



▶ **LOSS PREVENTION
FISHING VESSEL SAFETY**



SHIOWNERS

The information and recommendations in this booklet are given in good faith and are meant to highlight best practices, good seamanship and common sense in order to reduce incidents that result in related claims. However, Members must take into consideration the guidance and regulatory requirements given by Flag States and other governing authorities when formulating policy in line with the contents of this publication.

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Chapter 1

▶ Introduction

Fishing is the most dangerous job in the world. In 1999, the International Labour Organization estimated that 24,000 fatalities occurred worldwide in capture fisheries each year¹. The consequences of these fatalities have a huge impact on the families and dependants of the unfortunate seamen.

There have been many studies carried out over the years showing that fatalities on fishing vessels remain a real threat. This is reiterated by the claims incidents reported to the Club that historically show personal injury/illness as the area with the most reported cases. These events are often of a nature that could have easily resulted in death.

Fishermen must remember that fishing vessels are moving, often with wet platforms and therefore the risk associated with any task will dramatically increase. The decks of a fishing vessel are very busy with many pieces of equipment such as ropes, wires, nets and shackles being utilised simultaneously.

This publication does not seek to fully inform the skipper and their crews about all on board safety requirements (including the safety aspects involved with different methods of fishing). Instead, it hopes to highlight areas that, from the Club's experience, contribute to crew members becoming more safety aware, as well as assisting members of crew to recognise the dangers for themselves.

¹ www.ilo.org/global/industries-and-sectors/shipping-ports-fisheries-inland-waterways/fisheries/lang--en/index.htm

Chapter 2

▶ Your vessel

It is essential that the vessel's skipper and all crew are fully familiarised with the vessel and its equipment, including any vessel-specific quirks, prior to departing a berth. To assist with this, it is recommended that a pre-sailing checklist is completed (see Appendix 1). This should include the following:

1. The operation and maintenance of the fishing equipment. The Club has seen many claims that are attributable to crew members operating machinery out of sight of each other due to vessel design (Appendix 3 – Case study 1 – Careless action severely injures colleagues). It is imperative that the operating risk of the machinery is assessed as well as its ongoing maintenance.
2. The location and operation of safety equipment, ensuring it is free from obstruction (Figure 1).
3. The on board layout of the spaces such as void spaces, engine room and cargo spaces.
4. The location and operation of key equipment including:
 - **Bilge level alarms**
These should be fitted where possible in suitable spaces and should be tested prior to sailing to ensure they are in good working order.
 - **Sea water systems**
Sea inlet valves, discharge valves, pumps and piping should be verified to confirm they are in good condition.
 - **Hydraulic piping and systems**
There have been several cases notified to the Club involving the failure of hydraulic pipes. In some cases this has resulted in fatalities due to hydraulic oil entering a crewman's body at high pressure when the pipe has failed. It is imperative that these are maintained and parts replaced as necessary.
 - **Freeing ports and pumping systems**
Ensure that freeing ports are clear of obstructions and the pumping system is capable of pumping water out of the hull.

- **Items to ensure watertight integrity**

It is essential that all openings to the sea have the ability to be made watertight to ensure that water does not ingress during normal operations, when transiting or in an emergency. These items include hatches, doors and vents. During maintenance, rubber seals must be checked for deterioration and all closing devices must be in place with the ability to close fully. During the Club's routine Protection and Indemnity (P&I) Condition Surveys on fishing vessels, the poor maintenance of watertight openings is often noted (Figure 2).

- **Machinery**

Verify if the main engine, gearbox, propeller shaft, stern gland, propeller and steering gear are in good condition.

- **Electrics**

Batteries and electrics should be checked to show that they are in good working order and ready for operation.



Figure 1: Obstructed life raft



Figure 2: Poorly maintained access rubbers

Chapter 3

► Basic stability

It is crucial for skippers to have an awareness of the prevailing/forecasted weather conditions and sea state so as to determine if their vessel would be able to withstand such conditions. Refer to the recommended reference list at the end of this publication for further detailed stability advice.

A vessel's stability can be affected by many factors including the vessel's design and any alterations made to the vessel's original configuration (e.g. the adding of derricks and changing winches), the type of operation the vessel is performing, weight distribution (including the loading of excessive weights on deck), cargo on board, tank conditions and fasteners².

Other reasons for a vessel to capsize include:

- Free surface effect caused by flooding, therefore reducing stability.
- Free water on deck.
- Ice accumulation in freezing conditions on the vessel's steelwork and fishing equipment, including pots.
- Incorrect stowage of fish.
- Lifting weights by derrick, therefore changing the vessel's centre of gravity.



Figure 3: Capsized fishing boat

² A fastener is when a fishing vessel gets its fishing gear caught on an underwater obstruction (wreck, rocks, pipelines, etc.).

- Movement of cargoes.
- Openings such as hatches and doors are not watertight or have been left open.

All skippers should be aware of their vessel's stability characteristics, how to calculate the prevailing stability condition and the basic terminology used, as follows (see Figure 4):

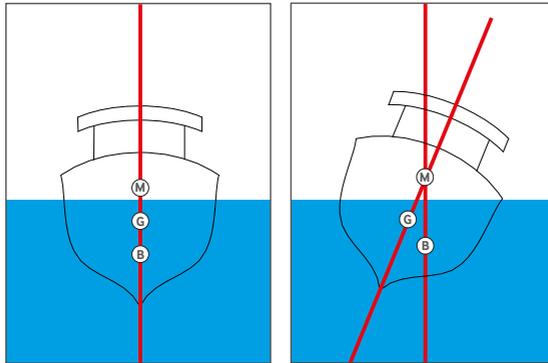


Figure 4: Diagrams to illustrate Centre of Gravity and Buoyancy, Metacentric height and Metacentre

- Centre of Gravity (G) is the point at which all the mass of body may be considered to be concentrated.
- Centre of Buoyancy (B) is at the centre of gravity of the underwater volume.
- Metacentric height (GM) is the distance between the centre of gravity of a ship and its Metacentre (M) – the point on the centre-line of a vessel through which all the forces of buoyancy pass when the vessel is heeled.

It is essential for all skippers to remember that:

- Stability cannot be measured – it has to be calculated.
- They must be aware of all factors that affect the vessel's stability.
- They must use the stability book if available.
- They must assess the effect of possible modifications may have on the vessel e.g. adding derricks and replacing winches.
- The higher up a weight is placed, the greater detrimental effect it has on the vessel's stability.

Many administrations and companies offer basic stability courses for fishermen, including Seafish (see contact details in Chapter 9, Acknowledgements) concentrating on practical and relevant scenarios. We recommend that Members contact their regulatory authority for further information.

Chapter 4

► Navigation

It is vital that the vessel has fully certified and trained crew on board who are capable of keeping a watch with a good understanding of what is required to undertake this safely and efficiently. The importance of this became readily apparent in an incident reported to the Club. In this case a steel trawler manned by a crew of two collided with another fishing vessel which was lying at anchor.

The investigation that followed showed that the skipper had set a course for the boat's home port and had then handed over the watch to the deckhand who was cleaning the aft deck when the collision occurred. The vessel was not fitted with a watch alarm, nor did it have a guard ring facility on the radar. In addition, no anchor watch had been set on the anchored vessel and all her crew were turned in.

From the Club's experience of claims, we have seen that navigational incidents are mainly caused by:

- Poor watchkeeping, unqualified or inexperienced watchkeepers (see Appendix 3 Case study 2: When a lookout should look out).
- Insufficient lookout/no one on the bridge.
- Fatigue – a major cause of a lapse in concentration and impaired judgement.
- The use of alcohol and drugs.

Skippers are therefore advised that, to keep an effective watch, the following should be adhered to:

- The wheelhouse should be manned at all appropriate times by experienced personnel. Do not leave the wheelhouse unless properly relieved.
- All crew should be given training on how to keep an effective lookout, including the ability to plan a voyage in advance, monitor movements of other vessels and how to ascertain the vessel's position, speed and course steered.
- All watchkeepers should be instructed on their duties. This is especially vital when navigating in restricted visibility, close to landfall or in dense traffic.
- Crew should be aware of hazards associated with the time of day, visibility and proximity of land.
- Crew should be aware of prevailing/forecasted weather and sea conditions.

- Navigational aids must be kept in good condition and used effectively. It is crucial that the vessel has on board navigational equipment adequate for its intended operational area. All navigational charts must be kept up to date with the available notices to mariners.
- All crew should be familiar with Global Maritime Distress and Safety System (GMDSS) equipment, as applicable.
- All crew should have a good understanding of The International Regulations for Preventing Collisions at Sea (Colregs). This should include knowledge of the correct positioning of day signals and lights.
- A passage plan should be prepared for the intended voyage to the fishing grounds. Crew should be familiar with the plan and any hazards/restrictions which may be expected during the voyage.
- In order to avoid the fouling of nets on underwater obstructions, an assessment should be carried out using all available means, to identify any subsea hazards. Members are encouraged to utilize services which provide information regarding hazards such as subsea cables, pipelines and wellheads.

It is vital for all skippers to remember that:

- It is not possible to rely on every give-way³ vessel to take appropriate action.
- Fishing vessels do not **always** have special privileges.
- A proper lookout must be maintained at all times.
- They must not hesitate to use helm, engine and sound signals if in danger.
- A magnetic compass must be utilised.
- The radar must be used as an aid to navigation.
- The watch alarm must be tested on automatic pilot.
- Video plotters must not be solely relied upon.
- Crew should monitor the relevant navigation warnings and other forms of hazard warnings available for the area and nature of fishing operations.

³ Reference should be made to the Colregs.

Chapter 5

▶ Working safely/Safety equipment

All fishermen must be aware of the health and safety laws applicable to their vessels for the area of operation e.g. for vessels within the UK, Health and Safety at Work Act 1974, Control of Substances Hazardous to Health (COSHH) and Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) apply. Prior to sailing, the person in charge must ensure that their operations conform to the local regulations and requirements.

Every vessel should provide a safe means of access to and from the vessel, fishing vessels being no exception to this rule. It is the skipper's responsibility to ensure a risk assessment has been carried out. Personnel should always choose the safest route, especially if having to transit/cross other vessels. A life jacket should always be worn where there is even a slight possibility of entering the water while boarding, e.g. whilst using a tender. When on the ladder (permanent or portable) two hands should always be used and the ladder should be supported as appropriate.

Underpinning the importance of a safe access, the Club was notified of an incident which resulted in a crew member falling 12 feet onto the dock. The crew member concerned had been removing some of his belongings from the vessel as the fishing season had closed. No proper gangway had been rigged and the only access down was by way of a Jacob's ladder tied to the top railing of the pilot house deck. As the crew member clambered over the top railing, he lost his balance and fell, resulting in a severely broken wrist and herniated disc in his upper spine.

The vessel's working areas should be well lit and, so far as possible, free from any obstructions or potential dangers (Figure 5). Crew members' awareness of lines under tension and snags on the lines or visible bights is vital.

It is up to the individual crew members to ensure that they work in a safe manner on board the vessel by:

- Following instructions.
- Not causing harm to others through actions or neglect.
- Not misusing or tampering with safety equipment.
- Reporting perceived dangers or potential hazards to the vessel's skipper.
- Signing that they have been informed about on board health and safety and can identify their on board safety policies.

In the unfortunate event of an incident or near-miss, Member's should carry out an investigation to establish the root cause. Once established control measures can be identified and implemented to avoid re-occurrence of similar incidents. The Club's Evidence Collection Booklet (www.shipownersclub.com/lossprevention/claim-evidence-collection) may be of assistance to skippers in the event of an incident.:

It is the skipper's responsibility to ensure that:

- A risk assessment has been completed.
- Emergency procedures are in place and the crew are fully acquainted with them.
- Maintenance of the vessel and its associated equipment and machinery is up to date.
- Safety gear is in good order and in the correct location (see Figure 6).
- The crew are informed of all safety requirements/policy and working practices required of them.
- The crew has the correct personal safety/protective equipment including appropriate safety shoes for the job.



Figure 5: Working deck with many obstructions and dangers



Figure 6: Poorly maintained fire extinguisher not in correct location

Safety assessments and policies

Prior to operating a vessel, the owner or operator must consider and be responsible for the task it is going to undertake, ensuring its suitability to carry out the operation in a safe and legal manner. When assessing safety, all concerns and hazards that may exist on the vessel should be considered and questions answered honestly, including whether or not improvements can be made. Safety assessments are not risk assessments. If the situation on board the vessel can be justified, there is no need to make any changes. Owners or operators should be happy that they can:

- Identify the hazards.
- Recognise how crew members could be harmed.
- Evaluate the risks and consider precautions.
- Review risk assessments and update them if necessary.

When carrying out a safety assessment, all hazards that can be associated with working on a moving deck, galley, fish rooms, engine room, accommodation and with fishing operations should be included, as follows:

- Clutter.
- Falling overboard.
- Hazardous substances.
- Manual handling, including portable equipment.
- Noise and vibration, hot surfaces, electricity and hydraulics in the machinery space.
- Openings.
- Physical injuries such as blows to the head, becoming caught in fishing gear, cuts, stings and bites.
- Working alone.
- Working at a height.
- Working conditions.
- Working with haulers and winches and the importance of keeping everyone in sight.
- Dangers with fishing nets becoming fast upon an underwater obstruction.

It is a priority to minimise potential risk. After completing the safety assessment it may be considered prudent to formulate policies around the findings. These will recommend safe ways of carrying out on board operations such as wearing a life jacket/life vest while on deck, the positioning of safety guards on winches, always keeping crew in sight of one another while performing operations and enclosed space entry.

Entry into and working within enclosed spaces

Several recent cases notified to the Club show fatalities due to crew members entering spaces they do not consider an enclosed space and are therefore unaware of the impending danger. We have included a case study (Appendix 3, Case study 3: Death from hydrogen sulphide poisoning) where the associated dangers are highlighted. In response to these incidents, the Club first published a booklet entitled **Enclosed Space Entry** in 2007 and has published a revised edition in February 2016 (see Figure 7). This is available on the Club's website www.shipownersclub.com/lossprevention/enclosed-space-entry. The booklet highlights the dangers associated with crew entering areas of a vessel that may not be considered an enclosed space. An enclosed space includes, but is not limited to: cargo holds; tanks (including ballast, fore and aft peaks, fresh water, slop/waste and bunker); void spaces; and any other spaces that may normally be kept closed or sealed.



Figure 7: The Club's publication
Enclosed Space Entry

When entering an enclosed space, the crew member must initially locate the emergency exits as well as the whereabouts of any moving machinery and must not smoke. It is imperative to realise that gases can build up anywhere, especially refrigerated gases and ammonia. Therefore, the use of personal gas monitoring equipment is recommended.

Maintenance

Prior to undertaking maintenance on board, thought should be given about what equipment and personal safety gear may be required, such as goggles while scaling and hard hats while working with moving equipment. Safety procedures, which are a measure of good practice, must also be checked, including having a permit for both hot work and entry into enclosed spaces. Regular maintenance will assist in preventing potential hazardous situations from arising in the first place.

It is well understood that, during operations at sea, fishing vessels are constantly working with very few rest periods, so it is unlikely that maintenance will be carried out during these periods. Maintenance must be performed and it is the skipper's responsibility to ensure that this is carried out.

The skipper should ensure that:

- The bilge alarm systems' electrical supply is checked and all debris removed. A check should be undertaken at the start of a voyage and then weekly (Figure 8).
- Bilge and fish room strainers are kept free of debris.
- Electrical wiring is in good condition.
- Engine, fuel systems and filters are clean and serviced.
- Equipment is properly secured.
- Freeing ports are clear and free to operate.
- Machinery guards are well maintained, inspected and tested. Reference should be made to the Marine Safety Agency's Marine Guidance Note (MGN) 331 – The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006. See the Recommended reference list at the end of this publication for further information. Members should consult with the vessel's regulatory authority to ascertain their requirements.
- Navigational equipment, including lights and shapes, are available and working
- Pipes are checked for corrosion and wear.
- Pumps are checked regularly.
- Seacocks are checked regularly by operating them.
- The hull, deck and watertight bulkheads are in a good structural condition.

- The vessel is suitable for, and capable of, operating in the prevailing sea conditions.
- Valves and valve chests are checked and labelled correctly.
- Watertight doors and hatches are free to open and close and toggles are greased (Figure 9).
- Working gear such as wires, shackles and blocks are checked for signs of wear and deterioration, tested and marked. Reference should be made to MGN 332 – The Merchant Shipping and Fishing Vessels (Lifting Operations and Lifting Equipment) Regulations 2006. See the Recommended reference list at the end of this publication for further information. Members should consult with the vessel's regulatory authority to ascertain their requirements.



Figure 8: Bilges containing water



Figure 9: Hatch without a locking pin

Safety equipment and drills

It should be ensured that all members of the crew are fully conversant with the operation of the on board safety equipment. If there is any doubt, advice should be immediately sought from the vessel's skipper who is responsible for ensuring that all crew members are aware of the location of all safety equipment on board and how it operates. It is also the skipper's responsibility to ensure that all equipment is stored in the correct locations, is correctly maintained and that the service history is up to date.

The locations of designated safety equipment must be identified on boarding. This includes equipment used for the following situations:

- Emergency abandonment – approved life jackets (stowage and donning instructions), immersion suits, pyrotechnics, life buoys, search and rescue transponder (SARTs), life rafts and if time allows, Emergency Position Indicating Radio Beacons (EPIRBs) (which should be registered with the appropriate agency).
- Rescue location – GMDSS (as applicable), SARTs and EPIRBs.
- Outbreaks of fire – portable fire extinguishers, breathing apparatus, lifelines, fire blankets, water hoses and fixed insulations.
- Medical emergencies – first aid kits and medical equipment.
- Location of the Damage Control Kit.
- Man overboard – lifebuoys and lifelines.

Life jackets should be worn at all times – not just in an emergency. There are many reported incidents where crew members have been swept off the deck and therefore life jackets should be viewed as part of daily personal protective equipment. While these may be regarded as cumbersome, there are many versions now available that do not restrict movement and where fitted the crotch strap must always be utilised.

All equipment should be well maintained, regularly inspected and checked to ensure it is within the test date. This should be recorded in the boat's official log book. As a measure of good practice, inspections of safety equipment should be undertaken on the following basis:

- Survival craft (weekly) – attention should be paid to ensure the correct installation of the hydrostatic release unit (HRU). Figure 10 illustrates an incorrectly stowed life raft (without a HRU), Figure 11 illustrates correct stowage.
- Alarm signals (weekly).
- Life saving equipment, including fire extinguishers (at least every four weeks).



Figure 10: Incorrectly stowed life raft

Hammar H2O installation

White: Maximum strong rope secured to deck as shown will enable standard in-flight lashing with a clip back. Lashing points are attached to the Red Web Belt.

If the ship sinks, the water pressure, water is released, will cut the strong rope, which cuts the lashing and the H2O will float free.

No the ship sinks, the H2O will inflate and the H2O will float free.

Red Web Belt lashing and points are attached to the H2O.

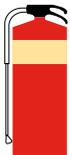
HAMMAR®

Figure 11: Hammar poster on HRUs

Fires and fire extinguishers

It is important that extinguishers are fit for purpose.

Extinguishers are colour coded according to the type of fire they are suitable for and it is essential that crew members are given training on the categories as shown in the table below.

Fires and fire extinguishers	
	<p>Red = Water</p> <p>Class A (e.g. wood, paper and plastics)</p>
	<p>Cream = Foam</p> <p>Class B (e.g. liquids, oils, petrol and paint)</p>
	<p>Blue = Dry powder</p> <p>Class C (e.g. gases)</p>
	<p>Black = CO₂</p> <p>Electrical</p>
<p>It is important to select the correct extinguisher!</p>	

It is also imperative that the vessel's crew understands:

- The principles of firefighting, including The Triangle of Fire (Figure 12).
- How to use basic firefighting equipment (including fire blankets).
- The areas most likely to be susceptible to fire hazards, such as the engine room, galley, accommodation spaces, storerooms and wheelhouse.
- Fire hazards, such as oily rags, grease on electrical equipment, cookers and hot surfaces, drying clothes over heaters, stoves and smoking in bunks.

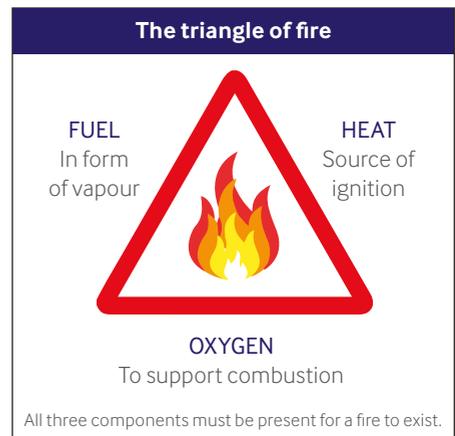


Figure 12: The triangle of fire

The risk of fire can be dramatically reduced by keeping a good maintenance regime and implementing good working practices such as:

- Cleaning ventilator systems.
- Correctly locating liquid petroleum gas (LPG) cylinders with efficient detector systems.
- Correctly storing hazardous substances.
- Ensuring all spills are cleaned in good time.
- Ensuring correct and practical maintenance regimes are in place and utilised.
- Ensuring that extinguishers are correctly sited and maintained.
- Maintaining on board cleanliness and tidiness.
- Ensuring that wheelhouse equipment is earthed.
- Maintaining electrical equipment.
- Maintaining engine room and associated compartments.
- Maintaining escape routes.
- Maintaining galley and galley equipment, including a good cooking regime.
- Maintaining water pumps.
- Not drying clothes over stoves or heaters.
- Not leaving gear near ignition sources.
- Not smoking in bunks and cabins.
- Not smoking near electrical cells on charge.
- Not storing gear in engine room compartments.
- Not storing flares in accommodation spaces.

In addition to safety equipment, one major factor in ensuring the vessel's and crew members' safety is by ensuring that crew take responsibility for their own fitness to work and therefore their ability to perform the task ahead. By taking rest prior to joining a vessel, not joining a vessel if ill, looking after personal hygiene while on board and not using alcohol and drugs while on the vessel or ashore, fitness to work can be maintained.

The requirements for the time periods between drills may change depending on the regulatory authority, but as a general rule, these should be performed and recorded in the ship's official log at least every month and, if possible, at the following intervals:

- At the start of the voyage.
- At intervals not exceeding 14 days.
- If 25% of the crew has changed.
- Within 48 hours of leaving port.

Drills are designed to test equipment, on board organisation (muster points and lists) and maintenance and to identify potential problems. It is well understood that performing emergency drills may be perceived as taking up valuable time in a day, but this will prove priceless in an emergency situation if the crew members concerned can put on a life jacket and jump into the water safely, right a life raft, use emergency equipment, know the emergency signals for general alarm, abandon ship and distress signals all with confidence and efficiency.

Drills are not just for new joiners but are to be considered as an ongoing training tool to keep all crew members updated on new pieces of equipment.

The general alarm signal, which consists of seven or more short blasts and one long blast, is for calling all crew members to their muster station. The abandon ship signal is normally given by word of mouth from the skipper. A predetermined signal may be used which everyone on board must be aware of.

Drills must be taken seriously and not considered a waste of time.

During drills, emergency contingency plans should be tested. In case of an emergency it is important for the crew on board to be prepared for the actions they must undertake. On board emergency contingency plans should therefore be drawn up and included in the vessel's on board manual. These plans should cover all types of emergencies including personal injury, man overboard (including the extraction of a crew member by helicopter), collision, flooding, fire (including the donning of a fireman's outfit and breathing apparatus), loss of propulsion, launching and recovery of survival craft, making a distress call, activating the general alarm, donning of immersion suits to ensure they fit, abandoning a vessel and capsize. Whilst it is hoped that, with correct maintenance and proper training, a major emergency may be prevented, risk can never be fully alleviated and it is therefore vital for the crew to be ready.

Emergency instructions should be posted in visibly conspicuous locations throughout the vessel. The intent is to ensure that all crew members know their responsibilities and how to deal with emergency situations. These notices should illustrate the donning of immersion suits, man overboard, how to make a distress call and details of the general alarm, including what emergency signals are used on board, as detailed earlier in this chapter. An example of this notice or station bill is shown in Appendix 4. This could be adapted for the size and type of vessel operated, including the alarm signals used on board.

Chapter 6

▶ Risk assessments

Risk assessments are designed to keep people on board safe by encouraging crew members to take responsibility for their own actions. They should be considered by all as a proactive measure. They should be carried out by a competent person who has sufficient training and experience or knowledge of risk assessments, enabling them to make informed judgements. When carrying out this process, all risks are assessed on the vessel, including those that have the potential to cause harm to any crew members on board. If correctly completed it will show that crew members have considered on board health and safety and made every reasonable effort to ensure the vessel is secure.

It is important to note that all new crew members must read the valid risk assessment so that they are immediately aware of the risks (how likely it is that harm will occur), hazards (an object or situation that can cause harm) and the controls in place. Risk assessments should be reviewed every 12 months and also when there has been a change in the fishing method, or a modification to the vessel has taken place. However, all crew members should assess risk all the time, as it is for their own safety.

A sample risk assessment and instructions on how it should be used is available on the Club's website (www.shipownersclub.com/risk-assessments-fishing-operations) or MGN 20 – Merchant Shipping And Fishing Vessels (Health and Safety at Work) Regulations 1997 (F). See the Recommended reference list at the end of this publication. Risk assessments must be kept as simple as possible and applicable to the vessel they are meant for.

Crew members should be involved! It is their safety that is being assessed.

Damage control

Damage control is the emergency action that may be taken to reduce or limit the danger to a vessel from flooding following failure of equipment or structural damage.

The purpose of damage control is:

- To reduce the immediate danger to manageable levels and control the ongoing situation.
- To prevent or limit further damage.
- To inform and request help as needed.

⁴ www.seafish.org/media/Publications/SmallVesselRiskAssessment_052007.pdf

Many incidents and vessel losses are the results of flooding. Fishermen are taught little about preventing their vessels from sinking once water ingress begins. Prevention could be achieved by thorough and regular maintenance, but saving the vessel during a flooding incident could be achieved by having knowledge of damage control and the right equipment on board (i.e. Damage Control Kit – Figure 13).



Figure 13: Typical damage control kit

Suggested items to include in a Damage Control Kit are:

- Amalgamating or duct tape.
- Assorted pieces of timber (sheet and 0.6m x 0.6m shoring).
- Clamps – jubilee and hose clips (preferably stainless steel) in assorted sizes.
- Epoxy resin stick.
- Flashlight(s).
- Gland and seam packing material.
- Hammer.
- Hatchet and/or axe.
- Heavy twine.
- Knife with a serrated edge.
- Saws (wood and hacksaws).
- Screwdrivers.

- Softwood plugs (assorted sizes).
- Spare hose lengths to fit pipes in use on board.
- Tarpaulin (1.8m x 1.8m with eyelets at each corner).
- Wooden wedges.
- Wrapping material (e.g. rubber sheet).

It is imperative that all members of the crew know the location of the kit, the importance of not using the equipment in the course of routine maintenance and then not replacing used items and how to utilise all the equipment contained within the kit. The Club has produced a poster highlighting this information which can be displayed on board⁵. In 2009 the UK's Marine Accident Investigation Branch (MAIB) reported that 52% of vessel losses were caused by flooding and most of these are on vessels under 12 metres. See the Recommended reference list at the end of this publication.

Preventative measures to reduce risk of flooding

The MAIB has identified that hull failures account for half of flooding incidents, with the remaining being sea water pipe failures (failed seacocks or associated pipework).

In order to minimise the possibility of equipment failure that may result in flooding, it is necessary to ensure that the watertight integrity of the hull is maintained by carrying out a regular and effective maintenance regime. This is especially required for older vessels as they may not have received the level of ongoing maintenance necessary to investigate and replace corroded pipework and fittings, or to ensure the integrity of the hull. This maintenance regime should pay particular attention to those features of the vessel's construction that are most likely to jeopardise the safety of the vessel and/or crew in the event of failure including:

- Watertight doors and hatches.
- Hull and deck structures.
- Freeing ports (should be clear of obstructions).
- Bilge alarms – a working bilge alarm is a basic and extremely valuable device to detect and warn about unseen flooding in its critical early stages.

⁵ <https://www.shipownersclub.com/media/2014/05/damage-control-kit.pdf>

- Seacocks and associated hoses and pipework should be of proper marine grade quality and all metalwork should be protected against electrolysis. Inspect and maintain all seacocks regularly. Regularly examine hoses and pipes associated with seacocks for:
 - Chafing.
 - Corrosion/electrolysis.
 - Cracking and splitting, particularly around clamps. All hoses should be double clamped at terminations.
 - Signs of vibration fracture/general deterioration.

If flooding is discovered, it is likely that the source is through a seacock, therefore, the first action should be to immediately close all seacocks. If possible, keep all seacocks closed when not in use. It is recommended that, if possible, secondary means of closing seacocks should be extended as high as possible under the deck to allow them to still be closed, even when deeply submerged in the flooded hull.

Early detection of flooding is essential if the vessel is to be saved.

▶ Summary

BE EQUIPPED

BE PREPARED

TRAIN

CONDUCT DRILLS

REMAIN CALM

HAVE A PLAN AND FOLLOW IT

Chapter 8

► Recommended reference materials

We would like to reiterate that the information presented in this booklet is not definitive. There are many publications that provide advice and information that should be considered as excellent reference points. A selection is detailed below:

Australian Fisheries Management Authority and Great Australian Bight Fishing Industry Association Inc. (2010). **Boat Operating Procedures Manual**. Accessed at: www.afma.gov.au/wp-content/uploads/2014/02/boat-operating-procedures-great-australian-bight-apri-2011.pdf

Australian Maritime Safety Authority (1989). **Marine Order 51 (Fishing vessels) 1989**. Accessed at: www.amsa.gov.au/vessels/standards-regulations/marine-orders/documents/MO51-modcomp-130726Z.pdf

Food and Agriculture Organization of the United Nations (2009). **Safety practices related to small fishing vessel stability**. Accessed at: www.fao.org/3/a-i0625e.pdf

Fisheries and Oceans Canada (2000). **Fishing Vessel Safety Review (less than 65 feet)**. Accessed at: www.mun.ca/safetynet/library/Fishery/CFVSafetyReview.pdf

FishSAFE (2018). **Improving fishing awareness**. Accessed at: www.fishsafe.eu/en/home.aspx

International Maritime Organization (2005). **Code of Safety for Fishermen and Fishing Vessels 2005: Part A, Safety and Health Practice**.

International Maritime Organization (2005). **Code of Safety for Fishermen and Fishing Vessels 2005: Part B, Safety and Health Requirements for the Construction and Equipment of Fishing Vessels**.

International Maritime Organization (2005). **Voluntary Guidelines for the Design, Construction and Equipment of Small Fishing Vessels**.

KIS-ORCA Offshore Renewable & Cables Awareness (2018) Project KIS-ORCA, **Designed for Fishing Safety**. Accessed at: www.kis-orca.eu

North Pacific Fishing Vessel Owners' Association (NPFVOA) (1986) **Vessel Safety Manual 5th edition.**

Marine Accident and Investigation Branch (MAIB) (2008), **Analysis of UK Fishing Vessel Safety 1999 to 2006.** Accessed at:
www.gov.uk/government/uploads/system/uploads/attachment_data/file/377352/FishingVesselSafetyStudy.pdf

Maritime and Coastguard Agency (2008), **Fisherman's Safety Guide: A guide to safe working practices and emergency procedures for fishermen.** Accessed at:
www.gov.uk/government/publications/fishermens-safety-guide

Maritime and Coastguard Agency (Various dates), **Marine Notices.** Accessed at:
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Seafish (2018), **Information about Kingfisher.** Accessed at:
www.seafish.org/industry-support/kingfisher-information-services/kingfisher-bulletins

US Department of Homeland Security and the United States Coast Guard (2010), **The Coast Guard Journal of Safety & Security at Sea – Proceedings of the Marine Safety & Security Council, 'Fishing Vessel Safety'.** Accessed at:
www.uscg.mil/proceedings/archive/2010/Vol67_No4_Wint2010-11.pdf

Western Australian Fishing Industry Council (WAFIC) (2003), **Occupational Health and Safety Code for the Commercial Fishing Industry in Western Australia.** Accessed at:
www.environment.gov.au/system/files/pages/95c2af5b-5689-4abd-9f70-dffdc9e15e27/files/purse-seine-appendix4b.pdf

Western Australian Fishing Industry Council (WAFIC) (2003), **Occupational Health and Safety Code for the Commercial Fishing Industry in Western Australia.** Accessed at:
www.environment.gov.au/system/files/pages/95c2af5b-5689-4abd-9f70-dffdc9e15e27/files/purse-seine-appendix4b.pdf

Chapter 9

► Acknowledgements

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Appendix 1

► Pre-departure checklist

Vessel: Equipment*	Location: Checked and OK	Date: Equipment	Time: Checked and OK
Main engine/s		VHF (fixed)	
Running & ready for use		Tested & available for use	
Alarms & indicators operational		VHF (portable)	
Astern propulsion tested		Tested & available for use	
Emergency stop operational		A.I.S	
Thrusters		Tested, on & operational	
Running & ready for use		Navigational lights & sound signals	
Alarms & indicators operational		Depth sounder	
Directional control tested		GPS	
Emergency stop operational		Whistle* tested ok	
Steering gear		E/R comms	
Tested port - stbd		Deck comms	
Emergency steering available		Bilge level	
Radar		Deck cargo secure	
Running & available for use		Hatches secure	
Auto pilot		W/T doors secure	
Tested and available for use		Log book entry made	
Fire detection panel		Bilge alarms checked	
All heads reset & cleared		Navigation	
Magnetic compass		Weather forecast checked	
Visible & clear of faults		Passage plan completed	
Error known & accounted for		Fishing ground hazards identified	

* This pre-departure checklist is not exhaustive and additional factors may need to be taken into account when making this specific to your company and vessel(s). This checklist does not include equipment that may be in place and readily available on board as applicable such as gas detectors, EPIRB, MOB life jackets, flares.

Appendix 2

► Risk checklist for fishing vessels

Company:

Vessel:

		Yes	No	Comment
1	Have the ship's crew undergone familiarization training with the company's Safety Management System (SMS) and/or on board procedures?			
2	Are Risk assessments carried out on the identified operational hazards along with details of how these are eliminated or reduced?			
3	Does the company have an effective drug and alcohol policy to manage drug and alcohol related risks at sea?			
4	Does the company have an effective fatigue management policy to manage fatigue related risks at sea?			
5	Does the company have effective systems and equipment to manage the risks of fire on board the vessel?			
6	Are all fire fighting equipment on board regularly inspected and serviced as required?			
7	Does the company ensure that all the vessels it operates have approved stability manuals and stability is calculated and verified on board?			
8	Are all power outlets (internal and external) certified with no unauthorised modifications?			
9	Are all portable power and electrical equipment certified for use on external areas of the vessels?			

10	Are all portable power and electrical equipment regularly inspected and serviced as required?			
11	Have all crew had relevant at sea safety training?			
12	Do vessel(s) have defibrillators on board?			
13	Does the company maintain an emergency response plan for all vessels it operates?			
14	Do all vessel(s) operated by the company comply with all statutory and local certification requirements?			

Name _____ Signature _____

Date _____

Please note that this checklist is not exhaustive and additional factors may need to be taken into account when making this specific to your company and vessel(s).

Appendix 3

▶ Case study 1: Careless action severely injures colleagues

The incident

While trawling, the net became entangled on its reel. A crew member climbed onto the net reel in an attempt to clear the tangled section. The deck boss, who was operating the winch, moved the net reel without warning and without checking that the crewman was clear. As a result, the crewman fell from the winch and fractured his leg, severely damaging his kneecap.

Observations

The incident was caused by the deck boss handling the winch, failing to ensure that all crew were clear prior to operation. It is not uncommon for winch controls to be positioned in a way that limits the operator's sights and, in such circumstances, clear procedures must be put in place to prevent the winch being turned without the prior knowledge of those working in the vicinity. If a crew member has to approach a winch, he should ensure its operator is made aware of his impending actions.

As is the case with most of these incidents, saving time is considered to be more important than safety and shortcuts are taken. It is only when injuries are suffered that crew have more than enough time to reflect on the consequences of compromising safety.

The financial cost

US\$ 200,575

Issue date

03/10/07

Case number

40374

► Case study 2: When a lookout should look out

The incident

This claim involved a collision between a fishing vessel and a 17,000 GT products tanker.

The Member's vessel, a stern trawler, was proceeding to her intended fishing grounds which required her to cross a traffic separation scheme. The Member's vessel contravened Rule 10c of the Collision Regulations by not crossing the traffic lane at right angles.

The master had left the wheelhouse and an inexperienced 17-year-old deckhand was left alone on watch.

A radar target was noted approximately three miles on the starboard bow and, after making a visual check, the watchkeeper made the assumption that the vessel would pass clear to starboard. Having made this assessment, the watchkeeper paid no further attention to his lookout duties. More than one vessel was in fact within the immediate vicinity and the fishing vessel collided with another ship shortly thereafter.

The watchkeeper realised a collision was to take place seconds before it actually occurred. He put the wheel over but as he had not disconnected the autopilot there was no response.

Fortunately there was no loss of life, but each vessel sustained heavy damage.

Observations

The Member's vessel failed to maintain a proper lookout and this was compounded by the fact that an inexperienced crew member was left in charge of the watch while transiting an area of heavy traffic. Having noted a radar target on the starboard bow and making an initial assessment, no further observations were made until it was too late.

The importance of maintaining a proper lookout cannot be overemphasised, nor can the need to monitor all vessels closely when navigating in busy waterways. Consideration should always be given to doubling up watches in these circumstances.

Root cause

Inadequate lookout

Issue date

18/06/03

The financial cost

US\$ 406,000

Case number

35122

► Case study 3: Death from hydrogen sulphide poisoning

The incident

The vessel involved was a 97-foot fishing vessel which had left her home waters in Alaska to fish for albacore tuna in the South Pacific. The vessel experienced problems with her refrigeration system which culminated in a full catch (approximately 15 tons) of tuna being rejected as being unfit for human consumption.

The skipper decided to return to Alaska, hoping to sell the catch as bait. It appears that problems with the refrigeration system worsened and, six days into the voyage, it was shut down altogether. The three-man crew started to dump the fish overboard. Nine tons of tuna were disposed of before the smell of decomposing fish became overwhelming. The skipper decided to partially flood the fish hold in the hope that the fish would rapidly break down into a soup which could then be pumped overboard. After leaving the fish to decompose for a few days, the crew started to pump the mixture, but after a short period the strum box clogged with fish remains. The skipper descended into the fish hold to try to clear the pump but, within seconds, he was overcome by hydrogen sulphide gas given off by the rotting fish. The engineer attempted to rescue him and also succumbed. The one remaining crew member was unable to operate the radio to summon assistance and steamed in the direction of Honolulu until the boat's generator ran out of fuel and the electrical supplies to the steering gear failed. At that point he abandoned ship and set off the EPIRB. He was rescued by the US Coastguard.

The survivor claimed damages for post-traumatic stress disorder and claims were made by the families of the dead crew.

Observations

This unusual incident highlights the dangers of entering enclosed spaces. The atmosphere of any enclosed or confined space which is not continuously and adequately ventilated may be deficient in oxygen or contain flammable and/or toxic fumes, gases or vapours. Crews should be made aware of the dangers and instructed not to enter enclosed spaces if there is any reason to suspect that the atmosphere may be hazardous. On no account should rescue attempts be made without wearing breathing apparatus, a rescue harness and lifeline. In this case the crew were aware that the fish were rotting but were ignorant of the effects of the resultant gas. The vessel carried no breathing apparatus, gas testing

Root cause

Inadequate enclosed space entry procedures

Issue date

01/01/02

The financial cost

The cost of this claim exceeded US\$650,000

Case number

14132

► Case study 4: Heat of the moment

The incident

The skipper of a fishing vessel was leaning into an ice box when the lid, weighing half a ton, fell on to him. He suffered serious chest injuries and has a 10% body impairment as a result. The normal procedure for opening the lid was to raise it by means of a rope and tackle, then inserting a safety prop to hold it up.

Observations

On this occasion the skipper relied on the rope to hold the lid open and did not use the prop. The lead of the synthetic rope was such that it came into contact with the funnel and the heat had a degrading effect which caused the rope to eventually part. Had the safety prop been used, this accident would have been prevented. In all likelihood the rope would have parted when the lid was being either opened or closed and the crew standing clear.

This incident highlights several facts

- Crew should never rely on a wire or rope to hold a hatch lid open. A safety prop or securing pin should always be used to secure a hatch lid in the open position. Such a restraint must enable clear access to the opening.
- Wherever possible, synthetic rope at risk of coming into contact with an indirect heat source should be replaced, preferably by a wire rope or at least by a natural fibre one.
- Lifting arrangements should be subjected to a thorough visual examination at regular intervals. In this particular incident, it was reported that the damaged section of rope was not obvious to a casual observer.

Issue date

03/02/06

Case number

37148

The financial cost

US\$ 228,000

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