UKP&I

Risk Focus: Tugs and Barges

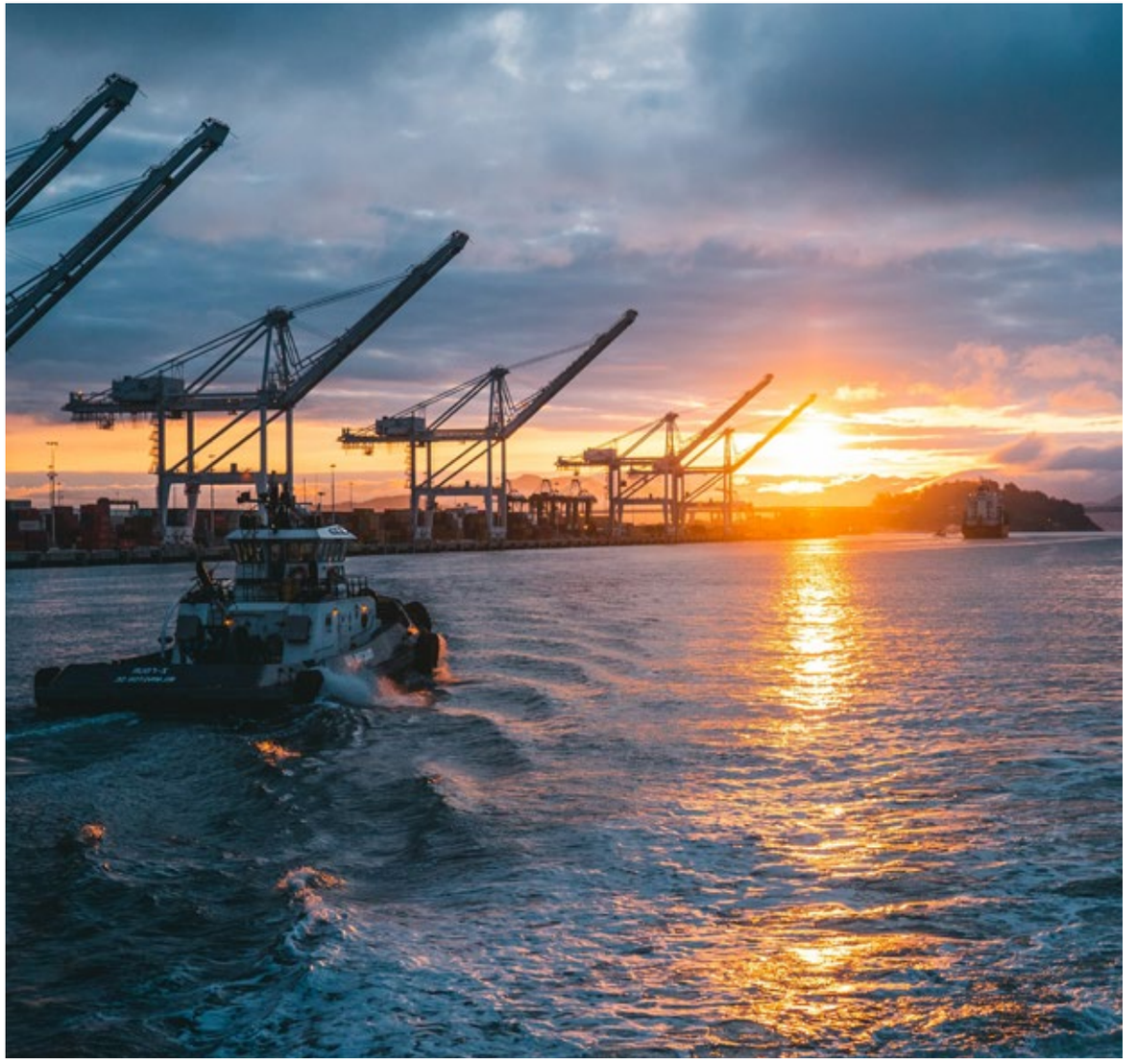
UK P&I CLUB
IS MANAGED
BY **THOMAS MILLER**

Contents

Tugs and Barges

The UK P&I Club has a long history of providing liability insurance for owners and operators of tugs and barges. In terms of number of ships, almost 30% of vessels entered with the Club are barges or tugs.

P&I (Protection and Indemnity) insurance provides cover against a wide range of events, including damage to other vessels or structures; pollution; damage to or loss of cargo; injury or illness of crew and third-party personnel; wreck removal; etc. However, analysis of claims over the past twenty years identifies clear trends occurring within this specific trade.



Tug Claims

87% of tug claims concern injury or illness of personnel. Other claim types include collision, cargo, pollution, damage to fixed or floating objects, and fines – but the number of those claims is very small compared with personnel injury/illness claims.

In terms of dollar cost of claims, the picture is very similar – personnel claims account for 79% of the value of claims. The total cost of pollution incidents has proven to be more costly than incidents of collision, damage to fixed or floating objects, and all other claim types. **Therefore, personnel claims is the clear area to apply focus to reduce the number of incidents and their impact on these vessels.**

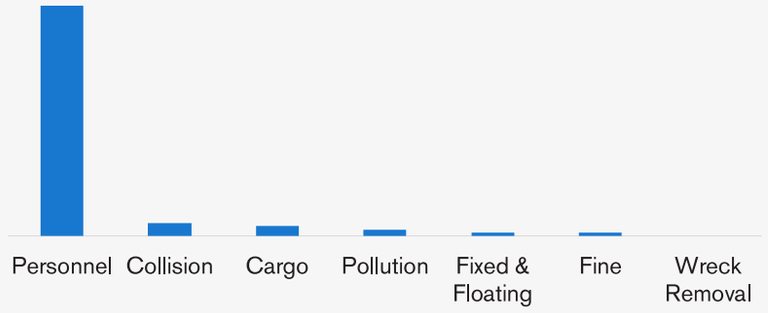
Of the total number of personnel claims, 60% are Injury and 40% are Illness. In terms of dollar value, however, 93% of the cost of personnel claims is related to injury and only 7% to illness. In summary, **personnel injury is the biggest cause of claims and is the most costly claim type** on tugs.

“93% of the cost of personnel claims is related to injury and only 7% to illness”

In terms of frequency and value, most claims – and the majority of cost – is associated with falls from heights (i.e. falls between two levels). Slip, trip and fall incidents (i.e. on the same level) are close behind, making **fall incidents the biggest concern with tugs.** Accidents resulting in burn injuries are common, but strain injuries have proven much more costly – typically because of the extent of surgery and medical aftercare required in musculoskeletal cases. Other significant accident types on tugs include getting caught in machinery and being struck by falling/flying/moving objects.

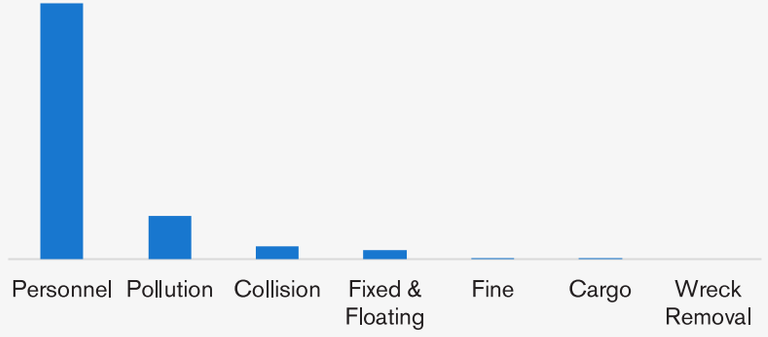
Indicative tug claims over the past twenty years

Number of Tug Claims



No. of Tug Injury Claims by Accident Type

Value ($) of Tug Claims



Value ($) of Tug Injury Claims by Accident Type

Barge Claims

In a tug and barge combination, most claims are associated with the tug. Claims associated with the barge are less common but they do occur. As can be expected, the majority of barge claims are cargo-related. However, injuries do occur there also and, although rare, they are serious and costly. For example, injury incidents on barges over the period 2018-2022 cost US$3 million.

Similarly to tugs, accidents on barges resulting in injury normally involve personnel falling from height or being struck by falling/flying objects.

Case Study

South Korea's worst-ever: Barge collides with tanker in anchorage

In 2007, Korea experienced the worst oil spill disaster in the country's history. The incident occurred when a barge broke free from its tow and slammed into the side of the anchored VLCC Hebei Spirit. As a result of the collision, a total of 10,900 tonnes of oil escaped into the sea, polluting to varying degrees the west coast of the Republic of Korea and leading to over 128,000 claims for compensation being submitted. Claim payments totalled KRW321.6 billion, making this one of the largest oil spills in the history of the IOPC Funds.

Following an investigation by the authorities, the recommendations below were made:

- The Master in charge of the towing should prepare a towing plan that is as comprehensive as possible to cover all aspects of the towing voyage. The Master should consider that weather might deteriorate during the voyage and a contingency plan for the situation should be prepared or the voyage should be postponed.
- When there is a loss of control in navigation during the towage, the Master of the tug should immediately inform the local Vessel Traffic Centre of the seriousness of the situation so that the latter can issue alerts to vessels in the vicinity to take early precautionary actions.
- Master of the tug should ensure that proper towing wires are used for the towing.

Observations from the Club's Condition Survey Programme

The Club's condition survey programme is intended to help Members ensure that their entered ships conform to acceptable standards. These are done as a standard practice, including when a ship reaches ten years of age, or for new ships joining the Club that are already more than ten years old.

"...most of the top deficiency areas concern management of the ship and operations, not the material condition of the vessel itself"

The Club analyses the condition survey data to identify areas where surveyors most commonly highlight deficiencies. It is interesting to note that most of the top deficiency areas concern management of the ship and operations, not the material condition of the vessel itself:

- Bridge Procedures, Company Procedures, and Master's Standing Orders not in place or not followed.
- No procedures in place for transferring bunkers, oil or contaminated bilges.
- Machinery spaces (including bilges) not clean, tidy and free from combustibles.
- Procedures not in place for towing operations.
- Inadequate signage for safety equipment (e.g. IMO symbol placards and instructions written in the working language of the vessel).

Other common deficiency areas include the availability of:

- Safety and emergency equipment, including means of communication.
- Emergency procedures.
- Personal protective equipment (PPE) for crew.

UK Club Safety Assessment Service

On average, the Club handles more than 2,000 claims each year totalling more than US$200 million. The Club's Loss Prevention department analyses the data to determine the causes of claims and the appropriate control measures that could likely prevent such incidents from occurring or developing out of control.

One service the Club offers to Members, free of charge, is the Safety Assessment Programme. The Club has a team of Risk Assessors who study the Club's claims data and conduct safety assessments on board Members' vessels – in order to identify potential hazards and shortfalls in control measures, and to provide the Member with a private and non-obligatory report of improvement suggestions.

Safety Management

Many vessels within the scope of tugs and barges are not subject to international conventions due to their size, characteristics or restricted trading area, e.g. vessels not engaged on international voyages. In this case, local standards and requirements to be applied can vary greatly in their scope, quality, application and enforcement, resulting in a poor standard of operation on some vessels despite the hazards and potential severity of incidents being no less significant.

All operators of tugs and/or barges are recommended to implement, on a voluntary basis in cases where these are not required by statutory instruments, a safety management system in line with the IMO's ISM Code (international management code for the safe operation of ships and for pollution prevention), and have their implementation of safety management and environmental protection certified by a recognised organisation.

The ISM Code provides operators with a lot of freedom with regards to how they set up and implement a safety management system (SMS). Ideally, the company will operate in accordance with policies and a mission statement that describe values based around the principle that 'promoting safety and crew welfare is good for business', because accidents result in loss of time and money, as well as other damages and losses that are harmful to the business.

"promoting safety and crew welfare is good for business"

The management system should incorporate a structured and documented set of interdependent practices, processes and procedures used by the managers and the workforce at every level in the company to plan, direct and execute activities. The following example Operating Management System (OMS) Framework (copyright: the International Association of Oil and Gas Producers and IPIECA www.iogp.org) comprises two interdependent components:

- Four Fundamentals focus attention on management principles that are arguably the most important for an effective OMS – Leadership, Risk Management, Continuous Improvement and Implementation. These principles apply to every Element of the OMS to drive its success.
- Ten Elements establish a structure to organise the various components of an OMS. Every Element requires the establishment and maintenance of appropriate documentation and records.
- Refer also to IACS and classification society guidelines on the various aspects of safety and environmental protection management.

Fig.1: Model OMS with ten Elements underpinned by four Fundamentals

With regards to incidents of inadequate maintenance on board, an effective management system will:

- Clearly describe inspection and preventative maintenance routines.
- Ensure a log of the inspections and maintenance work carried out, noting condition and any defects.
- Ensure equipment critical for safety or pollution prevention is identified, including minimum spare parts to be carried on board.
- Clearly describe action to be taken by crew when defects are identified or when maintenance cannot be performed in accordance with the schedule (for any reason), in particular critical equipment – including reporting and record-keeping.

With regards to incidents involving unsafe work practices or unsafe conditions, an effective management system will:

- Based on assessment of risk, clearly describe how operations are to be conducted, in particular hazardous operations.
- Provide the necessary training, familiarisation and supervision of crew – and other resources as required – to ensure crew can competently and safely execute the duties they are expected to perform.
- Promote safe work practices at all levels in the organisation and actively empower all personnel to stop a job they consider to be unsafe or inadequately managed.
- Promote the reporting of unsafe acts and unsafe conditions. Implement a programme of regular inspections and audits. Ensure an appropriate degree of investigation and cause analysis followed by implementation of corrective actions and sharing of lessons learnt – documented accordingly.

Principles of safety management can be applied to any ship or trade type. Tug and barge operations require a skilled crew but their performance is largely influenced by the work environment as controlled by the barge or tug operating company. The remainder of this document explores areas of safety management that require particular attention, as determined via a review of tug and barge P&I claims.

Preventative Maintenance Programme

Good operation of a vessel is very much a technical endeavour. An adequate schedule of inspections and preventative maintenance, and management of spares and repairs, are essential to ensure safety, operational efficiency and charter obligations.

Material condition of the vessel is normally monitored by a recognised organisation, but the Club has observed – through its survey programmes – that statutory surveys alone are not adequate to ensure that safe and effective conditions are maintained.

In particular, with regards to tugs and barges, the integrity of structures, fittings and equipment that may be subjected to high static or dynamic loading during operations should be effectively monitored and maintained.

Operators of SOLAS vessels will be familiar with the ISM Code requirement to identify potentially hazardous situations that may result due to the operational failure of specific equipment. This is with regard to safety and pollution prevention, and is done via a risk assessment process. It is then required by the Code that operators establish SMS procedures to promote reliability of such equipment and systems, including back-up/stand-by equipment or technical systems that are not in continuous use. This part of the Code is specifically concerned with inspection and maintenance routines, and establishment of a system to ensure necessary routines are followed.

When assessing which equipment and systems are critical for safety and environmental protection purposes, it is recommended to also evaluate equipment and systems that are critical for operational purposes, e.g. what is the vessel chartered to do and what failures could result in the vessel being put off-hire. Ensuring reliability of this equipment will also promote safety of personnel in shipboard operations and reduce the likelihood of operational emergencies.

! Deck fittings should be maintained and steel coated to prevent wastage.

! Well-maintained equipment may look to be in good condition but can be ripped off the deck if the deck and underside structures are allowed to waste.

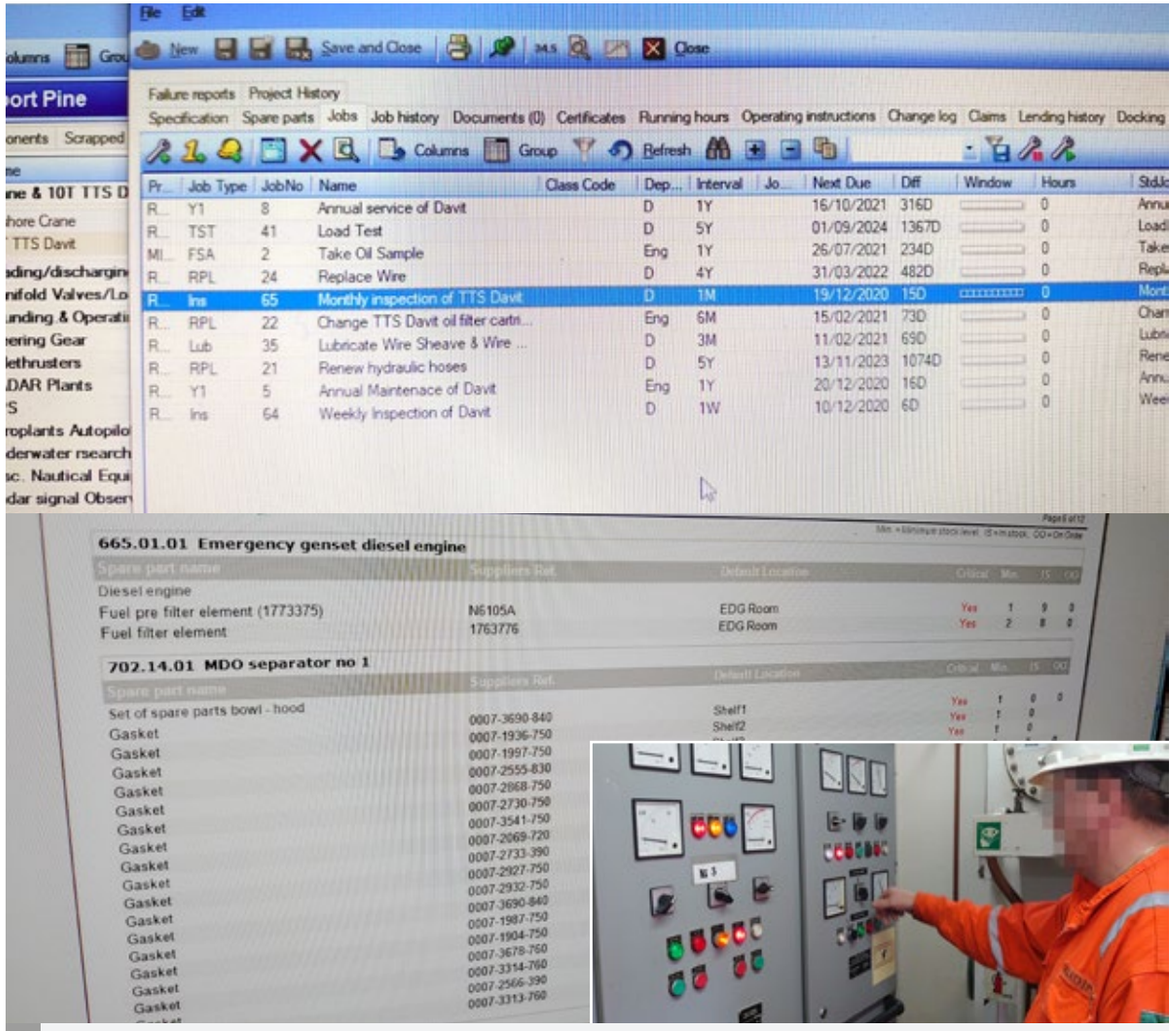
For each routine in the planned maintenance system, the following should be indicated:

- Is this item related to critical equipment
- Responsibility (which rank is responsible for this work order)
- Frequency (how often is this routine to be conducted)
- Description (with adequate detail) of the job to be performed
- Any relevant safety precautions or procedures to be referred to
- Any checklists to be used
- Any relevant diagrams, etc., including lubricating diagram and lubrication table
- List of replaceable parts and supplier details.

When jobs are completed, they should be documented with the name/rank of the person who carried out the job and a description of their observations and/or work done. Any defects should be reported as appropriate, in accordance with reporting procedures.

There are many planned maintenance system software products available and the benefits of implementing such a system – over the use of spreadsheets – are significant. PMS software allows for easy and standardised implementation and monitoring across a fleet but also provides crew with better tools for managing routines, understanding thoroughly the jobs to be done, documenting the results and monitoring the status of maintenance, including a list of jobs that are coming due and jobs that are overdue.

Ideally, the same system is used to manage the inventory of spare parts. Connecting the two makes it easier for crew to manage inventory, requisition orders, stock levels and associated reporting.



PMS maintenance routines and inventory and testing of stand-by equipment.

Vessel Performance Specification

When chartering a tug for a towing operation, the charterer will be particularly concerned about the specifications necessary to ensure a safe towing operation, giving due consideration for the size of the tow and weather conditions that may be expected, including tides where applicable.

The pulling force of a vessel is measured using a calibrated load cell in what is known as a bollard pull test. The test is normally conducted under the supervision of a recognised organisation, and the vessel is issued with a certificate. However, the pulling power of the vessel will naturally deteriorate over a period of years and it is recommended to conduct a bollard pull test periodically – every five years for example – in order to ensure accurate specification of the vessel. Incidents resulting in loss of control of the tow have occurred where vessels have not been operated according to their performance specification.

Dynamic Measurement Systems
16515 Hedgecroft, Suite 320, Houston, TX 77060 (281) 405-0606, Fax (281)405-0303

www.dynameasure.com

CERTIFICATE OF CALIBRATION

PRODUCT INFORMATION
MANUFACTURER: Tractel
MODEL #: LLX
CAPACITY: 50 Ton
DESCRIPTION: Electronic Dynamometer
UNIT SERIAL #: [redacted]
CALIBRATION DATE: 4-23-14
DUE DATE: 4-23-15
CALIBRATION TECH: [redacted]
TEMPERATURE/HUMIDITY: 73/37
MANUFACTURER'S ACCURACY: ± .2% of Capacity

CALIBRATION DATA

EQUIPMENT READINGS (UNITS ton.)	(STANDARD) AS RECEIVED (UNITS ton.)	(STANDARD) AFTER ADJUSTMENTS (UNITS ton.)	ERROR (UNITS ton.)
10.000	9.900	9.920	- 0.080
20.000	19.840	19.940	- 0.060
30.000	29.880	29.940	- 0.060
40.000	39.840	39.980	- 0.020
50.000	49.900	50.020	+0.020

☐ Unit within tolerance, No adjustments required.
☒ Recalibrated within unit accuracy specifications.

Parts replaced:
Comments:

THIS IS TO CERTIFY:
TEST WEIGHTS, LABORATORY CALIBRATING MACHINES AND/OR ELECTRONIC LOAD CELLS, USED IN THE CALIBRATION OF THIS EQUIPMENT HAVE BEEN CALIBRATED BY STANDARDS WITH ACCURACY TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (N.I.S.T.), REFERENCE STANDARDS ARE CALIBRATED IN ACCORDANCE WITH ANSI/NCSL Z540-1-1994.
CERTIFICATIONS ON FILE, AVAILABLE FOR REVIEW AS NECESSARY.

Particulars of Bollard Pull

	Total Number	Make	Type	RPM (MCR)	Power (kW)
Engines	**4**	**MAN**	**8L32/44CR**	**750**	**4x4800**
Engines					
Engines					
Engines					
Propellers	**2**	**MAN/ALPHA**	**Ø4200mm/4 blades**		
Prop. Thrusters					
Nozzles	**2**	**MAN/ALPHA**	**AHT 0,5LD**		
Rudders	**2**	**ROLLS-ROYCE**	**FS 3300x4450**		

Test location: **Rovde, Norway**

Test date: **27. April 2015**

DNV GL, after having surveyed and examined the relevant data according to our recommendations for the testing of bollard pull, hereby declare that the above named vessel and its towing gear have been tested giving these results:

	Continuous Bollard Pull (t)[1]	Mode description (Engine configuration, utilisation, active propellers, duration of test period if less than 10 min, etc)	Propulsion Engine Power (kW)[2]
Mode 1	**261**	**Main Engines 4x 100%**	
Mode 2			
Mode 3			
Mode 4			

! Example bollard pull certificate and load cell calibration certificate.

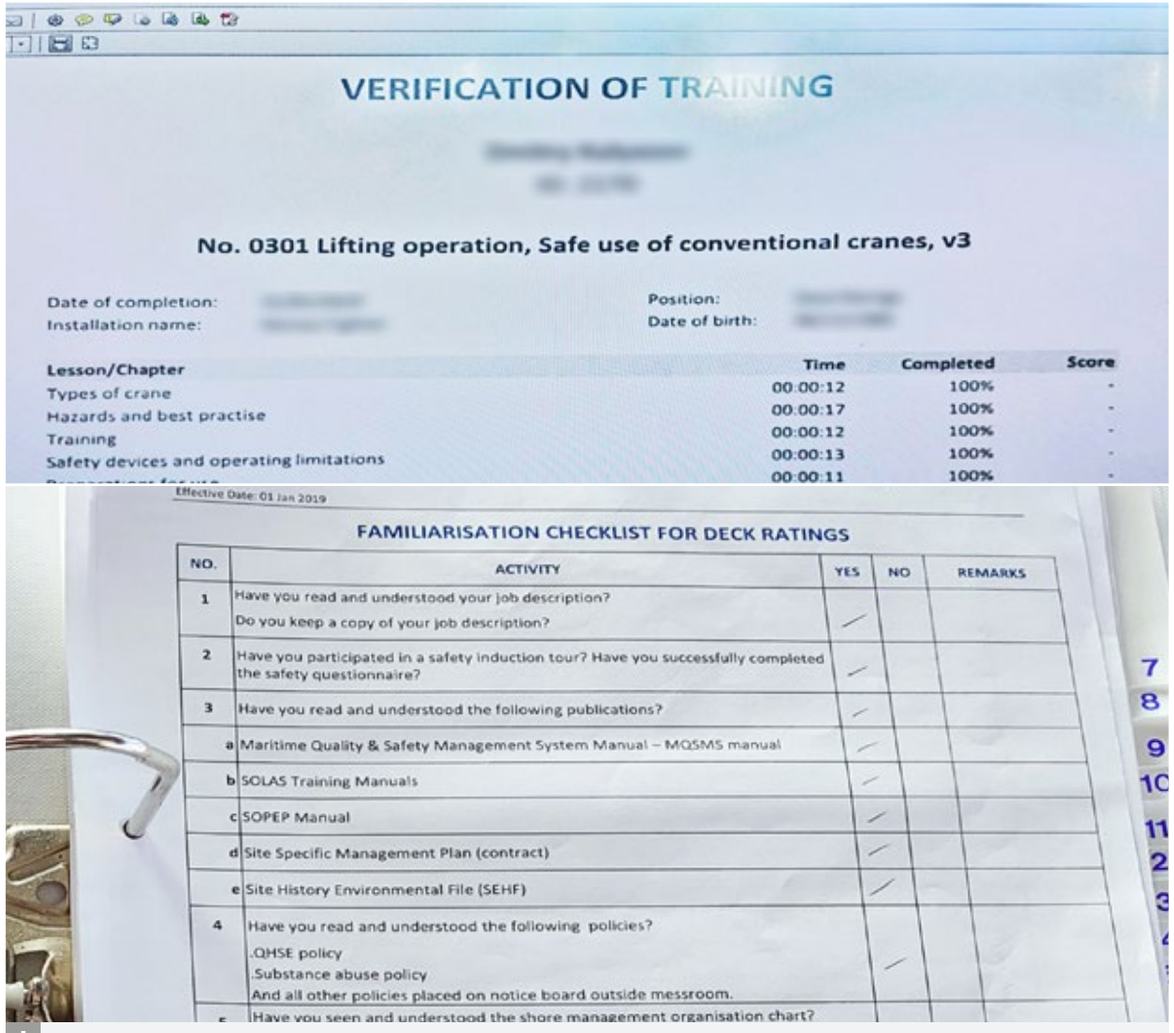
Competent Crew

Tug and barge operations are highly specialised. Safe and efficient operations require a competent crew with adequate knowledge and experience. In addition to crew certification requirements, operators gain an edge by establishing a robust Learning Management System (LMS) populated with industry and company-specific content to provide a training platform that is appropriate for the specific vessel operations undertaken. Where appropriate, training modules should include a process to verify the information delivered has been understood.

Crewing processes should be documented in comprehensive procedures to ensure:

- Training and certification requirements for each rank are specified
- New crew in senior roles are provided with an adequate induction and handover – minimum overlap periods should be specified for senior positions
- Onboard familiarisation, induction and training are conducted and documented. For officers, it should be specified which items of the induction checklist must be completed before the officer is permitted to conduct unsupervised watch-keeping
- Adequate manning levels are maintained.

It is recommended to implement a Management of Change (MoC) process. A MoC request can be submitted to senior management for approval in each case where – for whatever reason – it is necessary to deviate from a documented process. The form is used to describe the deviation and how the change will be managed safely, etc., and can be signed off as authorised at an appropriate level of senior management. A time limit for the deviation is normally included, at which point, a review of the situation would need to be conducted.



VERIFICATION OF TRAINING

No. 0301 Lifting operation, Safe use of conventional cranes, v3

Date of completion:
Installation name:
Position:
Date of birth:

Lesson/Chapter	Time	Completed	Score
Types of crane	00:00:12	100%	-
Hazards and best practise	00:00:17	100%	-
Training	00:00:12	100%	-
Safety devices and operating limitations	00:00:13	100%	-
	00:00:11	100%	-

Effective Date: 01 Jan 2019

FAMILIARISATION CHECKLIST FOR DECK RATINGS

NO.	ACTIVITY	YES	NO	REMARKS
1	Have you read and understood your job description? Do you keep a copy of your job description?	✓		
2	Have you participated in a safety induction tour? Have you successfully completed the safety questionnaire?	✓		
3	Have you read and understood the following publications?	✓		
a	Maritime Quality & Safety Management System Manual – MQSMS manual	✓		
b	SOLAS Training Manuals	✓		
c	SOPEP Manual	✓		
d	Site Specific Management Plan (contract)	✓		
e	Site History Environmental File (SEHF)	✓		
4	Have you read and understood the following policies? .QHSE policy .Substance abuse policy And all other policies placed on notice board outside messroom.		✓	
f	Have you seen and understood the shore management organisation chart?			

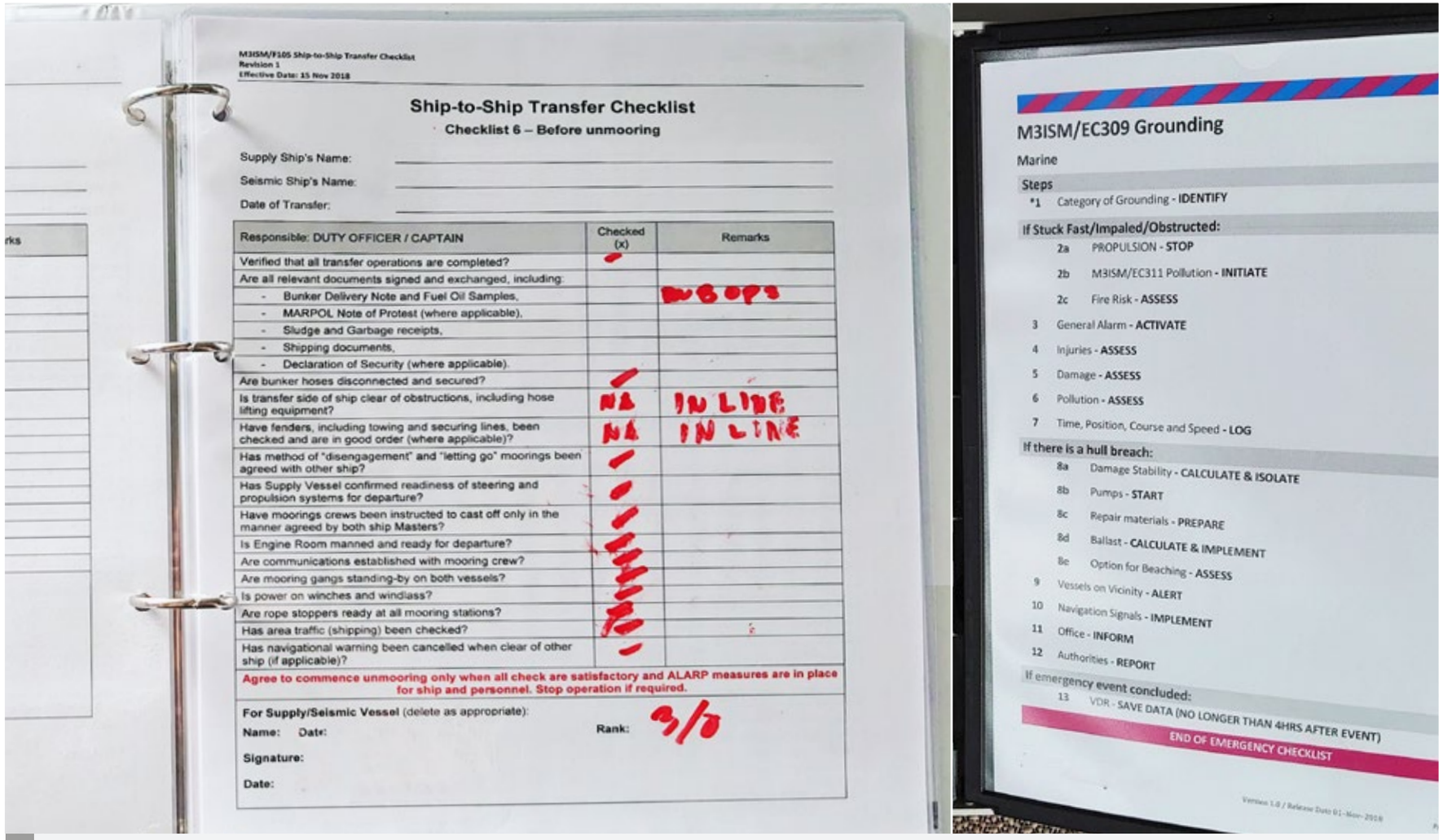
Crew certification, induction form and training record.

Documented Processes and Standards

The management system will normally consist of different types of documents, including policies, standards, manuals, procedures and checklists. These should be supplemented by Master's Standing Orders, Chief Engineer's Standing Orders and Night Order Book.

It is recommended to include checklists for critical operations (for example, for safety or environmental protection). The checklists help to ensure standardisation across the fleet or across the crew and help to ensure that critical steps do not get missed.

It is standard practice to include emergency checklists within the SMS. These cover events such as fire, abandon ship, injury, loss of power, loss of steering, collision, grounding, flooding, pollution, etc. It is recommended to expand upon typical ship emergencies to include trade-specific operational emergencies, for example, failure of the towing arrangement. Emergency procedures and checklists, training and drills will ensure crew take swift action to bring the situation under control and mitigate losses.



M3ISM/F105 Ship-to-Ship Transfer Checklist
Revision 1
Effective Date: 15 Nov 2018

Ship-to-Ship Transfer Checklist

Checklist 6 – Before unmooring

Supply Ship's Name: _____

Seismic Ship's Name: _____

Date of Transfer: _____

Responsible: DUTY OFFICER / CAPTAIN	Checked (x)	Remarks
Verified that all transfer operations are completed?	✓	
Are all relevant documents signed and exchanged, including:		
- Bunker Delivery Note and Fuel Oil Samples,		WBOPS
- MARPOL Note of Protest (where applicable),		
- Sludge and Garbage receipts,		
- Shipping documents,		
- Declaration of Security (where applicable).		
Are bunker hoses disconnected and secured?	✓	
Is transfer side of ship clear of obstructions, including hose lifting equipment?	NA	IN LINE
Have fenders, including towing and securing lines, been checked and are in good order (where applicable)?	NA	IN LINE
Has method of "disengagement" and "letting go" moorings been agreed with other ship?	✓	
Has Supply Vessel confirmed readiness of steering and propulsion systems for departure?	✓	
Have moorings crews been instructed to cast off only in the manner agreed by both ship Masters?	✓	
Is Engine Room manned and ready for departure?	✓	
Are communications established with mooring crew?	✓	
Are mooring gangs standing-by on both vessels?	✓	
Is power on winches and windlass?	✓	
Are rope stoppers ready at all mooring stations?	✓	
Has area traffic (shipping) been checked?	✓	
Has navigational warning been cancelled when clear of other ship (if applicable)?	✓	

Agree to commence unmooring only when all check are satisfactory and ALARP measures are in place for ship and personnel. Stop operation if required.

For Supply/Seismic Vessel (delete as appropriate):

Name: **Date:** **Rank:** 3/O

Signature:

Date:

M3ISM/EC309 Grounding

Marine

Steps

*1 Category of Grounding - **IDENTIFY**

If Stuck Fast/Impaled/Obstructed:

2a PROPULSION - **STOP**
2b M3ISM/EC311 Pollution - **INITIATE**
2c Fire Risk - **ASSESS**
3 General Alarm - **ACTIVATE**
4 Injuries - **ASSESS**
5 Damage - **ASSESS**
6 Pollution - **ASSESS**
7 Time, Position, Course and Speed - **LOG**

If there is a hull breach:

8a Damage Stability - **CALCULATE & ISOLATE**
8b Pumps - **START**
8c Repair materials - **PREPARE**
8d Ballast - **CALCULATE & IMPLEMENT**
8e Option for Beaching - **ASSESS**
9 Vessels on Vicinity - **ALERT**
10 Navigation Signals - **IMPLEMENT**
11 Office - **INFORM**
12 Authorities - **REPORT**

If emergency event concluded:

13 VDR - **SAVE DATA (NO LONGER THAN 4HRS AFTER EVENT)**

END OF EMERGENCY CHECKLIST

Version 1.0 / Release Date 01-Nov-2018

Operation checklists, emergency checklists.

Ensuring static and dynamic stability of the tug and the barge is a critical factor to be covered comprehensively in the management system. The design, arrangement and condition of the vessel and the towing arrangement must be capable of handling the strong forces they may be subjected to during the voyage.

- Crew should verify that tanks and void spaces are not containing water when they are expected to be empty
- The Master must be satisfied with the safe condition of the barge and rigging of the tow, before sailing
- Stability should be verified before sailing and monitored throughout the voyage
- Company procedures should describe passage planning requirements and provide a template to be used for creating the plan. The passage plan should be prepared by a competent officer, approved by the Master, and read and signed by all watch-keeping officers.

Voyage and passage planning should include the following four elements:

- Appraisal, i.e. gathering all information relevant to the contemplated voyage or passage
- Planning of the whole voyage or passage from berth to berth
- Execution of the plan
- Monitoring of the progress of the vessel in the implementation of the plan.

For further information, see IMO Resolution A.893(21) – Guidelines for Voyage Planning.

! Vessel and barge draught marks and water in void space.

Safe Access

Ensuring safe means of embarking and disembarking a tug or barge, or movement between them, can be a very challenging issue. This requires attention in the design phase (or retrofit) and good planning in operations. Every charter should involve a review of the specification of the vessel and area of operation, and a risk assessment that includes analysis of access.

Safe access will normally require installation or provision of access equipment or arrangements. It should be suitable and safe, and measures should be implemented to ensure correct rigging and maintenance as applicable.

A significant number of fall from height incidents on ships involve the use of portable ladders. A portable ladder should only be used for access to a ship when no safer access is reasonably practicable. If portable ladders are used, procedures must be implemented to ensure they are used appropriately. Measures should include that:

- Personnel:
  - wear appropriate PPE (footwear that is suitable, properly fitting and clean)
  - do not carry anything while using the ladder
  - maintain three points of contact at all times
  - are supervised and assisted as necessary
  - are secured against falling as appropriate.
- The ladder:
  - has been inspected and found in good condition
  - is adequately secured against slipping, shifting sideways or falling
  - is kept clean of oil, cargo residues and other debris
  - load has been checked
  - base is stable, dry and clear of any obstacles
  - is pitched at an angle of 75 degrees from the horizontal
  - extends at least 1 meter above the upper lander place unless there are other suitable handholds
  - is placed as to afford a clearance of at least 150 mm behind the rungs
- The environment:
  - is safe, with consideration given to external factors that could impact the safety of the ladder, such as other operations, and the weather, tides, lighting, etc.

On small vessels, a gate is normally provided in the bulwark, or a bulwark ladder with steps and handholds is provided for any personnel stepping on the gunwale. Anywhere personnel may be expected to step should be designed to be non-slip, or anti-slip measures should be applied and maintained. Where possible, a gangway brow should be rigged for access. In cases where the standard access equipment cannot be used, every possible effort should be made, as appropriate, to prevent a person from falling.

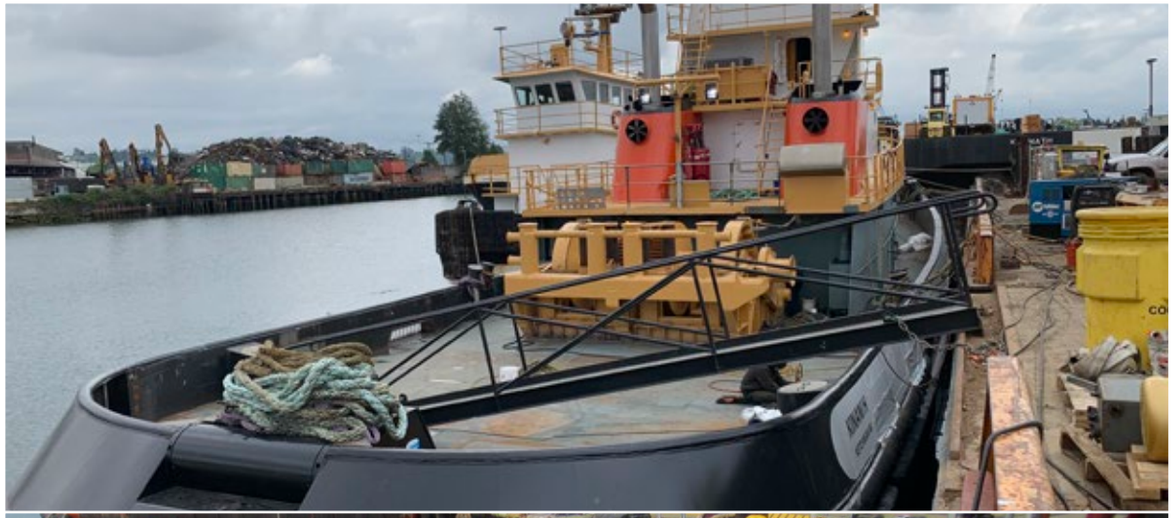
! Ideally, a gangway brow with safety net can be rigged. Bulwark ladder can be provided also if required.

!

If a portable ladder is used, it should be in good condition, secured and used with caution.

!

No means of safe access has been provided.



! Gangway brow could be improved by fitting a safety net. The plank with no handholds is unsafe.

! Both ladders are damaged. The first one is missing the top three rungs and is unsecured.

Slips, Trips and Falls

Reducing the potential for slip, trip and fall incidents requires attention in a number of areas:

Decks and steps

Decks should be maintained clean and free of oil to prevent slips and falls. Additionally:

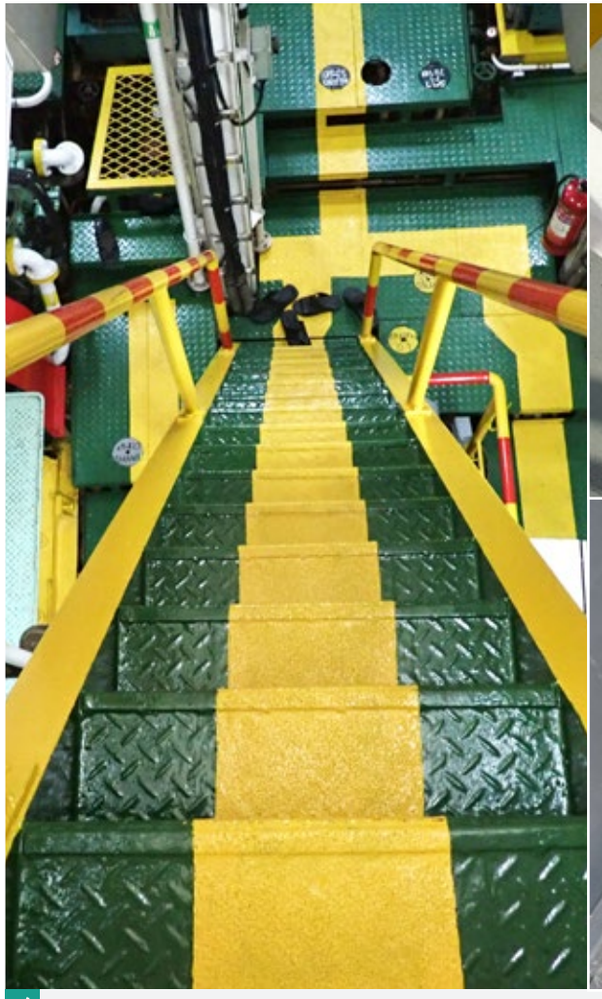
- Designated walkways on external decks should have an anti-slip coating applied
- Deck plates in machinery spaces should be designed to be non-slip and be secured
- Steps and staircases should be designed to be non-slip

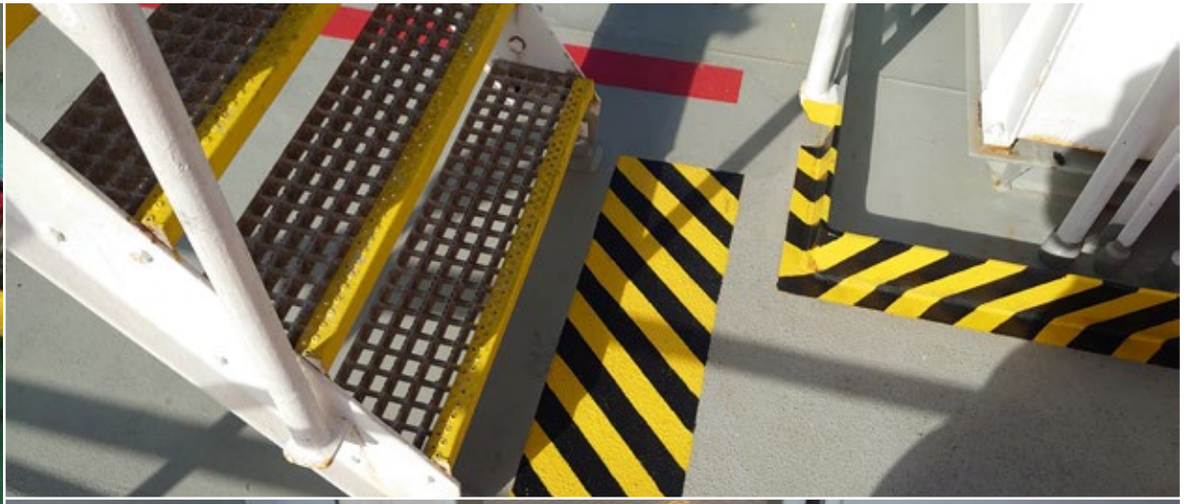
Permanent trip and snag hazards should be made conspicuous, i.e. hazard highlighting.

X Slip hazards. Oil is particularly hazardous as it is easily spread and is not always visible

! Trip hazards.

X Inadequate highlighting of changes in deck level





✓ Safe walkways and good highlighting of changes in deck level and permanent trip hazards

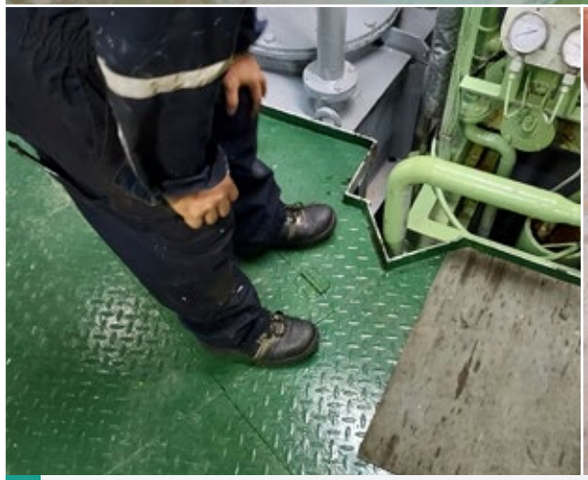
Footwear

Sensible footwear should be worn in the accommodation, and safety footwear should be worn in work areas. Loose-fitting footwear without heel support or heel strap, such as flip-flops, slides, thongs, pluggers, jandals, slops, plakkies and tsinelas, should be prohibited outside of cabins. Such loose footwear is hazardous when ascending/descending a staircase or on a moving vessel.

In work areas on deck, in machinery spaces and in the galley, it is normally appropriate to wear safety footwear due to the nature of the environment, hazards and activities that exist there.

Safety footwear should be designed and manufactured according to recognised standards, should be the correct size, and should be maintained in a clean and good state of repair. They should be replaced when the tread is significantly faded or damaged.

X Inappropriate footwear



✓ Appropriate footwear

Housekeeping

Ensuring clear passageways can be challenging on a small vessel, but good housekeeping is essential to prevent slips, trips and falls. Keeping the vessel ‘ship shape’, i.e. stores and equipment stowed and passageways clear, is essential to prevent slips, trips and falls. Ensure emergency exits and access routes to fire-fighting and other safety equipment are clear.

Maintaining a high standard of housekeeping can be particularly difficult during work activities and this is where personnel are particularly at risk. Crew should continuously keep worksites tidy and organised, erect barriers and keep non-essential personnel clear of the worksite as appropriate, and promptly clear away tools and materials on completion of the work.

! Trip hazards at the top and bottom of ladders.

! Trip hazards on deck.

Clutter making unsafe access to the vent flap.

Exposed batteries along with combustibles, chemicals and other disorganised equipment in steering gear compartment.

NO	AUDIT	Y / N	COMMENTS	ACTION
3.25	Spills to be cleaned up and work surfaces to be wiped down	Y ☒ N ☐	Covid 19 Safety Plan followed for cleaning	
3.26	Food is served at the correct temperatures Hot Food > 60°C Cold Food < 5°C	Y ☒ N ☐	Cold Food machine is being reviewed by Eletrician	
3.27	The cooking stove(s) fully functional and clean	Y ☒ N ☐		Broken rubber gasket in cooler 1 and conventional oven
3.28	Storage areas are orderly and unobstructed	Y ☒ N ☐		
3.29	No cleaning above food area when food is out	Y ☒ N ☐		
3.30	Staff to wear gloves when making sandwiches	Y ☒ N ☐		
3.31	All equipment surfaces are free of corrosion and in good repair	Y ☒ N ☐		To pay attention to wipe down cooking equipment.
3.32	Dishes are stored and dispensed from hygienic shelves or racks	Y ☒ N ☐		
3.33	Glasses and cups are stored upside down on clean shelves or racks	Y ☒ N ☐		
4	**DINING ROOM**			
4.1	General Appearance – the dining room should be clean and orderly	Y ☒ N ☐	Covid 19 Safety Plan followed for cleaning	Reminder to clean behind and under furniture
4.2	Serving lines and areas are clean and unobstructed	Y ☒ N ☐	Covid 19 Safety Plan followed for cleaning	
4.3	Cutlery is clean stacked upright in clean dispensers	Y ☒ N ☐		
4.4	Crockery is stored dry (vertical or upside down) and covered	Y ☒ N ☐		

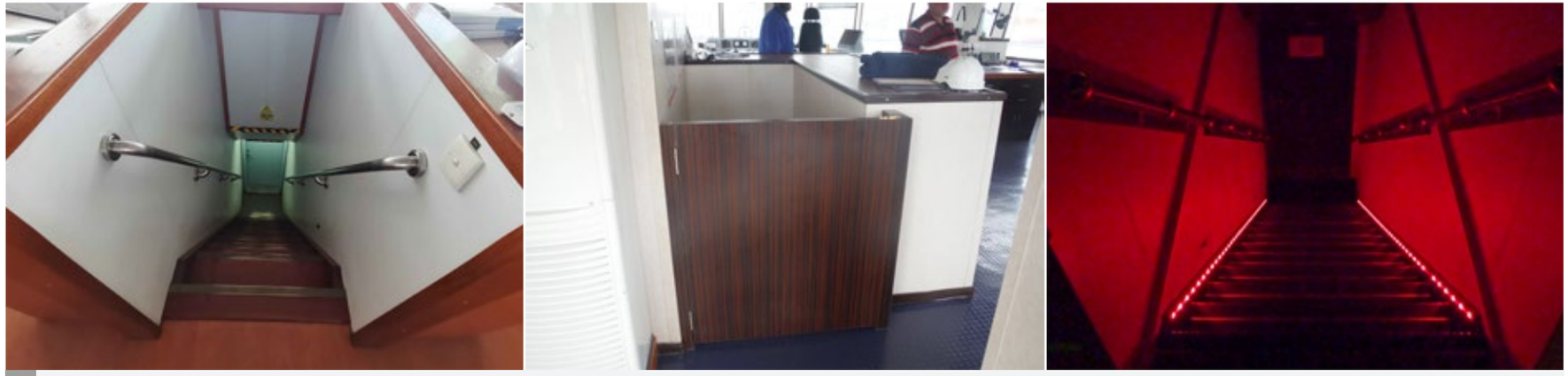
Example checklist for Master's weekly inspection of accommodation spaces

Environment

Maintaining a safe environment includes ensuring adequate lighting during hours of darkness. Where this is not possible or feasible, extra effort is required as described in the above points on housekeeping.

Handrails and handholds should be maintained in good condition. They will be particularly important in areas where personnel may fall onto a harmful surface, e.g. a galley stove, electrical switchboards, adjacent to machinery, etc., and in other places where personnel may be liable to slip, e.g. a shower compartment.

! Poor lighting and bright sunlight can both reduce visibility of trip and slip hazards



! A crewmember may fall down the bridge staircase during heavy weather or during hours of darkness. A gate at the top of the stairs and/or low lighting on the staircase can help prevent falls

Where a low-level hatch or cover has been opened/ removed, it may be appropriate to rig barriers to prevent a person from accidentally falling down.

!

Openings in the deck left unguarded

!

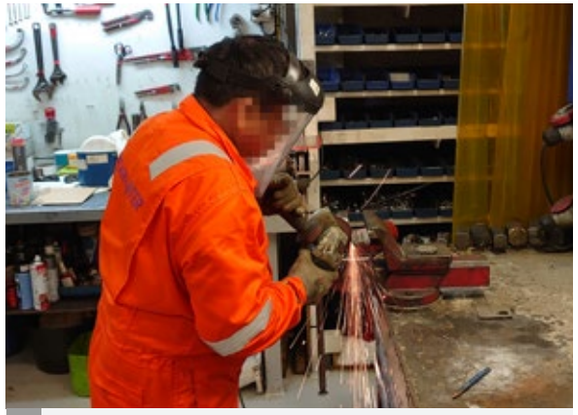
Stanchions and chains/bars readily available at low level hatches, and tape used in other areas to control access

Management of Work Activities

The company should ensure that crew are provided with safe systems of work, including standard work instructions and risk assessments. PPE should be appropriate for the work activities and work environment, and in accordance with the risk assessment. Tools and machinery should be operated in accordance with manufacturer's instructions. Use of hazardous chemicals should be in accordance with the applicable safety data sheets (SDS).

! No personal protective equipment (PPE).

! Appropriate PPE.



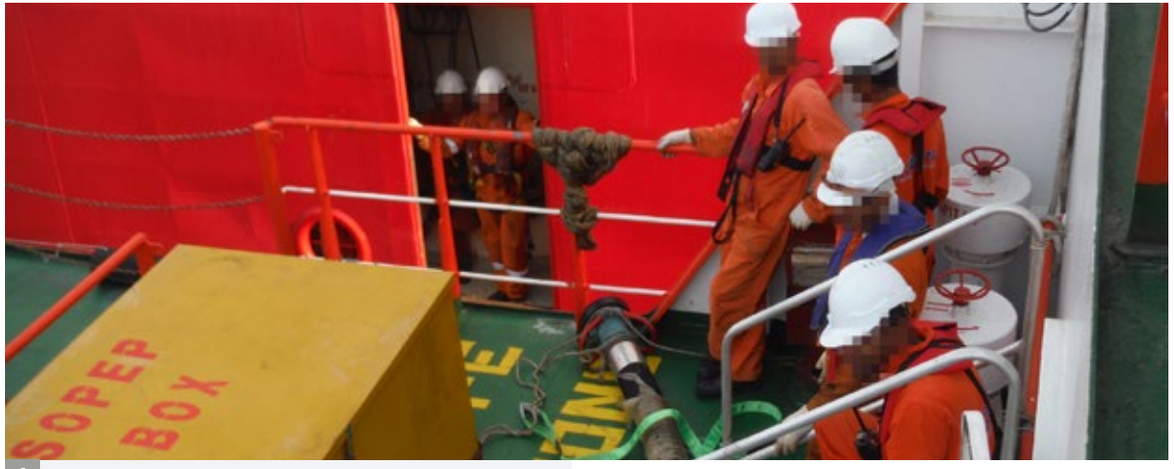
! Safety guard fitted on angle grinder and face shield and gloves in use.

! Organised workshop and basic PPE.

PPE lines marked on deck. Lifejackets required when working close to the open stern.

PPE is readily available.

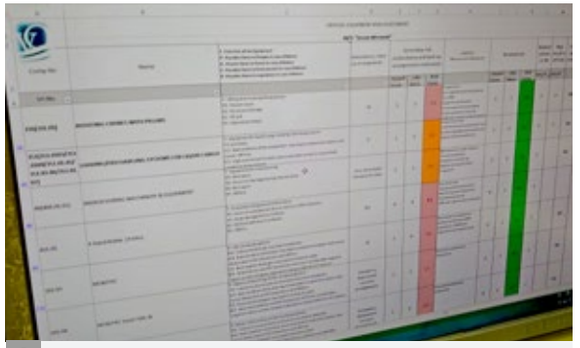
PPE requirements are clearly indicated.



All crew complying with PPE requirements.

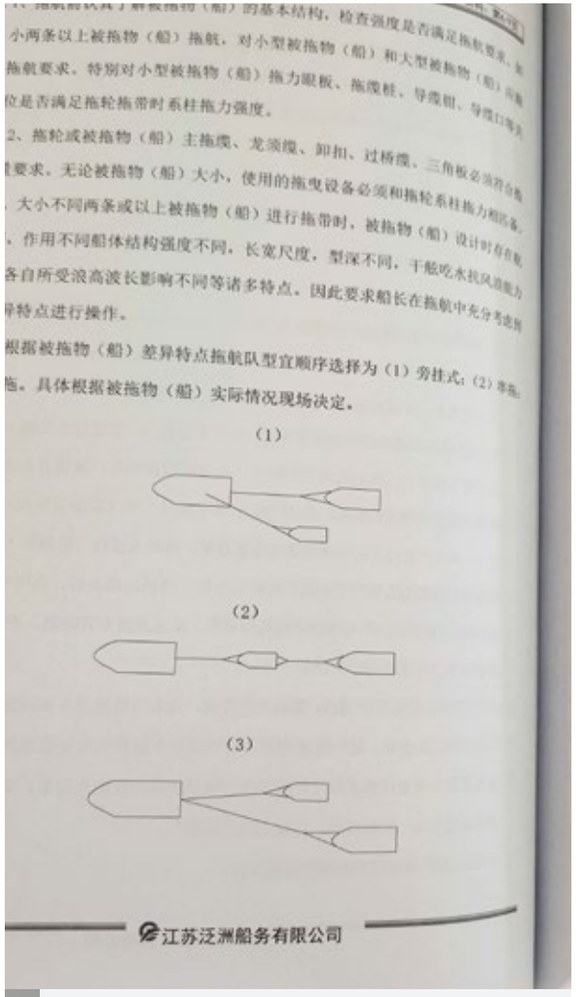
Lifejacket worn in accordance with risk assessment and procedure.

Spring-loaded switch on the needle scaler is functional (not secured in ON position).



Risk assessments identify specific PPE requirements for specific steps in the activity (job safety analysis).

Procedures and tables clearly indicate the PPE requirements for specific work areas and specific activities



Clear procedures in the working language of the ship.

Crew re-setting the quick release hook on completion of a training session utilising both local and remote (bridge) control.

Pushing and Towing Operations

The whole main deck forward/aft should be considered a ‘snapback zone’ during operations and at other times when gear is under tension. Line-handling safety and the risk of snap-back should be discussed in the toolbox meeting prior to each operation. Non-essential personnel should be kept clear of the deck. Crewmembers required to be on deck should stand clear where appropriate and utilise ‘protected areas’ where possible to reduce the likelihood of injury in the event of a rope parting on deck. Crew should be informed of proper manual handling techniques, and these should be adopted in order to reduce the likelihood of strains and sprain injuries.

Mooring and towing gear needs to be maintained in good condition. It should be included in a planned maintenance system to ensure routine inspection and preventative maintenance. Only certified equipment should be in use. Certificates and maintenance records should be maintained on board.

! Harbour tug operations.

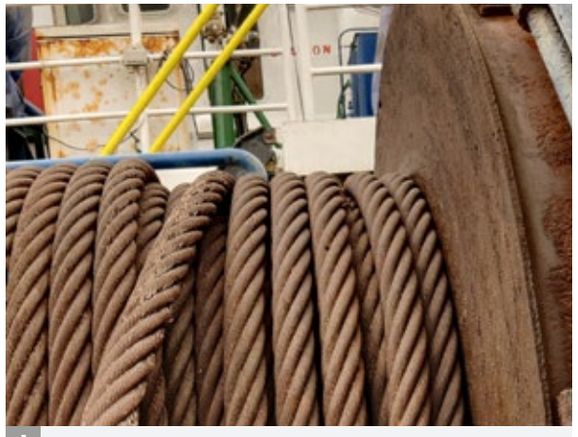
Ropes stowed off deck but not protected from sun and weather.

Ropes stowed off deck but not protected from sun and weather.

Rope stowed off the deck in a protected location.

This rope is soaking up oil from the deck. Oil, paints and other chemical contaminants may degrade the fibre ropes.

Ropes allowed to be squeezed between the tug and barge will suffer damage.



Wire ropes should be routinely inspected and greased as applicable.

Working at Height

Ensuring control of work at height normally starts with providing a clear definition of work at height, such as: **“work where there is a risk of falling more than two metres, or a lesser height where a fall would likely result in injury; and any work over the ship’s side or where there is a risk of falling into the water”**.

Work at height should be subject to risk assessment, and suitable control measures should be taken to protect those who may be put at risk. Depending on the severity of the risk, a permit to work (PTW) may be required (e.g. for working aloft)*.

*Anyone working in a location where there is a risk of falling may be regarded as working at height. In addition to work on ladders, staging and scaffolding, this includes undertaking work inside a tank, near an opening such as a hatch, or on a fixed stairway.

Further guidance is contained in marine guidance note MGN 410(M+F) Amendment 2.

! Fixed ladder blocked with PTW signboard. Example PTW form. Active permits posted.

When analysed properly, work at height is found to be a complex topic. However, it is one of the main activity types where there is potential for serious injury or death and where control measures must be effectively applied. Unfortunately, it is an area where crew are often unsure. For example, working on deck near an unguarded edge – where there is a risk of a fall to another deck below is (technically) working at height. But how close do crew have to be to that unguarded edge for it to be considered working at height? Adequate training and familiarisation will normally be required in addition to clearly documented procedures.

Personnel walking along the gunwale of a barge are exposed to falling overboard. Normally, this would require wearing a lifejacket, but in the case of a large barge moored alongside a quay, personnel may be exposed to falling a significant height to the quayside. Given the characteristics of the barge, it may be appropriate to install a jackstay or other arrangement onto which personnel can connect a safety lanyard.

! How close to the edge are crew permitted to get before specific PPE is required?

! This operator uses colour-coded lines to indicate PPE requirements. In this case, basic PPE + lifejacket + fall protection equipment are required when moving beyond the yellow line.

Work at height activities will normally require use of fall protection equipment – whether that be the rigging of safety barriers (passive fall protection), use of personal protective equipment to restrict the worker's range of movement so they cannot fall (fall restraint systems) or use of personal fall protective equipment to arrest a fall within acceptable force and clearance margins (fall arrest systems). In all cases, it must be ensured that adequate equipment is available on board, that it is properly inspected and maintained, and that crew are suitably trained and familiarised in its use. Note: In cases where a fall arrest system is used, there should also be 'rescue at height' planning, and additional equipment may be required.

! Work at height could be prevented by using a halyard instead of fixing this day signal up the mast.

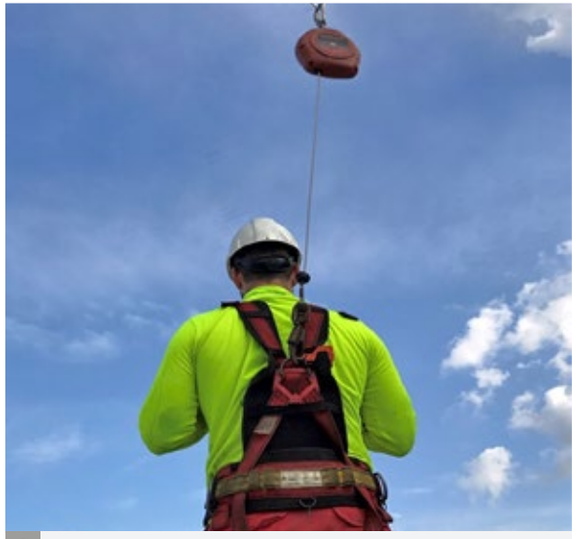
! What personal fall protection equipment is required when using this ladder?

! Where should a crew member secure his or her personal fall protection equipment when in position to maintain this flap or light?

! Portable ladders should be stowed where protected against impact and ideally not exposed to weather.

A WaH locker containing a range of personal fall prevention equipment, including full body harnesses in a range of sizes.

Examples of a fall restraint system in use. It's not possible for the crewmember to step over the edge.



Use of a fall arrest system, which arrests the user after they fall.

Lifting Operations

Lifting appliances, loose lifting gear and lifting operations need to be very well managed. Failure of a lifting arrangement can have fatal consequences for personnel involved, even with relatively lightweight loads. Therefore:

- Personnel should be adequately trained and competent in rigging/slinging and crane operating .
- All components of lifting equipment should be certified and routinely inspected.
- Appliances should be checked and safety devices tested at start-up. Loose gear should be inspected before each use. Defective equipment should be promptly taken out of service.
- When there is any suspicion that any lifting equipment or any part of that equipment may have been subjected to excessive loads, exceeding the safe working load (SWL), or subjected to treatment likely to cause damage, it should be taken out of service until it can be subjected to a thorough examination by a competent person.

! Limit switches are recommended and should be tested during pre-use checks.

! Spring-loaded safety latch across the throat of this hook is not self-closing. It is damaged and should be taken out of service until repaired.

! Pneumatic fenders should be lifted from the lifting points at either end – not from the tyre and chain net. They should be lifted with certified slings or strops.

! It is recommended to use a colour-coded system so crew can easily identify the last annual inspection performed on items of loose lifting gear.

! Webbing slings with green tags – colour indicating the last annual inspection performed.

! Shackles marked with colours to indicate SWL/WLL and year of last inspection.

Rotating Machinery and Hot Surfaces

Rotating machinery and hot surfaces should be guarded/shielded.

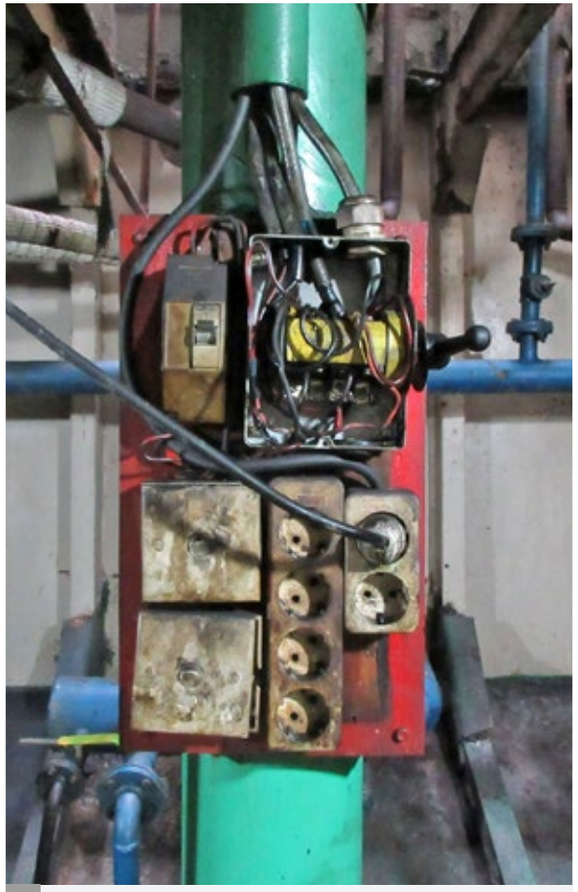
! Rotating machinery with guards correctly installed

Electrical Hazards

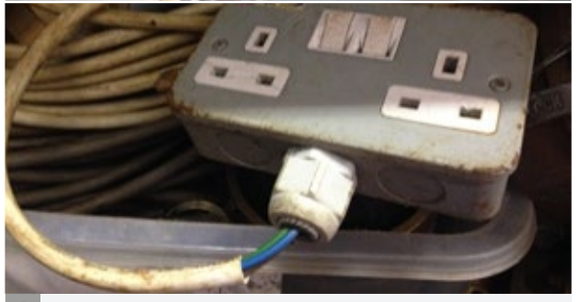
The safety of personnel from electrical hazards should be ensured.

Batteries should be in a battery compartment or battery box with a lid and ventilation, and with signage indicating no smoking or naked flame, and PPE should be required for handling lead acid batteries.

! Poor installation of batteries.



! Live components should not be exposed.



! Cable terminations should be secure. The cable jacket should be secured inside the termination – individual wires/conductors should not be exposed and junction boxes should not be taped in place.

Fire Hazards

Fire safety should be ensured.

In machinery spaces, all surfaces with temperatures above 220°C (430°F), which may be impinged as a result of a fuel oil, lubricating oil and other flammable oil system failure, should be properly insulated.

The insulation of hot surfaces is primarily required to reduce the risk of fire, by reducing the temperature of surfaces below the auto-ignition temperature of oil fuel, lubricating oil or other flammable oils.

Manufacturers' instructions should be followed, if available. Permanent insulation should be used to the greatest extent possible. Insulation should be provided with readily removable sections to allow access for normal maintenance. Where the insulation used is oil absorbent or may permit the penetration of oil, the insulation should be encased in steel sheathing or equivalent material.

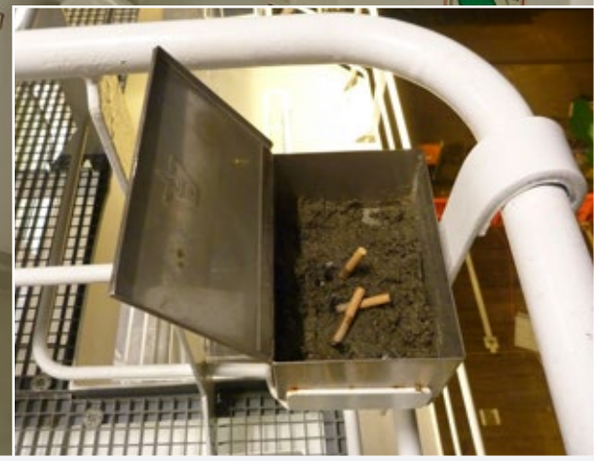
A regular check of equipment should be made to confirm that the insulation is in place. When maintenance or repair to equipment has been carried out, checks should be made to ensure that the insulation covering the heated surfaces has been properly replaced.

! Oil-soaked insulation should be replaced

! Insulation in good oil-free condition and tightly fitting with no gaps exposing hot surfaces.

! Oil leaks, including small ones, should be rectified as soon as possible. Oil-soaked absorbent pads increase fire risk

! Machinery spaces should be clear of combustible materials and waste. Garbage receptacles should be metal with a lid. Oily rags should only be placed in metal bins with a lid.



! Smoking should be controlled. Designated smoking areas should be established and clearly signed, and suitable ash trays should be provided.

Fire Safety Systems, Life-Saving Appliances and other Safety Equipment

Fire safety systems (FSS), life-saving appliances (LSA) and other safety equipment should at all times be in place and ready for use. It is also important to ensure adequate:

- Inspection and maintenance instructions and routines
- Operating instructions in the working language of the ship
- Crew familiarisation, training and drills.

Typical defects observed during surveys:

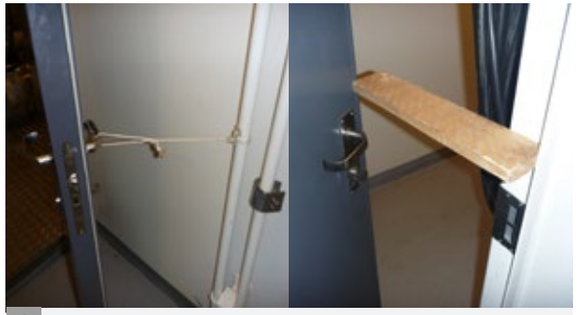
! International shore connection (ISC) connection not kept together with gasket bolts, nuts and washers.

! EEBD gauge indicating an empty cylinder.

! Vent flap not marked to indicate the space/ compartment served.

! Crew spent more than 20 minutes trying to get this emergency generator started and never succeeded.

! Emergency stop not weather-tight.



! Self-closing doors in fire division bulkheads should not be secured in the open position when not in use

Good examples of LSA, FFE and safety equipment:

Control panels and valves in good condition, clearly signed and labelled, and operating instructions posted.

Fire flaps and dampers maintained in good operable condition, clearly signed and labelled.

Fire detection and alarm system regularly tested, by appropriate means.

Portable and wheeled (mobile) fire extinguishers exposed to weather are protected, and are subject to routine inspection and periodic renewal.

Fire-fighting equipment maintained, routinely inspected and ready for immediate use.

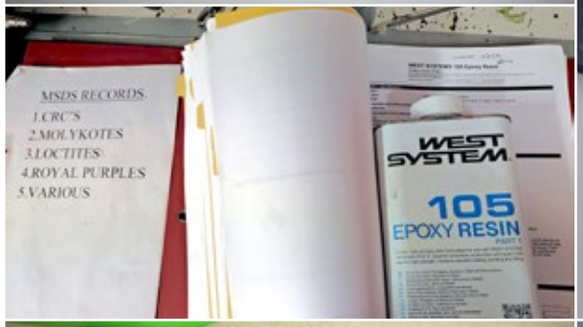
Safety Equipment and Safe Work Arrangements

Flame arrestors should be provided in the oxygen and acetylene supply lines and will usually be fitted at the low-pressure side of regulators, although they may be duplicated at the torch.

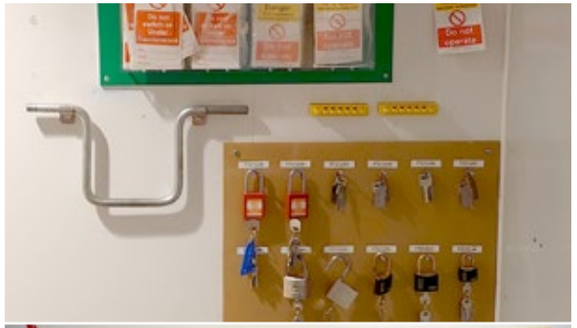
Equipment found in good order:

! Gas cutting/welding cylinders (Ac/Ox) and any domestic fuel gas cylinders stored securely in a protected and ventilated space outside of the accommodation. For gas distribution systems, safety devices in use as per certified installation

! Safe and secure stowage of paints and other flammables including safety data sheets (SDS), PPE (e.g. eye protection) and emergency eye wash bottles readily available. Fire protection in accordance with applicable regulation



! Safe and secure stowage of chemicals, including safety data sheets (SDS), PPE (e.g. gauntlets, apron, face shield), and emergency eye wash bottles readily available. Containers properly labelled.



! Lock-out tag-out (LOTO) equipment available for system isolations, including a range of valve and switch locks.

! Hold-back devices installed so that doors can be safely secured in the open position.

Adequate SOPEP equipment readily available on deck.

Rescue equipment and first aid instructions posted in locations where there is a risk of electrocution

Galley stove fitted with storm rails and grab bar.

Emergency shutdown and emergency stop buttons clearly signed.

Emergency Escapes

Emergency escape routes should be maintained and well marked with low-level photoluminescent escape signage. Emergency exits must be signed and unobstructed.