipment and Spare Parts Guidance" provides further information. Please download the document via HERE.

13.13 **Are the major components of the main engine maintained as per manufacturer's recommendations and records of periodic maintenance kept? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Random checks should be made by inspectors to ensure that the periodic maintenance of fuel valve, fuel pump, exhaust valve, cylinder cover, pistons, liner, cross head, bottom end, main bearing, turbo charger and governor of the main engine units had been done as per manufacturer recommendation. The main engine shall appear well maintained and free of any leaks.

13.14 **Are the major components of the auxiliary engines maintained as per manufacturer's recommendations and records of periodic maintenance kept? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Periodic maintenance intervals recommended by the manufacturer shall be followed. Random checks should be made by inspectors to ensure the periodic maintenance of fuel valve, fuel pump, cylinder cover, piston, liner, bottom end, main bearing, and turbo blower of the auxiliary engines had been done as per manufacturer recommendation. Inspector shall check the engine logbook entries to see that any idle generators had been run recently. The auxiliary engines shall appear well maintained and free of any leaks. Check that the automatic switch over arrangements and protection devices such as reverse power relays are in good order.

13.15 **Are the emergency escape routes clearly marked, free of obstruction and adequately lit? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
In the event of the engine room being filled with smoke, even light smoke, the escape routes, and doors from the engine room may be obscured and therefore they should be more clearly indicated. The crew cannot see a white door against a white bulkhead. Whatever paint is used it should be a water-based paint rather than an oil-based paint, so as not to affect the properties of the class 'A' fire doors that are always fitted to the engine room exits. Pad eye, shackle, single block, rope, and harness should be provided for lifting an incapacitated person from engine room. (RISK FOCUS: CONSOLIDATED 2017 Identifying major areas of risk, 2017)

13.16 **Is the lighting illumination level in engine room space adequate (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Broken lighting reduces the ability of the crew to work effectively and safely in the engine room.

13.17 **Is the emergency equipment tested, in good condition and the result recorded? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The emergency fire pump, main fire and foam pumps, emergency air compressor, emergency generator, emergency generator switchboard, emergency steering, emergency stops, engineers' alarms and bilge pumping system, where applicable, shall be tested. Testing of the emergency generator should be carried out under load at least annually. The inspector should ask the engineer accompanying, the method of automatic sequential test. This testing is not to be carried out during a RightShip inspection. The emergency air compressor, if fitted, should be regularly tested to the starting pressure of the diesel generator. The emergency air reservoir should be permanently maintained at the required pressure.

13.18 **Are engine room emergency stops for ventilation fans and the closing mechanism of ventilation supply and exhaust ducts clearly marked, in working condition, and do records indicate that they have been regularly tested? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.19 **Are engine exhausts and other hot surfaces effectively shielded against oil spray and are flanges and connections of flammable liquid pipelines adequately protected with guards and spray tape? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Spray from engine room equipment can be at relatively high pressures and can spray many metres from the source of the leak. Almost invariably there is a hot exhaust or some other hot surface nearby. Typically, these can be at a temperature greater than the auto ignition temperature of the sprayed liquid, resulting in a fire. (Swedishclub.com, 2018) Surfaces with temperatures above 220°C which may be impinged as a result of a fuel system failure shall be properly insulated. Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter, or heater from coming into contact with heated surfaces. (SOLAS 74, 2014) A perfect insulation of all exhaust pipes and other hot surfaces will make an engine room more fire safe. When installing the spray tape on flanges its width should cover the entire surface of the flange and a minimum of 100 mm on both sides of the pipe joint. This is required to ensure enough adhesive surface strength in case when high pressure expands installed material.

13.20 **Is lagging and insulation, free of any significant oil impregnation ? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Lagging and insulation should be in good condition and free from oil.

13.21 **Are main engine bearing temperature monitors or crankcase oil mist detector(s) in good condition and regularly tested as per manufacturer instruction? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Internal combustion engines of 2,250 kW and above or having cylinders of more than 300 mm bore shall be provided with crankcase oil mist detectors or engine bearing temperature monitors or equivalent devices. (SOLAS 74, 2014) Regardless of if the vessel has a UMS notation assigned, if engine bearing temperature monitors or an Oil Mist Detector is fitted, they should be regularly tested and maintained as per manufacturer instructions and the inspector should satisfy that they are in good working order.

13.22 **Are the main, emergency switchboards and local starter panels surrounded by non- conducting mat and are the mats in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Where necessary, non-conducting mats or gratings shall be provided at the front and rear of the switchboard. (SOLAS 74, 2014) Non-conducting deck coverings, such as non-conducting mats or gratings, suitable for the specific switchboard voltage, should be installed for personnel protection at the front and rear of the switchboard and should extend the entire length of, and be of sufficient width to suit, the operating space. (46 CFR 111.30-11- Deck Coverings, 2009) Some decks are made from insulating composite material and will not need extra insulation.

13.23 **Are the self-closing valves and gauge glasses being maintained and in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Self-closing valves are fitted between the lower end of an oil tank and its gauge glass. The purpose of these valves is to isolate the tank gauge glass from the tank. In normal operation they should be shut and only opened to check the tank contents, after which they should shut automatically under spring pressure or counterbalance gravity. Chocks of wood, pieces of wire and purpose-made clamps shall not be used to keep these valves open. Self-closing valves are essential safety devices. They should be properly maintained and should never be tampered with. (Quick Closing and Self Closing Valves, 2011)

13.24 **Are self-closing sounding devices in good order and closed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The 'deadman' weight of a self-closing sounding device must not be removed, reversed, or lashed open. If spring-loaded types self-closing sounding device are in use, the springs must not be removed as well. Sounding rods/tapes or funnels are frequently found to be left inside the open sounding pipe for ease of operation, or for dumping of residues back into the tanks via the sounding pipes. (Engine Room Sounding Pipes, 2009) **The inspector shall record non-conformity if the above practices are noticed in the engine room.**

13.25 **Where moving machinery presents a hazard, is it guarded effectively? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Correct safety guards should be securely fixed to appliances requiring them and should be checked for security before starting any operation. Such guards should only be removed when the equipment is not operating. No machine should be used when a guard or safety device is missing, incorrectly adjusted or defective, or when it is itself in any way faulty. If any defect is identified, the machine should be isolated from its power source until it has been repaired. (Code of Safe Working Practices for Merchant Seafarer's, 2019)

13.26 **Are the protective guards, shields and emergency stop of the engine room workshop tools being maintained in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Workshop and bench machines should only be operated by competent personnel. The operator should check a machine every time before use and ensure that all safety guards and devices are in position and operative; that all tool pieces (drill bits, cutting blades, etc.) are in good condition, and that the work area is adequately lit and free from clutter. (Code of Safe Working Practices for Merchant Seafarer's, 2019) The absence of protective guards and shields on workshop machinery can cause serious eye or bodily injury not only to operators but also other crew members present in the workshop.

The guards fitted to the lathe, drill and grinder should be well maintained, transparent and made from impact-resistant material.

Regular checks on the condition of workshop machinery guards should form part of the shipboard planned maintenance system.

13.27 **Is the engine room crane and other lifting gear regularly inspected, tested, and maintained? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The engine room crane is subject to annual thorough examination every 12-month period and load test every 5 years, unless otherwise stated by the ship's flag administration.

Portable lifting gear including chain blocks, strops and slings shall be inspected and maintained on a regular basis and record of such inspection and test should be available on board.

> The engine room transverse crane beam should be clearly marked in several locations – not only on the travelling beam itself and, on the hook, but also on the internal fore and aft 'I' beam – so that no matter where you are standing on the engine room top plates the SWL of the equipment is clearly visible.

> Shackles are by their nature a 'link' between two components and therefore play an essential role in terms of safety. They should be marked and stamped with the safe working load (SWL).

(Lifting equipment – shackles and other loose gear, 2013)

The spring-loaded retaining 'tongue' of hooks should be in good order.

The minimum SWL for which testing is required is one tonne (1,000 kgs).

A Chain Register is not required, but documentation supporting testing, examination and maintenance should be available on board.

13.28 **Are all spare parts and loose gear in the machinery spaces, stores and steering compartment properly secured? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.29 **Is the standard of housekeeping in the machinery space and steering gear room satisfactory and are they clean and free from obvious leaks? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Emergency signage and fire and life-saving equipment should be kept clear at all times. Instruction plates, notices and operating indicators should be kept clean and legible and should not be obstructed by other items. (Code of Safe Working Practices for Merchant Seafarer's, 2019)

Housekeeping in the engine room is critical. Keeping debris from building up in the corners of the main space or machinery flats eliminates potential fuel. Workshops, spare part storeroom, chemical stores, electrician's store/workshop should be maintained clean.

13.30 **Are engine room bilges clean and free of oil and sediment? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The presence of oil accumulated in bilges or drip trays act as additional fuel to sustain burning and increase the likelihood of the fire reaching further areas in the engine room.

The bilges, especially in the engine room, should be kept clean and free of oil at all times and chemical cleaning should be completed periodically.

("Hazards associated with dirty engine room bilges - The Shipowners' Club", 2018)

RightShip recommend painting engine room bilges a light colour to assist in visually identifying a fresh leak.

13.31 **Is the bilge high level alarm system in good order, regularly tested and are records of test maintained? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.32 **Are the sea chest, seawater pumps and related sea water lines in good order, free of hard rust and temporary repairs? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.33 **Is the following machinery/equipment, where applicable, in good order and well maintained? (V)**

- Shaft generator and emergency generator
- Boilers, including waste heat and domestic boilers (Boilers should be operated in automatic mode where the automated boilers are installed)
- Boiler safety system and instrumentation
- Boiler water safety system
- Main and emergency air compressors
- Purifiers and fuel oil handling equipment
- Refrigeration and air conditioning machinery
- Stern tube sealing arrangements
- Incinerator
- Sewage system
- Air condition and heating system
- Refrigeration plant
- Accommodation service systems (i.e., Calorifiers, Portable water equipment, heating etc)
- Any other items of machinery, including stand-by machinery.
- Burners, tubes, uptakes, exhaust manifolds and spark arrestors.

☐ Yes ☐ No ☐ N/A ☐ N/V

13.34 **Is the pipe work in the machinery space, including but not limited to steam, fuel, lubricating oil, sewage, drain and air lines well maintained, in good condition and free of any temporary repair? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.35 **Are engineers familiar with operation of the main engine from the local manoeuvring control position? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record the date of last drill in comments.

If the remote-control manoeuvring system fails to operate from the bridge and engine control room remote stations, or the governor of the main marine engine goes faulty, the engine shall be operated by the local manoeuvring control system located at the engine side or, in the case of Controllable Pitch Propeller (CCP) at the local position to control the pitch of propeller.

Procedures should be available for operation of the main engine from the local manoeuvring stand. The instructions should be posted, and communication systems should be available.

13.36 **Are crew familiar with the starting procedure for the emergency generator and how to put power on the emergency switch board? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

When agreeable by the chief engineer and safe to do so and the test switch is clearly available, the inspector shall witness the automatic starting and connecting of the emergency generator to the Emergency Switch Board (ESB) using the test switch in the ESB. Please download the guideline via **this link.**

SOLAS II-1/Reg.43.7 requires that provisions for the testing of the emergency source of electrical power, including its automatic starting arrangement, are to be made. Such testing can be conducted using a test switch provided in the Emergency Switch Board (ESB) that enables automatic starting and connecting of the emergency generator to the ESB during simulated blackout conditions, in general.

It is recommended that tests to ensure automatic starting as well as connecting of the emergency generator to the ESB shall be carried out at appropriate intervals using the test switch in the ESB.
(Operation test for automatic starting arrangement of emergency generator (Blackout simulation test), 2018)

Inspector shall review of the suitable evidence of such test onboard.

All crew members must be familiar with starting procedure of the emergency generator.

Each emergency generating set arranged to be automatically started shall be equipped with starting devices approved by the Administration with a stored energy capability of at least three consecutive starts. A second source of energy shall be provided for an additional three starts within 30 minutes unless manual starting can be demonstrated to be effective.

(SOLAS 74, 2014)

The brief instruction should be simple, clear, and understandable by all crew. The instruction shall incorporate how to put power on the emergency switch board, if the system is not automatic.

13.37 **If the starting source of the emergency generator relies on a single starter motor, has a spare starter motor been provided? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

RightShip recommends that a spare starter motor be provided if the starting source relies on that one starter motor.

13.38 **If an emergency generator is not fitted, are engine room emergency batteries in good order, fully charged and capable of supplying the designed power load up to a minimum 18 hours? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.39 **Is the earth fault monitoring equipment of the main and emergency switchboards operational and are they free of faults? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Minimum insulation resistance as per classification society requirements is 1 megohm. It is good practice to maintain the insulation resistance more than 5 megohms for 440 system and 2 megohms for a 220 Volte system. Alarm settings should be 0.2 MOhm for 220V systems and 0.5 MOhm for 440V systems. This meets the minimum insulation resistance requirement for 1000 Ohm per Volt.

13.40 **Is the emergency steering gear drill being carried out every three months? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Emergency steering drills shall take place at least once every three months in order to practise emergency steering procedures. These drills shall include direct control within the steering gear compartment, the communications procedure with the navigation bridge and, where applicable, the operation of alternative power supplies.

Simple operating instructions with a block diagram showing the change-over procedures for remote control systems and steering gear power units shall be permanently displayed on the navigation bridge and in the steering gear compartment.

(SOLAS 74, 2014)

13.41 **Is the emergency reserve tank of the steering gear system fully charged? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

A fixed storage tank shall be provided having sufficient capacity to recharge at least one power actuating system including the reservoir.

(SOLAS 74, 2014)

13.42 **Is a heading indicator and communication system provided in the steering gear room and are they in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Ships with emergency steering positions shall at least be provided with a telephone or other means of communication for relaying heading information to such positions.

(SOLAS 74, 2014)

In addition, ships of 500 GT and upwards constructed after 1st February 1992 shall be provided with arrangements for supplying visual compass readings to the emergency steering position.

(SOLAS 74, 2014)

13.43 **Is the emergency steering position rudder angle indicator in good order and clearly marked in red and green? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.44 **Is the steering gear compartment clear of obstructions and loos equipment properly secured? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

13.45 **Are suitable handrails, gratings or other non-slip surfaces provided for the steering gear compartment? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The steering gear compartment shall be provided with suitable arrangements to ensure working access to steering gear machinery and controls. These arrangements shall include handrails and gratings or other nonslip surfaces to ensure suitable working conditions in the event of hydraulic fluid leakage. (SOLAS 74, 2014)

Section 14: General Appearance - Hull and Superstructure

14.1 **Is the ship's hull clean, free of significant corrosion, extensive coating breakdown and marine growth? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Implementing practices to control and manage biofouling can greatly assist in reducing the risk of the transfer of invasive aquatic species. Such management practices can also improve a ship's hydrodynamic performance and can be effective tools in enhancing energy efficiency and reducing air emissions from ships. This concept has been identified by the IMO in the "Guidance for the development of a ship energy efficiency management plan (SEEMP). Hull resistance can be optimized by new technology-coating systems, possibly in combination with cleaning intervals. Regular in-water inspection of the condition of the hull is recommended. (GUIDANCE FOR THE DEVELOPMENT OF A SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP), 2009)

14.2 **Are the following permanent markings on the ship's hull, where applicable, plainly visible and painted in a contrasting colour? (V)**

- **The vessel's name**
- **Port of registry**
- **Load lines**
- **Draft marks**
- **Thruster warnings**
- **Tug push points**
- **IMO number**
- **Bulbous bow mark**

☐ Yes ☐ No ☐ N/A ☐ N/V

14.3 **Are the weather decks free of loose rust scale and maintained in a satisfactory condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

14.4 **Are the pipes on deck free of significant corrosion, pitting, soft patches or temporary repair and maintained in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The following deck pipes should be checked for external indications of corrosion, pitting and temporary repair:

- Hydraulic and pneumatic pipework
- Fire mains and associated fittings
- Compressed air lines
- Electrical conduit lines
- Ballast lines
- Fresh water line

Pipe securing arrangements should be maintained in good condition and allow free movement of the pipes, as necessary.

14.5 **Are all the watertight doors, weathertight doors, portholes, and wheelhouse windows maintained in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

14.6 **Are the vents and air pipes on weather decks maintained in good order and are they clearly marked to indicate the compartment they serve? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Vent head should be maintained in good condition. The flame screen, if fitted, should be clean and in good condition. The closing device which prevents the ingress of water into the space through the vent head should be in good condition and operating correctly.

14.7 **Is the cosmetic appearance of the superstructure satisfactory? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

14.8 **Are the hatch numbers clearly indicated and correctly placed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

The ship shall be provided with the hatch identification numbers used in the loading manual and loading or unloading plan. The location, size and colour of these numbers should be chosen so that they are clearly visible to the operator of the loading or unloading equipment.

(BLU Code, 2011)

Cargo spaces to be included in the computation of net tonnage are enclosed spaces appropriated for the transport of cargo, which is to be discharged from the ship, provided that such spaces have been included in the computation of gross tonnage. Such cargo spaces shall be certified by permanent marking with the letters CC (Cargo Compartment) to be so positioned that they are readily visible and not to be less than 1100 millimetres (4 inches) in height.

(International Convention on Load Lines (1966). Protocols and Organization, 2005)

14.9 **Are the deck lights, emergency lights and hold lights (where fitted) in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Hold lighting system shall be fully operational and properly maintained. The inspector shall test the lights to make sure the lighting system is operative and there is no significant earth on the switch boards.

14.10 **Are portable and fixed cargo lights used for illumination of cargo holds inspected regularly and maintained in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The synthetic lamp holder, drip shield and shade of portable cargo lights should be nonconductive and insulate the crew from electrical shock hazards. "Many bulk carrier / general cargo holds have fixed cargo lights. These can easily ignite combustible cargoes such as grain, animal feed, wood chips, pulp, and paper if they are too close to the light. Self-decomposition of fertiliser has been initiated in this manner. Cargo lights in holds need to be properly isolated before cargo is loaded". "This is best done by removing fuses or other physical links in the electrical circuits so that the lights cannot be switched on by mistake. In container ships the lights need to be properly placed so that they do not overheat cargo or other combustibles and thus cause damage or fire. Lights in car carriers and ferries are usually fluorescent, which are unlikely to cause ignition. Nonetheless it makes sense to leave lights switched off when they are not needed, particularly in cargo areas where combustibles are present" (A guide to the causes and prevention of cargo fires, 2017)

14.11 **Is the condition of electrical equipment including switches, sockets, junction boxes, plugs, conduits and wiring on weather decks satisfactory? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

14.12 **Are the explosion-proof lights in paint lockers, acetylene stores or similar spaces in good condition? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Applicable to ships constructed on or after 01 Jan 2007: No electrical equipment shall be installed in any space where flammable mixtures are liable to collect, for example in compartments assigned principally to accumulator batteries, in paint lockers, acetylene stores or similar spaces, unless the administration is satisfied that such equipment is: 1. Essential for operational purposes 2. Of a type which will not ignite the mixture concerned 3. Appropriate to the space concerned, and 4. Appropriately certified for safe usage with the dusts, vapours, or gases likely to be encountered. (SOLAS 74, 2014)

14.13 **Are the stores located inside the accommodation and on the weather decks clean and tidy? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

14.14 **Are dryers inside the laundries clear of any build-up of lint? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The build-up of lint inside and under the dryer can cause fire. Dryer vents, vent hoses and filters should be cleaned regularly. (Preventing Laundry Fires, 2008)

14.15 **Are galley appliances, audio-visual equipment, and other electrical equipment inside the accommodation in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The electrical cooking appliances inside the galley must all be in working condition. The deep fat fryer is equipped with a safety thermostat. The thermostat should be in working condition.

14.16 **Are the door seals, catches and alarm system of the refrigerated space in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Separate refrigerators should be used for cooked and raw food. Refrigeration chambers must be kept at recommended temperatures, which should be regularly checked and to ensure good air circulation. Door seals and catches should also be checked regularly. Safe temperatures for cold stores are generally considered to be 5°C or colder and minus 18°C or colder for chill and freezer cabinets respectively but a slight tolerance of one or two degrees is unlikely to create any significant risk to food safety. If cabinets do not have a means of checking temperatures, a suitable thermometer should be provided. Thermometers should be calibrated periodically but a simple check monthly, using boiling water (99ºC to 101ºC) or melting ice (-1ºC to +1ºC) will verify the accuracy of the thermometer. 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. Food should never be stored in front of cooling units as this restricts the circulation of air. Suitable packaging is essential to avoid the loss of moisture from the surface of food which can produce a freezer burn effect on exposed meat cuts or joints. If defrosting is not an automatic process, equipment should be defrosted regularly to maintain its efficiency. 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 condition of door seals and closing devices as well as routinely monitoring temperatures.

14.17 **Is the elevator, where fitted, inspected, tested and in good order? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Each lift shall be tested and thoroughly inspected before being brought into use and after repair work and important modifications. The inspection should preferably be carried out at 12-month intervals, but at intervals not exceeding 18 months unless rules from classification societies and other rules, as referred to under clause 0, require otherwise. The maintenance operations shall be carried out by authorised lift maintenance personnel. The basic characteristics of the lift shall be recorded in a register or file; drawn up, at the latest, at the time the installation is brought into service. This register or file shall be kept up-to-date and shall comprise of inspection, test, and maintenance information. (ISO 8383:1985 / Lifts on ships -- Specific requirements, 2016) A procedure clearly defines elevator maintenance, responsibilities and safety barriers shall be incorporated in the SMS. Evidence of permit to work and risk assessment related to maintenance should be available.

14.18 **If provided, is the ship's hospital properly equipped, clean, hygienic and for medical use only? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The MLC, 2006 requires regular inspection of the vessel's medicine chest by the competent authority. RightShip recommends that the annual inspection of medical chest conducted by a vessel's supplying pharmacist or a doctor. The ship's hospital shall not use the hospital as a cabin or storage space. Vessels are required to carry a medicine chest and medical equipment that complies with the requirements in the current edition of the WHO 'International Medical Guide for Ships' and / or flag State. **Ships carrying dangerous goods** Ships carrying dangerous goods have additional medicines, specific antidotes, and special equipment on board, as prescribed in the International Maritime Organization's Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG). These special items, which are not listed in this guide, should be stored, and registered together with the regular medicines and medical supplies carried on board. (International MEDICAL Guide for Ships, 2007) For additional information, reference should be made to the Medical First Aid Guide for use in Accidents Involving Dangerous Goods. Rightship recommends all ships shall carry the latest edition of the Ship Captain's Medical Guide.

Section 15: Health and Welfare of Seafarers

15.1 **Do the Seafarer Employment Agreements (SEA) comply with the requirements of MLC 2006 and do the crew salaries meet or exceed the current ILO Minimum Wage Scale? (V & M)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record a N/C if the seafarer's wage was below the ILO minimum recommended wage scale. Employment agreements and compliance with ILO Minimum Wage Scale of one crew and one officer should be checked by the inspector. All seafarers must be given an original copy of the SEA.ILO publishes the ILO Minimum Wage Scale annually. Click here for the rates applicable from 1st January 2021. > If the 'employer' is a 3rd party manning agent, then the shipowner must guarantee to meet the employer's obligations if the employer fails to do so > Must be paid at least monthly in full > Late payments incur 20% p.a. interest > Schedule of duties, with hours of work/rest prominently posted > Payment in lieu cannot replace leave entitlement > Shore leave must be granted where consistent with operational requirements > Duty to repatriate at no cost to seafarer > Insurance in place to cover liabilities relating to repatriation (Crew Health and Welfare 3, 2016) All seafarers are entitled to repatriation: > After a maximum 12 month period > As stated in the SEA > In case of termination for justified reasons (by the shipowner or seafarer) > When they are not able to carry out their duties on board due to illness, injury, etc. (ILO MLC pocket checklist, 2012

15.2 **Are the accommodation spaces safe, provided to a respectable level of health and hygiene and regularly inspected, including checks of ventilation, noise, heating, lighting, and sanitation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record a N/C if records of the master's inspections of the vessel's accommodation are not available. The inspector shall conduct a random check of cabins to ensure they are clean and fully functional. Master or master representative shall conduct accommodation/cabin inspection with due diligence, ensuring that a respectable level of health and hygiene is maintained. > Accommodation spaces shall be kept clean and free of dirt and dust > All cabin portholes shall be checked for water tightness > Hot and cold water in the washrooms of cabins must be in working condition > The bed must be checked for clean sheets, washed linen and overall tidiness > The laundry equipment should be in working order. Separate washing machines for civil clothes and boiler suits shall be provided. Sufficient detergent shall be provided. > The heating and ventilation ducts inside the cabins and common accommodation spaces should be in working condition > Adequate natural and artificial light shall be available > Private / common toilets and shower rooms shall be in good order. Soap, detergents, and other cleaning material to keep the space clean should be supplied to the ship's staff regularly.

15.3 **Are the ship's staff provided with adequate recreation facilities on board the ship? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record the most recent group social activities that were carried out on board. **Record a N/C if crew are not provided with free internet access and free email communication facilities.** The following recreational facilities shall be provided on board: > Separate smoking room and bars > TV, radio, video, CD, DVD and PC equipment > Sports facilities > Table and deck games > Library, and > Communication facilities including email and internet access. (Crew Health and Welfare 3, 2016)

15.4 **Has the master been provided with a monthly welfare budget? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record in comments the monthly welfare budget available to the master.

15.5 **Are seafarers being provided with sufficient food and water free of charge and does the cook hold appropriate qualifications? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record in comments the food budget of the vessel per person/day.

- Sufficient quantities of good quality food including fresh fruit, vegetables and drinking water should be supplied free of charge
- Food is to be nutritious, varied and prepared and served in hygienic conditions
- Religious and cultural considerations should be considered
- The cook is over 18 years of age and holds appropriate qualifications, in accordance with the flag state's laws and regulations
- All other catering staff are adequately trained (a training programme, posters, etc. may be available)
- For ships with less than 10 crew, no cook is required, but the crew handling food are to be trained in food hygiene.

(ILO MLC Pocket Checklist, 2012)

The Merchant Shipping Notice, MSN 1845(M), "Maritime Labour Convention, 2006: Food and Catering: Provision of Food and Fresh Water" provides further guidance.

15.6 **Are ship's staff provided with appropriate medical care and health promotion programmes? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record in comments the method of health promotion and related education programs on board the ship.

- The medical care should be provided free of charge and be comparable to workers ashore
- Include health promotion and education programmes
- An up-to-date list of radio contacts where medical advice can be obtained should be readily available

(ILO MLC Pocket Checklist, 2012)

Health promotion might include:

- Health Awareness Material displayed in crew rest rooms/ mess rooms
- Training films shown to crew

15.7 **Is there evidence to confirm that visits to a qualified medical doctor or dentist have been arranged without delay in ports of call, where required? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Health protection and medical care, including essential dental care should be available and free of charge to all seafarers. The medical log and visit reports are kept up to date. A standard medical report form is used for both onshore and on-board medical personnel and the completed forms are kept confidential.

(ILO MLC pocket checklist, 2012)

15.8 **Are individual monthly statements provided to all seafarers on board, detailing their monthly wage and any authorised deductions such as allotments? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record a N/C if unauthorised deductions, such as payments for travel to or from the ship was recorded on the monthly statement.

15.9 **Is there a complaints procedure on board and are seafarers aware of this procedure? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Each seafarer should be given a copy of this procedure. The complaints should be handled in a timely, fair and effective manner. The contact details of the flag state and the competent authority in the seafarer's country of residence for complaints should be available on board and posted in the seafarer's recreation rooms. A complaints log shall be maintained on board.

15.10 **Is the vessel provided with adequate policies on mental health and mental disorders? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The aim of mental health and mental disorders policy shall be: > To promote the health, safety, and welfare of seafarers > To foster a company culture that is conducive to improving the mental health of seafarers > To ensure awareness of the importance of good mental health among company managers > To provide support for staff who are identified as having mental health problems, ensuring that they are treated with sympathy and respect and in confidence > To increase awareness among all staff of the potential signs of mental health problems To provide training to staff in having conversations with others about their mental health. (Guidelines to shipping companies on mental health awareness, 2018)

15.11 **Are seafarers provided with free access to external sources of support, whom they can contact in confidence while on board (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The company should consider providing free access to external sources of support for seafarers, whom they can contact in confidence. These may include maritime trade unions, seafarer welfare organisations or organisations specialising in the provision of support to those with mental health problems. (Guidelines to shipping companies on mental health awareness, 2018)

15.12 **Has company provided training for on-board key personnel in recognising signs of mental health problems? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Key personnel including the master, chief engineer, chief officer and second engineer. The company should provide, or arrange, training for management-level personnel on-board ships and ashore in recognising signs of mental health problems, facilitating discussions in staff meetings about mental health and having sensitive and supportive conversations with sufferers of mental health problems. (Guidelines to shipping companies on mental health awareness, 2018)

15.13 **Is the vessel provided with a practical guide regarding the management of death at sea?**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Whenever possible a body should be retained for post-mortem examination or for burial ashore. For the sake of the deceased person's relatives and to preserve the body in the best possible condition, if there is going to be any delay in reaching port, thoroughly wash and dry the body all over. Comb out and part the hair and give attention to fingernails. Straighten the arms and legs and interlock the fingers over the thighs. Tie the ankles together to keep the feet perpendicular. Empty the bladder by firm pressure over the lower abdomen. The body should then be put into a body bag and kept in a refrigerator or cold store which will have to be set aside for the purpose. The aim is to store the body at approximately 4°C, it should not be frozen. An alternative, if near port, is to lay the naked body on ice in a bath and to cover the body with lots of ice. (Management of death at sea - A practical guide sheet for Masters - News and Commentary - Knowledge Centre - Risk Management - Standard Club, 2020)

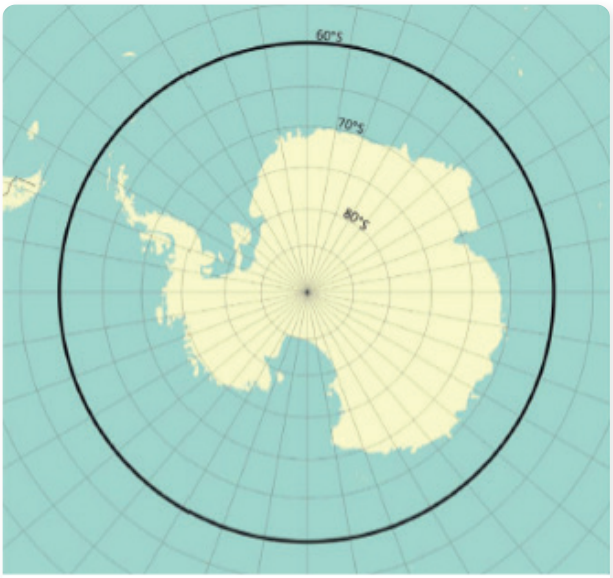
Section 16: Ice or polar water operations

This section is only to be completed if the vessel has an ice class notation and is navigating or intends to navigate in icy areas and/or in polar waters.

The objective of this section is to ensure that vessels navigating or intending to navigate in ice areas and/or polar waters are fit for operating in these areas.

The International Code for Ships Operating in Polar Waters (Polar Code) entered into force on the 1st January 2017 and is designed to ensure safe ship operation and protection of the polar environment. The Polar Code was made mandatory through separate amendments to the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL).

Arctic: Mostly north of 60° but with a limiting line from Greenland; south at 58°



Antarctic: South of 60° - North of Iceland, southern shore of Jan Mayen - Bjørnøya – Cap Kanin Nos

International Code for Ships Operating in Polar Waters (Polar Code, 2016)

The polar code is applicable to ships as follows:

New ship – built on/after 01st January 2017

Existing ship – built before 01st January 2017 (Must comply with Part I. by their first intermediate or renewal survey after 01st January 2018)

16.1 **Is the vessel provided with an approved ship-specific Polar Water Operation manual or an Ice Operation manual? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The Polar Water Operations Manual shall be approved by the vessel's Flag State. This is a ship-specific manual carried on board which outlines the ship's capabilities and limitations. The manual must also cover procedures for the use of ice breaker assistance vessels whilst trading in the region. Procedures to be followed in the event of an incident or emergency occurring within the Polar Regions should also be included. > Risk-based procedures that are contained in the manual should include: > Voyage planning instructions and guidance for operating in such regions, including any vessel limitations > The potential lack of reliable chart information that is possible in some polar areas > How to gather weather reports in higher latitudes > Any additional equipment to be carried > Any procedures required for machinery and equipment to ensure its continued safe operation in Polar Regions > Emergency contact details for any areas the vessel will operate in

Voyage planning is covered in the Code, and as such bridge teams should familiarise themselves with its contents.

The goal of the PWOM is to provide the owner, operator, Master, and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process.

(The Polar Code, 2017)

If the vessel is operating outside polar waters, but in ice water the ice operation manual shall include the following:

> Ship handling and navigation in ice
> Ice and snow accretion prediction and calculation
> Masters standing instruction
> Managing ballast water
> Engine room systems
> Safety and lifesaving equipment
> Firefighting equipment
> General precautions
> Task Risk Assessment

Arctic Council has developed a guideline contains best practice methods and data sources for conducting regional and area-wide risk assessments concerned with ship traffic and operations in Arctic. For additional information, reference should be made to the Guideline for Arctic Marine Risk Assessment via link

16.2 **Is the master aware of the operational limitations specified in the Polar Ship Certificate? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record in comment the following operation limitation of vessel in polar waters:

1. Category of ship
2. Ice condition
3. Temperature, and
4. High latitude

The Polar Ship certificate shows a vessel's Polar Category, operational limitations and capabilities, and any required additional safety, communications and navigation equipment needed for operating in Polar Regions.

(The Polar Code, 2017)

16.3 **Is the vessel appropriately manned by adequately qualified, trained, and experienced personnel? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection

Record in comments the details of training conducted by the crew.

There are two levels of training and certification:

> Certificate in Basic Training for ships operating in polar waters as per STCW Code, A-V/4, paragraph 1
> Certificate in Advanced Training for ships operating in polar waters as per STCW Code, A-V/4, paragraph 2

A Certificate of Proficiency (CoP) will be issued to persons qualified in accordance with the requirements.

CoPs may be issued by training providers and there is no requirement that they be issued by Administrations. CoPs issued under Regulation V/4 are not required to be issued with endorsements attesting to the recognition of the certificate (i.e., Flag State endorsement).

Basic Training:
When required by the Polar Code, Masters, Chief Mates and Officers in charge of a navigational watch on ships operating in polar waters are to hold the CoP in Basic Training for ships operating in polar waters. Every candidate for the CoP in Basic Training for ships operating in polar waters shall have completed an approved basic training course. There are no special seagoing service or experience requirements for this level of training.

Advanced Training:
When required by the Polar Code, Masters and Chief Mates on ships operating in polar waters are to hold the CoP in Advanced Training for ships operating in polar waters.

(Information and guidance training requirements for personnel on ships operating in polar waters, 2017)

16.4 **Is polar water operation incorporated in the approved SOPEP manual? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
On-board documentation concerning pollution prevention needs to be updated to take operation in polar waters into account, including requirements from MARPOL Chapters I, II, IV and V. Documents such as Oil Record Book and SOPEP on board the existing ships are to be revised, taking into account operation in polar waters and the Occasional Survey of existing ships to confirm the documents for compliance with Part II is to be carried out prior to entering polar waters on or after 1 January 2017. Although the item relating to the Polar Code was added to the form of IOPP Supplement (Form A, Form B) on 1 January 2017 in accordance with the Resolution MEPC.265 (68), the IOPP Certificate is not necessary to be rewritten at the Occasional Survey of Existing Vessels for compliance with Part II to comply with Polar Code (in other words, the current IOPP Certificate is valid on board until expired) based on MEPC.1 / Circ.856, unless so instructed by the Flag Administration. Regardless of whether the vessel enters polar waters or not, the IOPP Supplement amended by the Resolution MEPC.265 (68) will be issued at the next IOPP renewal survey. (Technical Information - Polar Code, 2016)

16.5 **Is the vessel provided with a means of detecting floating ice? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record in comment the means available on board the ship. Radar, searchlights and lookouts are examples of means for detecting ice. All ships intended to operate in periods of prolonged darkness should be equipped with at least two suitable searchlights, which should be controllable from conning positions. The searchlights should be installed to provide, as far as is practicable, all-round illumination suitable for docking, astern manoeuvres, or emergency towing. (Guidelines for ships operating in arctic ice-covered waters, 2002) A standard marine radar does not provide a good picture of ice conditions. As visibility is frequently limited by darkness, snow or fog, other navigational aids should be considered. Cross-polarised radar systems can provide a much better resolution of ice features, including bergy bits and dangerous free-floating ice. These are now becoming available from specialised radar suppliers. (Vessels operating in low temperature environments, 2006)

16.6 **Is the vessel able to receive up-to-date information including ice reports for safe navigation? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record in comments the means available on board the ship. All ships should be provided with equipment capable of receiving ice and weather information charts. (Guidelines for ships operating in arctic ice-covered waters, 2002) Vessels shall be equipped with a weather telefax receivers or equivalent capable of receiving high resolution ice weather charts. (Vessels operating in low temperature environments, 2006)

16.7 **Are main engine sea chests provided with steam heating systems and is a record of check available? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Steam heating systems for sea chests are to be checked in good working condition and kept in operation when the vessel is in ice waters.

16.8 **Are personnel provided with appropriate protective equipment suitable for sub- freezing temperature? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Cold weather can endanger lives and destroy the well-being of seafarers whose jobs put them in the midst of frigid temperatures and extreme weather conditions. Frostbite most often affects fingers, toes, the nose, ears, chin, and cheeks. The condition is a bodily injury that is caused by freezing and it can damage the body permanently. Hypothermia results when body temperature is below 35°C and often occurs from prolonged exposure to cold temperatures. Low body temperature has an adverse effect on the brain, compromising the victim's ability to think clearly or to move well.

16.9 **Are the accommodation spaces provided with adequate heating systems? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
All sleeping rooms, mess rooms, day rooms, recreation rooms, rooms for watching films and television, hobbies and games rooms, offices, studies, sanitary accommodation, and hospitals shall be installed with a main heating system capable of ensuring that: 1. The ventilation system provided for the room or crew accommodation is working as to supply at least 25 cubic metres of fresh air per hour for each person which the room or crew accommodation is designed to accommodate at any one time 2. When the temperature of the ambient air is -1˚ C the temperature in that room or crew accommodation can be maintained at 21˚C 3. The main heating system shall be operated by steam, hot water or electricity, or shall be a system supplying warm air 4. The means for turning on or off or varying the heat emitted by a radiator or other heating device without using a tool or key shall, wherever reasonably practicable, be provided in the space in which that radiator or other device is fitted. All heating equipment shall be so constructed that its operation is not affected by the use or non-use of propelling machinery, steering gear, deck machinery, calorifiers or cooking appliances. Heating equipment shall be constructed and installed, and if necessary shielded, so as to avoid the risk of fire, danger or discomfort to the crew. (Maritime Labour Convention 2006, 2006)

16.10 **Is the vessel equipped with suitable material and / or equipment for cleaning the ice and snow from critical areas? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Example of critical area are handrails, steps, ladders, and walkways.

16.11 **Is effective vision enhancement equipment provided on the Navigation Bridge? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
All Polar Class ships should be fitted with a suitable means to de-ice sufficient conning position windows, to provide unimpaired forward and astern vision from conning positions. The windows should be fitted with an efficient means of clearing melted ice, freezing rain, snow, mist, and spray from outside and accumulated condensation from inside. A mechanical means of clearing moisture from the outside face of a window should have operating mechanisms protected from freezing, or the accumulation of ice that would impair effective operation. All persons engaged in navigating the ship should be provided with adequate protection from direct and reflected glare from the sun. (Guidelines for ships operating in arctic ice-covered waters, 2002)

16.12 **Is exterior electronic equipment, such as communication transmitters / receivers exposed to rotating radar scanners and fog horns protected from sub-freezing temperature? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record in comments how the equipment was protected. Special consideration may be warranted for exterior electronics equipment. Communication transmitters and receivers may require anti-icing features to provide continual functionality, although whip type antennas can usually be de-iced with a strike of a wooden mallet or shaken to remove ice build-up. Other communications, including antennas with horizontal surfaces or dish shaped configurations, may require built-in heat elements. Exposed rotating radar scanners normally require no special measures, even at extremely cold temperatures, due to internal heating elements. However, the smaller enclosed type arrays can become encrusted with ice and can be difficult to de-ice due to their inherent fragility of construction. (Vessels operating in low temperature environments, 2006)

16.13 **Are procedures in place to safeguard the operation of critical equipment in sub-freezing temperatures? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Particular attention should be given to power generation/distribution, rescue boat and lifeboats. Insulating, heating, and/or adding antifreeze to any lines exposed to freezing temperatures may be required for any engine, and particularly for those using freshwater cooling systems. Where batteries are used to provide power for emergency equipment, they should be suited and sized for low temperature operation. (Vessels operating in low temperature environments, 2006)

16.14 **Are procedures in place to safeguard the readiness of lifesaving appliances and survival arrangements in sub-freezing temperature? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Ice build-up in the way of all lifeboats, life rafts, cradles, davits, and other launching gear should be regularly removed so that launching arrangements are not hindered. This may include ensuring a wooden mallet is available at each station or in the vicinity of the lifesaving appliances. Additional rations stored in the deckhouse / accommodation are recommended so that water is readily available to the crew as the water stored onboard the lifeboats will be frozen. Note that most EPIRBs work only down to -20°C according to manufacturer's instructions. Care must be taken to verify that the selected EPIRBs are suitable for the design service temperature. The manufacturer should be consulted for guidance. Air-cooled engines provide additional heating and can reduce problems associated with frozen valves, piping, and water intakes. The lifeboat's propeller is susceptible to damage from ice, particularly when operating astern. Another issue will be condensation, as humidity from survivor breathing touches the cold hull and canopy. This can render survivors even more uncomfortable and can fog the windows at the coxswain station (and elsewhere). Consideration should be given to installing supplementary ventilation or air circulation features, and to heaters for the craft interior. Lifeboat engine distillate fuel should have a cloud point well below the design service temperature. Lifeboat engine lubricating oil should have the correct viscosity at the design service temperature without the use of a heater. The IMO Life Saving Appliances Code requires inflatable life rafts to be capable of inflation within 3 minutes at a temperature of -30°C (-22°F). Lower design service temperatures may result in an inability to inflate properly at low temperatures, and so operators should verify that adequate air or other proven cold temperature gas is used for the inflation of life rafts. Manual inflation pumps are to be suitable for operation at the design service temperature. (Vessels operating in low temperature environments, 2006)

16.15 **Are procedures in place to safeguard the readiness of firefighting equipment in sub-freezing temperature? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Door gaskets should be treated with de-ice treatments at least each month or when required. All snow and ice accumulation on equipment should be removed using steam, compressed air or equal. Fire water hoses that have been used should be drained and dried immediately after use or stored at a frost-free location. Fire mains should be drained until needed when the temperature is 0°C (32°F) or below. When the temperature drops below 0°C (32°F), all external fire equipment should be checked daily, or more often when required. All the fire dampers directly exposed to the weather are to be checked and their function tested every day when the temperature is 0°C (32°F) or below. Fire pumps, including emergency fire pumps, are to be located in heated compartments. The pumps and their auxiliaries in the compartment are to be adequately protected from freezing at the design service temperature. Isolating valves are to be in accessible locations. Isolating valves located in exposed locations are to be protected from freezing spray. The fire main is to be arranged so that external sections can be isolated and means of draining are to be provided. Hydrants are to be positioned or designed to remain operable at the design service temperature. Ice accumulation and freezing are to be considered. All hydrants are to be installed with a two-handed valve lever or hand wheels and provided with quick connects for hoses. Valves and hydrants exposed to design service temperatures less than or equal to -30°C (-22°F) are not to be of cast iron (Vessels operating in low temperature environments, 2006)

16.16 **Are procedures in place to safeguard the ballast lines, hydraulic lines, fire lines and bunker lines in sub-freezing temperature? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
If fitted, piping connecting the upper wing tank and lower wing tanks is to be protected from freezing. The supports for ballast piping systems on deck are to be arranged so that free expansion and contraction of the pipes during ballast operations cannot be blocked by accumulated ice or snow. For hydraulic equipment, the hydraulic oil is to be suitable for the minimum anticipated temperature. If the hatches are hydraulically operated, the hydraulic oil should be suitable for the minimum anticipated temperature. A heater or other suitable means for heating is to be provided for the hydraulic oil sump, where necessary. Fire mains should be drained until needed when the temperature is 0°C (32°F) or below. Piping systems and equipment prone to freezing are to be able to be drained and are to be provided with drain cocks to facilitate drainage. (Vessels operating in low temperature environments, 2006)

16.17 **Are means and procedures in place to safeguard the readiness of the ballast systems in sub-freezing temperature? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Record in comments how the system was protected. Ballast water tanks for design service temperatures equal to or above -30°C (-22°F) but lower than -10°C (-4°F) are to be provided with arrangements to prevent freezing. These arrangements may be heating systems or turbulence-inducing systems, such as bubbler systems. (Vessels operating in low temperature environments, 2006)

16.18 **Are means and procedures in place to safeguard the blockage of vent pipes in sub-freezing temperature? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The blockage of vent pipes by ice accumulation at the deck or by the freezing of plugs inside the pipe can result in safety hazards due to over-pressurization. (Vessels operating in low temperature environments, 2006)

16.19 **Are the emergency drill procedures amended prior to entering sub-freezing / polar areas and are the crew being regularly trained with such a procedure? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
Crew members are to be provided with proper on-board instructions and be regularly trained in the operation of the vessel's evacuation, survival at sea and on ice / ashore, fire and damage control equipment and systems with appropriate cross-training of crew members with an emphasis on changes to standard procedures made necessary by operations in low temperature environments. (Vessels operating in low temperature environments, 2006) Prior to entering a polar area, emergency drill procedures should be amended to cover additional topics such as: > Donning immersion suits and thermal protective clothing > Prevention of cold-related injuries and hypothermia > Cold climate survival > Lifesaving craft launching

16.20 **If the vessel intends to trade in Polar Regions, have the hull underwriters and P&I Club been informed? (V)**

☐ Yes ☐ No ☐ N/A ☐ N/V

Guide to Inspection
The ship-owner has to inform their Hull underwriter and P&I club before trading in the Polar Regions

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