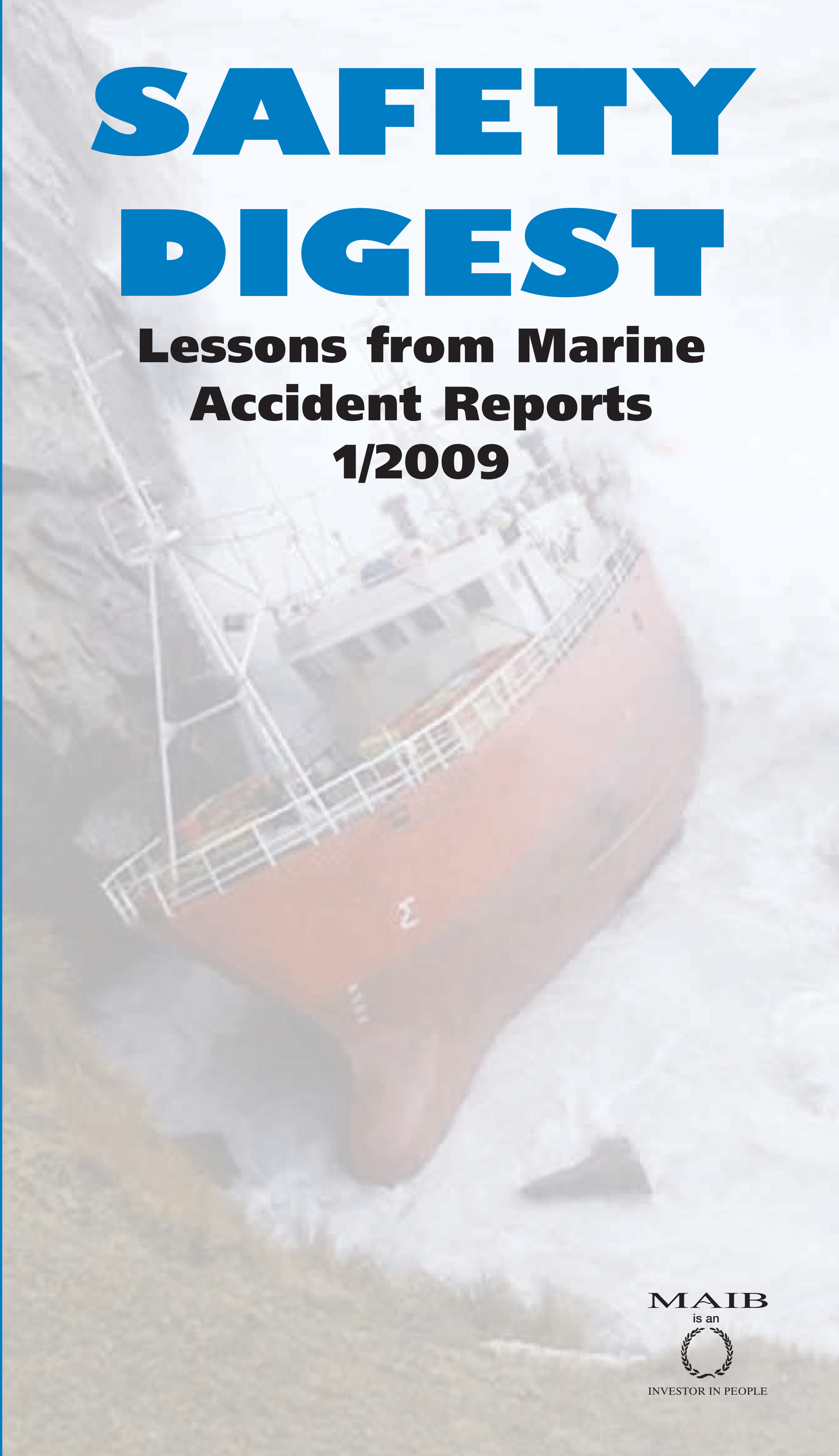
MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY DIGEST

Lessons from Marine Accident Reports 1/2009



MAIB is an INVESTOR IN PEOPLE

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No 1/2009

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Further copies of this report are available from:
Marine Accident Investigation Branch
First Floor
Carlton House
Southampton
SO15 2DZ

Printed in Great Britain. Text printed on material containing 100% post-consumer waste.
Cover printed on material containing 75% post-consumer waste and 25% ECF pulp.
April 2009

MARINE ACCIDENT INVESTIGATION BRANCH

The Marine Accident Investigation Branch (MAIB) is an independent part of the Department for Transport, the Chief Inspector of Marine Accidents being responsible directly to the Secretary of State for Transport. The offices of the Branch are located at Carlton House, Carlton Place, Southampton, SO15 2DZ.

This Safety Digest draws the attention of the marine community to some of the lessons arising from investigations into recent accidents and incidents. It contains facts which have been determined up to the time of issue.

This information is published to inform the shipping and fishing industries, the pleasure craft community and the public of the general circumstances of marine accidents and to draw out the lessons to be learned. The sole purpose of the *Safety Digest* is to prevent similar accidents happening again. The content must necessarily be regarded as tentative and subject to alteration or correction if additional evidence becomes available. The articles do not assign fault or blame nor do they determine liability. The lessons often extend beyond the events of the incidents themselves to ensure the maximum value can be achieved.

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The Editor, Jan Hawes, welcomes any comments or suggestions regarding this issue.

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MARINE ACCIDENT INVESTIGATION BRANCH

The role of the MAIB is to contribute to safety at sea by determining the causes and circumstances of marine accidents, and working with others to reduce the likelihood of such causes and circumstances recurring in the future.

Extract from
The Merchant Shipping
(Accident Reporting and Investigation)
Regulations 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

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Glossary of Terms and Abbreviations

AB	–	Able seaman
AIS	–	Automatic Identification System
ARPA	–	Automatic Radar Plotting Aid
C	–	Celsius
Cable	–	0.1 nautical mile
EmS	–	Emergency Schedule
EPIRB	–	Emergency Position Indicating Radio Beacon
GPS	–	Global Positioning System
GRP	–	Glass Reinforced Plastic
HP	–	Horsepower
HSE	–	Health and Safety Executive
ICS	–	International Chamber of Shipping
IMDG	–	International Maritime Dangerous Goods Code
IMO	–	International Maritime Organization
ISM	–	International Safety Management Code
kg	–	kilogram
m	–	metre
mm	–	millimetre
“Mayday”	–	The international distress signal (spoken)
MCA	–	Maritime and Coastguard Agency
MES	–	Marine Evacuation System
MGN	–	Marine Guidance Note
MSN	–	Merchant Shipping Notice
OOW	–	Officer of the Watch
“Pan Pan”	–	The International Urgency Signal (spoken)
PEC	–	Pilotage Exemption Certificate
PLC	–	Programmable Logic Controller
RIB	–	Rigid Inflatable Boat
RNLI	–	Royal National Lifeboat Institution
Ro-Ro	–	Roll on, Roll off
rpm	–	Revolutions per minute
RYA	–	Royal Yachting Association
SMS	–	Safety Management System
SOPEP	–	Shipboard Oil Pollution Emergency Program
TSS	–	Traffic Separation Scheme
VHF	–	Very High Frequency

Introduction

I was disappointed recently to learn that some of our readers still misunderstand what our Safety Digest tries to achieve, and how it fits in with the rest of our work. An experienced seafarer, who professed to be an avid reader of the Safety Digest, complained to me that the lessons identified were normally "pointing the finger" at the mariner rather than looking at the broader aspects of the incident.

When the MAIB investigates an accident or incident, our primary "output" is recommendations to try to prevent such accidents recurring. We work hard with the industry to try to identify the most appropriate recommendations, and we make them to the apposite body. It is very rare that such recommendations are made to individual seafarers; nearly all are focused at systems, companies, trade bodies and regulators. Nevertheless, there are always lessons for the seafarer to learn, and indeed we believe that just reading about accidents – and so thinking about accidents – helps to make us all more safety conscious. Thus, the Safety Digest is primarily aimed at getting the lessons from accidents and incidents out to the seafarer, and we have other ways of promulgating the important safety messages to the rest of the industry. I hope this helps clarify the focus of the lessons that appear in these pages.

One small change we have introduced in this edition, is to re-categorize one of the three sections of the Safety Digest. The replacement of the "Leisure Craft" section by "Small Craft" allows all appropriate incidents and accidents to be brigaded together without the pedants pointing out that, if commercially operated, they cannot be classed as leisure! However, I would still urge readers to look at every case – the more we understand about the problems that other seafarers face, the more we can operate safely together in our common environment.

Stephen Meyer
Chief Inspector of Marine Accidents
April 2009

Part 1 – Merchant Vessels

On reviewing the incidents detailed in this safety digest my first reaction was concerning the wide range of difficult circumstances faced by seafarers as they go about their daily duties. It is testament to their professionalism that accidents and incidents are, thankfully, comparatively few in number. We are all aware of the wonderful science of hindsight, and for those of us who now 'pilot' a desk it is always an easy option to blame the crew!

A seafarer is, and always has been, a 'Jack' of all trades and is expected to face challenging situations and take the correct decisions – often under the constraints of adverse conditions and time pressure.

It is not surprising to see the same lessons being learned time and again: resource management, complacency and lack of training.

The importance of bridge team training is stressed over and over again, yet frequently we read of the Master, isolated in command, being overtaken by events with his support team oblivious to developments. Is this a cultural issue generated by dictatorial Masters confident in their own invulnerability, timid junior officers blissful in their ignorance, or complacency resulting from familiarity, boredom and routine?

I cannot doubt that there may be poor management systems and that active seafarers are probably better able to write and review systems than their office based counterparts. But shore management have failed in their responsibilities if their Masters and crews feel they cannot, and should not, influence the development of systems; or even worse, that 'it is not worth the effort' because nothing will be done anyway!

I also question whether in respect of management systems there may be an element of 'paper armour': crew members are delegating their safety to the 'system' (risk assessment, tool box talks etc.), in the belief that compliance with the system negates all risks and therefore absolves them of the need to consider their own safety and that of their colleagues.

Complacency, or as coined in this report 'task familiarity', is one of the greatest threats to the mariner. Much of what we do is repetitive: planning, navigation, watch keeping, maintenance and cargo operations. Complacency is not easy to detect, particularly where it develops over time. When tasks become routine they become dangerous.

Accidents can happen to the best of us; in fact they often do happen to the best of us because our perceived ability caused us to develop feelings of invulnerability. It is said that 'the capability to know and follow authoritative guidance is the mark of a professional'. Because we become an 'expert' at one thing it does not mean that we should become complacent about others; professionalism is about being balanced.

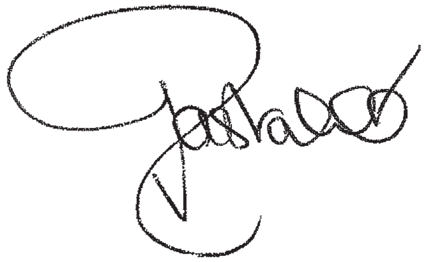
Perhaps once we recognise that a problem exists, we will be better placed to solve it. In the oil and gas industry, ashore and afloat, people were familiar with HSE guidance and in general made efforts to put in place systems that were designed to manage risk and prevent accidents. By contrast, the marine world still tends to be characterised by 'macho' can-do attitudes, and the belief that accidents are inevitable and simply part of getting the job done; act now – risk assess later.

We must all show and encourage respect for every position onboard, and recognise that everyone onboard is a professional. If any individual believes that their role is not valued then there will be more of a tendency to slip into 'rogue' behaviour.

Let's not underestimate the issue, maintaining vigilance in an atmosphere that nurtures complacency is an awesome challenge. Management at all levels (onboard and ashore) must support a culture of compliance. Ignoring or missing a non-compliant act or circumstance is as good as endorsing it.

Finally, as we all know, there can also be a tendency to know and love the rogues; 'he's the best ship handler in the company and always does it that way'…, yes he's 'Teflon coated' … alright until it all goes horribly wrong.

'Experience is the best teacher', but 'the wisest learn from the experience of others'.



Alastair Evitt

Alastair is a Master Mariner and has spent over 33 years in the marine industry. He spent 15 years at sea before coming ashore to work in Ship Management in 1990. Of his 18 years in Ship Management, 5 were spent in Cyprus as Operations/Division Manager and 8 in Singapore as General Manager/Managing Director for a large third party ship manager.

Alastair has sat as a committee member on both the Cyprus Shipping Council and the Singapore Shipping Association and was honoured to be appointed as a Councillor to the Singapore Shipping Association in 2003.

In 2004 Alastair returned to the UK to take up his present position as Managing Director of Liverpool based Meridian Marine Management.

Iron in the Fire

Narrative

A general cargo vessel was scheduled to load ferrous cuttings which included cast iron filings. The cargo was designated as UN 2793 – Ferrous Metal Borings, Shavings, Turnings or Cuttings, and was delivered directly from the engineering works to the dockside. On delivery, it was noticed that the cargo also contained cutting oil and other combustible materials including plastic bottles and rags.

The waste disposal contractor carried out the temperature checks as required in the Code of Safe Practice for Solid Bulk Cargo 2004, and although it was confirmed that the temperature was below the maximum 55°C required, this was not formally recorded. At 2200 cargo loading was suspended until the following morning but, despite it starting to rain, none of the hatch covers were put in place.

At about 0235, the duty AB detected a small fire in the open hold. He alerted the crew, who attempted to extinguish the fire. However, this was unsuccessful. At 0308 the local fire and rescue service attended the vessel and began to douse the cargo with water (Figure 1). The ship's master and harbour authorities advised against using large amounts of water because of potential stability concerns. At about 0330 the fire was declared to be under control, and three out of the five fire tenders providing assistance were released.

At 0530 the cargo loading crane driver arrived, and an hour later he started to remove the smoking cargo to the dockside, where it was cooled down once more. The temperature of the hold cargo was constantly monitored; it reached a maximum of 93°C (Figure 2). The cargo and hold water removal, and cargo re-load took a further 60 hours.

Figure 1

Figure 2

The Lessons

The cargo was liable to self-heat and ignite spontaneously because it contained fine shavings contaminated with cutting oil, cast iron borings and organic flammable materials.

The self-ignition risk was increased because the simple precaution of closing the hold hatches had not been taken. The Code of Safe Practice for Solid Bulk Cargo 2004 specifically highlights that cargo loading should not be undertaken in wet conditions, and that hatch covers should be closed when the hold is not being worked.

The master relied on the waste management contractor to ensure that the cargo was safe to load. In this case, the temperature was reported to be compliant with the regulations, but it was not recorded. In addition, no attempt was made to remove the organic matter, which significantly increased the risk of self-ignition.

To prevent the risk of self-ignition, the following precautions should be taken as laid out in the Code of Safe Practice for Solid Bulk Cargo 2004:

1. The temperature of UN 2793 cargoes should be recorded by the waste management contractor. Prior to loading, the temperature taken from between 200-350mm into the pile should not exceed 55°C.

2. If the cargo temperature exceeds 90°C during loading, operations should be stopped until the temperature has fallen below 85°C.

3. A vessel should not depart unless the temperature is below 65°C and has shown a steady downward trend for at least 8 hours.

4. Cargo loading should be suspended during wet conditions, and the hold hatches should be closed when the holds are not being worked.

CASE 2

Chute for Safety

Narrative

A ro-ro passenger ferry was conducting a routine deployment of one of its Marine Evacuation Systems (MES) as part of a planned inspection. The ferry was alongside and arrangements had been made for 50 crew members to use the system and then to be recovered from the liferafts. The equipment had been installed between decks and was mounted on a carriage that slid out from the ship's side. Liferafts, connected to the ship by vertical chutes, were then tipped into the water.

Representatives from the equipment manufacturer were in attendance. They made their own checks of the system and confirmed that it was configured correctly. The crew activated the evacuation system, and soon afterwards heard loud noises coming from the operating system. The carriage was seen to move outboard, but it caught on the forward of the two outer doors, which was only partially open. It moved upwards and twisted, breaking the deck plates loose. One shoot bolt engaged at the end of the sliding travel, but the other did not operate and the carriage twisted, causing the hydraulic operating rams to shear off their mountings. The liferafts were tipped off the carriage and landed in the water, where they inflated as normal.

Once the carriage had stopped moving, the damage was inspected. The boarding area was distorted, grab rails could not be assembled, and it was not possible to determine how securely the chutes were attached to the ship's side. The risk of using the chute was considered too great.

With all the preparations in place, it was decided to deploy a second MES on board. This was checked by the manufacturer's representatives and operated by the crew. The carriage began to move outboard but, again, had difficulty opening the outer doors. The doors opened further than on the previous test and the carriage was able to move to its required position. The rafts and chutes deployed, but during the process of heaving in the bowsing wires to secure the rafts alongside, the wires were snagged by heavy corrosion in the guiding channels, and they parted under tension. The evacuation exercise was cancelled and an investigation began.

Inspection of the outer door mechanisms of both MESs found that the outer door hinges were extremely stiff to move and could not be opened as intended. The hinges were mounted on the outside of the ship and, although designed for use in a marine environment, had deteriorated significantly. In the first instance, the carriage had then caught on the door structure, causing it to ride up as it moved outboard. Manufacturing errors in the shoot bolt prevented it from engaging correctly, allowing the carriage to twist and damage the hydraulic cylinders.

In the second instance, the liferaft bowsing wires had seized in their aluminium channels, on the ship's side, due to a build up of corrosion deposits within the channels. Although the crew conducted weekly and monthly inspections of the equipment, there was no requirement for them to test or maintain the door hinges, and these were only ever operated during the annual deployment or service exchange of liferafts. Inspection of the other outer doors on the vessel, and on a sister vessel, found they were all difficult to operate and had the potential to disrupt the deployment of the MES. Access to the hinges and bowsing wire mechanism could only be achieved by using specialist equipment from ashore, and the time available to do this was limited by the vessel's operational schedule.

The equipment manufacturers conducted an investigation into the failures and identified a number of system modifications designed to prevent future, similar deployment problems.

MES System showing liferafts connected to ship by vertical chute

The Lessons

Operators of ships fitted with MESs should satisfy themselves that all the components in the activation and release system are included in an inspection and maintenance routine. Time and resources must be allocated to ensure that this essential equipment is in an acceptable condition and will work correctly when required.

A Close Quarters Situation

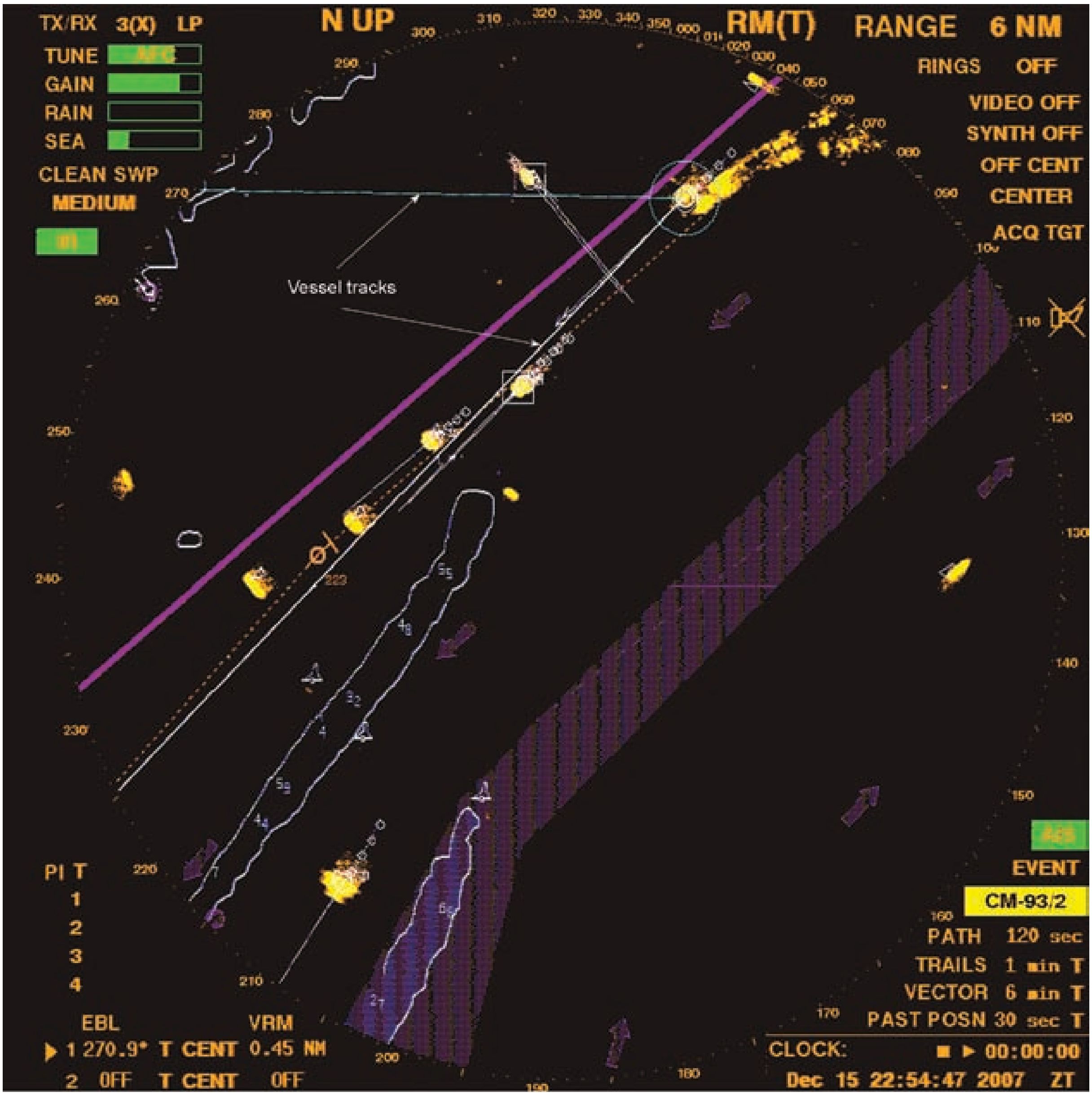
Narrative

A large passenger ship was transiting the south west lane of a Traffic Separation Scheme (TSS), steaming at 21 knots at night in good visibility.

A cross channel ferry was departing port to head for the continent. Once clear of the breakwater, the ferry's master assessed the traffic in the TSS before deciding how to cross it. He observed both visually, and on radar, the passenger ship on his port side at a range of 6 miles, almost on a steady bearing, which would result in the two vessels passing very close to each other in 12 minutes.

The ferry's master decided to set his course and speed to make it clear that his was the stand-on vessel, and that the passenger ship was the give-way vessel. Once steady on course the master handed over to the OOW, remaining on the bridge to monitor the developing situation.

The passenger ship's bridge team for the transit of the strait consisted of a senior OOW,



Screenshot from Traffic Separation Scheme data a junior OOW and a lookout. For the transit of the TSS, the team was supplemented by the deputy master, who was observing and chatting to the senior OOW. The senior OOW noted the ferry's departure from port, but he did not discuss this with the other bridge team members as he was engaged in conversation with the deputy master. The senior OOW, himself an experienced ferry officer, expected the ferry to set a course to pass clear around the passenger vessel's stern, and his subsequent monitoring of the ARPA failed to identify that the ferry's bearing was almost steady.

Acting in accordance with the COLREGS, the ferry's OOW maintained his course and speed (18 knots) as he and the master monitored the actions of the passenger ship. Noting that the passenger vessel was not giving way, they repeatedly signalled, using five or more short flashes by Aldis Lamp to indicate they were unsure of her intentions. As the distance between the two vessels closed to 2 miles, with the anticipated passing distance being 0.3 mile, the ferry's master considered that the passenger ship was taking insufficient action to avoid a collision, and instructed the OOW to reduce speed to around 12 knots.

As the passenger ship passed 0.6 mile ahead of the ferry, the ferry's master called the passenger ship by VHF radio to advise them of his actions and to give his opinion on the apparent poor seamanship of the passenger vessel's bridge team.

The Lessons

1. **The passenger ship's bridge team did not effectively assess the risk of collision with the approaching ferry, so took no action as the give way vessel. Specifically:**

   - **The senior OOW's mistake in not identifying the risk of collision went unnoticed by the other bridge team members as they were not communicating effectively.**

   - **The ship's deputy master was not integrated into the team and his presence probably hindered, rather than helped, the bridge team.**

   - **Neither the junior OOW nor the lookout supported the team in alerting the senior officers to the approaching danger.**

   Effective bridge teams require more than additional personnel; successful communication can be achieved only when each team member is fully aware of their role.

2. **In choosing how to cross the TSS, the ferry's master had the option to avoid a close quarters situation developing. However, he chose to act as the stand-on vessel and so created the risk of the two vessels colliding.**

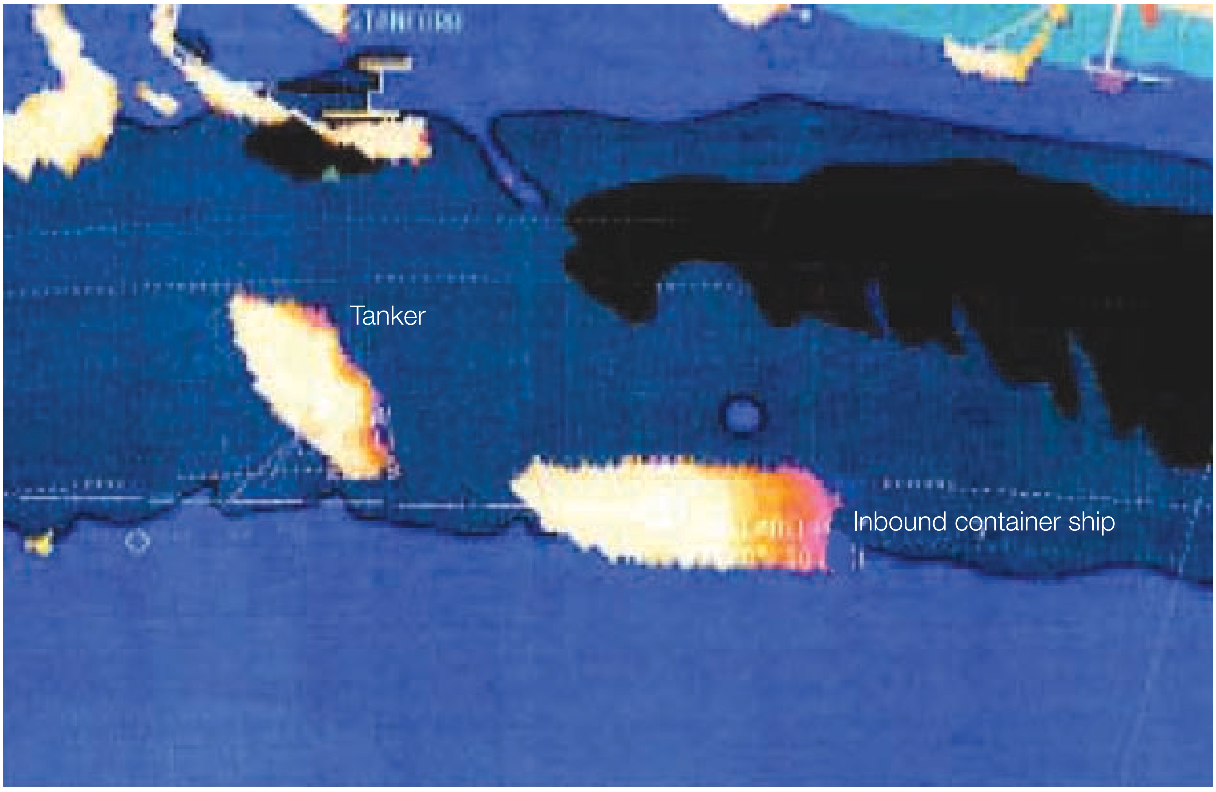
3. **By the time it was apparent to the ferry's master that the passenger vessel was taking no action to avoid a collision, the vessels were only 2 miles apart and closing at 25 knots. Had the passenger ship altered course to starboard as the ferry slowed down, the situation would have become confusing and the risk of collision significantly increased.**

Not Too Much Astern

Narrative

An Aframax tanker was approaching a port in the UK at night, timed to arrive off the berth during the high water slack period, and intending to turn and berth facing seawards. This was the usual approach for this size of vessel. On the bridge were the master, second officer, helmsman, the sea pilot and a berthing pilot who had arrived with two tugs. The tugs were made fast in a "push-pull" configuration, one on the starboard shoulder and one forward of the accommodation on the starboard side. Following the tanker into port was a container ship heading for a berth further upstream. The container ship would pass the tanker as she was turning to berth. The pilots of both vessels had agreed that the container ship would pass once the tanker had turned "nearly all the way round".

The berthing pilot began the manoeuvre to turn the tanker using a combination of engine, helm and tug movements. This included the order for the forward tug to lay back parallel to the ship's side, having the twin effects of slowing the tanker and assisting the swing to starboard. The berthing pilot positioned himself on the port bridge wing, from where he had good sight of a buoy marking the edge of the channel astern of the vessel. Once the turn had started, he could not see the container ship from this position, nor could he see the bridge instrumentation. The tanker's position in the channel also meant that there were few visual clues available to the pilot to indicate the vessel's direction and rate of movement. As the turn continued, the tanker slowed, stopped, and then started to gather sternway under the combined effects of her engines and the forward tug's actions. This reduced the available space for the container ship to pass astern of the tanker while still remaining in the channel, and resulted in a clearing distance of 15 metres.



Screen shot from VTS radar of incident

The Lessons

1. The tanker was equipped with ground stabilised radar, log and GPS, all of which indicated that she was making sternway. However, because the berthing pilot had positioned himself on the port bridge wing, he was unable to monitor the instrumentation. He was therefore estimating the vessel's movement by eye, a particularly difficult task at night with few visual clues. The master, OOW and sea pilot were all in the wheelhouse, and were in a position to advise the berthing pilot of the vessel's movement and of the proximity of the container ship. Yet they failed to do so.

2. Part of the bridge team's job is to monitor the actions of the pilot and, where doubt exists, confirm with him his intentions. The team should also provide support to the pilot as appropriate. Equally, the pilot should be proactive in requiring support from the vessel's bridge team. Once the turn had started, the bridge team failed to alert the pilot to the fact that the ship was gaining sternway, or to give updates on the position and movements of the container ship. The master had positioned himself on the starboard side of the bridge, from where he could see the container ship, but he could not see the pilot. He was therefore not in a position to effectively monitor, or question, his actions.

3. As the incident occurred close to the time of high water, there was sufficient depth of water available for the container ship to pass outside the main channel. The pilot of the container ship could have altered the vessel's course to pass the channel marker buoys on the "wrong side", thereby increasing the passing distance with the tanker. This is a manoeuvre that is discussed during pilot training, but it was not carried out on this occasion.

4. The VHF radio conversations between the pilots of the two vessels lacked formality, and relied on task familiarity to correctly interpret intentions. The agreement for the container ship to pass while the tanker was still turning, took insufficient account of where in the channel the tanker would be at the time of passing, or how much room the container ship would require to pass safely.

5. The port in question operated a Traffic Organisation Service and recognised that large laden tankers transiting through it increased the dangers within the port. However, no specific requirements were promulgated for other vessels to remain clear while the turn for berthing was carried out.

CASE 5

Poor Planning = Poor Performance

CCTV footage of vessel approaching occupied berth

Narrative

A 17,000 tonne ro-ro vessel had just commenced a new time charter and was making her first entry into one of the ports on her new route. The bridge team was relatively inexperienced and had not worked together before. The team consisted of the master, who had recently joined the vessel and had no previous experience of ro-ro vessels; the chief officer, who was newly promoted and was on the bridge for only the second time in this role; and a charterer's representative, who held a Pilotage Exemption Certificate (PEC) for the port but had no ship handling experience and had only joined the vessel the evening before the accident.

As the vessel approached the port, which was entered from a river via a lock, the master, chief officer and PEC holder discussed the tidal conditions and the manoeuvre required for entry to the lock. It was not clarified as to who would perform the manoeuvre and there was an assumption on behalf of the master and the PEC holder, based on their previous experience, that the other would be taking the controls. In the event, the vessel was manoeuvred into the lock with both the master and PEC holder making control interventions.

In the lock, the PEC holder sought to reassure the master, who was clearly uncomfortable and unfamiliar with manoeuvring a vessel in a confined area. Once the lock had filled, the vessel entered the dock and made her way towards the berth which the PEC holder assumed she would be using. Proceeding stern first, both men again were making control interventions as she approached the berth, which was not visible from the bridge wing control position from which the master and PEC holder were controlling the vessel. An officer, who was stationed aft, relayed the distances of the stern from the shore and other vessels in the dock.

When the vessel was close to the berth, the officer aft started to report a rapidly decreasing distance from another vessel, which the PEC holder assumed was on an adjacent berth, until the officer reported that the stern was less than 10 metres from the other vessel, which they were about to hit.

The PEC holder ran across to the other bridge wing and realised, just as contact was made, that the other vessel was, in fact, on the berth he had expected his vessel to occupy. The contact caused material damage to both vessels.

The Lessons

1. If the passage had been properly planned from berth to berth, and discussed, the collective lack of ship handling experience and training within the bridge team would have been highlighted at an early stage, and consideration could have been given to employing a pilot.

2. In addition to passage planning, had the chief officer and the officer aft been properly briefed for the berthing operation, they would have been able to contribute fully to its successful completion.

3. A few days before the accident, the Competent Harbour Authority for the port added the vessel to the PEC holder's certificate. The addition was made on the basis that the vessel was similar in size to another vessel already on his certificate. However, no check had been made to ensure the PEC holder was a competent ship handler before issuing him with his certificate.

4. When the vessel was chartered, the PEC holder was appointed to the vessel as the charterer's representative to perform pilotage duties. He was not signed on the vessel's crew agreement and was not her bona fide master or first mate as required by the Pilotage Act 1987, and he was not therefore fully integrated with the vessel's bridge team.

5. An assumption was made by the charterer that the vessel's master would be trained and experienced in ship handling. The owner, in turn, assumed that the PEC holder would be trained and experienced in ship handling.

   In the event, neither had the necessary training or experience, and they were placed in a difficult situation that could have been avoided if their respective managers had made an appropriate assessment of their ship handling expertise before appointing them to the vessel.

CO Poisoning – It's a Gas!

Narrative

During the winter months, the crew of a river launch started to suffer from headaches, nausea, dizziness, sore throats and, in some cases, fast and irregular heartbeats. When one of the crew visited his doctor, he was diagnosed with asthma and was prescribed an inhaler. However, his symptoms persisted. Blood tests were conducted on all the crew, which indicated they were suffering from carbon monoxide poisoning.

The source of the carbon monoxide was initially thought to be a space heater fitted in the river launch, which had been experiencing mechanical problems. The heater was removed, serviced and tested. As its carbon monoxide emissions were found to be normal, it was then re-fitted to the launch. However, the crew's symptoms continued.

Further checks were made and a small split was found in the heater's exhaust piping in the wheelhouse (figure). It was also determined that the heater's air intake piping had been modified. Instead of drawing air from the wheelhouse, the air supply for the heater was from the engine compartment. Consequently, air contaminated by leaked engine exhaust gases was being supplied directly into the wheelhouse.

After the heater's exhaust piping was repaired and its air intake ducting reconnected to a vent grill, as intended, no further illnesses were reported. A carbon monoxide detector was also fitted in the wheelhouse.

Heater exhaust pipe with crack indicated at the 4cm mark on the ruler

The Lessons

Space heaters are widely used in launches, fishing boats and tugs, usually without problem. However, as this case shows, where a space heater is fitted incorrectly or is poorly maintained, the possibility of carbon monoxide poisoning is increased. Therefore:

1. Space heaters, including their air supply and exhaust ducts need to be regularly maintained and inspected.

2. Crew should be protected by the fitting of carbon monoxide detectors and by the supply of fresh air to compartments served by space heaters.

3. All personnel need to be aware of the potential health hazards which can arise from both noxious and less obvious fumes.

Non-Routine Manœuvre Leads to Contact

Narrative

An 18,425 tonne passenger ro-ro vessel was departing from port in strong winds when it made contact with fendering at the edge of the main channel.

The vessel's routine departure, in favourable weather conditions, was to depart stern-first before turning around when clear of the breakwaters. On the night of the accident, the wind was strong to gale force, producing a heavy swell outside the harbour. The master, who held a Pilotage Exemption Certificate, decided to swing the vessel at the berth because he did not wish to depart stern-first in such conditions. He had seldom performed this manoeuvre previously.

Before departure, the master had briefed the officers on the intended manoeuvre to ensure the vessel was turned as tightly as possible owing to the relatively confined swinging area. The swing progressed to plan until the vessel came beam on to the strong wind when her stern started to slide along the berth. The master then applied more power to engines and thrusters to speed up the swing.

This additional power caused the vessel to go further ahead than anticipated, and increased the size of the swinging circle such that, on completion, she was closer than planned to the starboard side of the channel. With the vessel now at the edge of the channel and close to shallow water, she experienced bank effect. This drew her into the bank and resulted in her starboard side making contact with wooden fendering at the side of the channel as she proceeded out of the port.

Once clear of the breakwaters the master reported the accident to the port authority. It was then discovered that water was entering one of the vessel's void spaces. Having established that the vessel's bilge pumps were capable of coping with the rate of water ingress, the master decided to continue on passage to the vessel's next port. He contacted the ship manager's crisis team and kept them advised of the situation, but did not advise the coastguard.

On arrival at the next port, an inspection of the hull was carried out, which revealed that the vessel was holed below the waterline. She was taken out of service for almost 2 weeks while repairs were undertaken. The contact caused significant damage to a large area of fendering, which led to the port authority revising its guidelines for the berthing and unberthing of vessels in strong winds.

Damage to hull

The Lessons

1. The master decided to perform a non-routine manoeuvre when he judged that the weather was too poor for the vessel's normal departure manoeuvre. The manoeuvre had been seldom performed previously and had not been practised in favourable conditions. Ship managers, particularly of vessels operating on regular runs, should ensure that crews are properly trained and remain capable of performing all requisite manoeuvres for their vessels.

2. The planning of non-routine manoeuvres requires special consideration and good planning to ensure that everyone involved understands their role in the execution of the plan. The chief officer came to the bridge just before departure and was not fully briefed. He would have been able to provide more effective support to the master if he had been involved in the planning process.

3. The port authority had introduced weather limits for berthing and unberthing large vessels. However, the effects of strong winds from varying directions on different berths within the port had not been fully considered. When undertaking risk assessments in accordance with the requirements of the Port Marine Safety Code, port authorities should consider the impact winds of varying strengths and directions have on the safe use of the port.

4. The master held a Pilotage Exemption Certificate (PEC) for the port, which he obtained following satisfactory completion of assessment trips in varying wind conditions. Despite this, he was not prepared for the conditions on the night in question as he did not regularly perform the manoeuvre. Competent Harbour Authorities should ensure that PEC holders remain experienced in manoeuvring their vessels in all relevant weather conditions when renewing the certificate on an annual basis.

5. The vessel was holed and making water. Fortunately, the vessel's pumps were able to deal with the water ingress on this occasion. The master should have alerted the coastguard to the situation as soon as he was aware that his vessel was making water. Also, the ship managers should have ensured that the coastguard was informed of the situation as part of their crisis response plan. Early notification and regular updates to the coastguard will ensure they are able to provide a more effective response should a situation deteriorate.

Dangerous Cargo – it Did What it Said on the Tin

Figure 1

Narrative

A 20 foot container was stowed on top of a 30 tonne tank container. When the 20 foot container was lifted during discharge, the automatic midlocks securing the container to the tank container did not immediately disengage as designed. Consequently, the tank container was lifted between 30cm and 50cm before it dropped back to deck. The impact caused the tank frame to buckle and resulted in the release of a small quantity of the tank's contents (Figure 1). The crew immediately plugged the deck scuppers and spread sawdust over the deck to absorb the spilled liquid.

Figure 2

The chief officer quickly identified the contents of the tank as hydrogen peroxide, and consulted the appropriate substance information sheet on the ship's dangerous cargo database. The master informed the shore authorities of the spillage while the crew were mustered on the poop deck; the ship's ventilation was also isolated. As no inert absorbent material was carried on board, additional sawdust was spread around the container by crew wearing positive pressure breathing apparatus, rubber gloves and boots. Approximately 15 minutes after the spillage, the local emergency services arrived and established an exclusion zone around the vessel. Several of the crew were medically examined by shore-based medical staff and, although an AB was sent to hospital for tests, there were no injuries.

Following inspection, the tank was transferred ashore (Figure 2) and, shortly afterwards, the sawdust on the deck was swept up and put into open plastic containers. These were then placed with the SOPEP equipment in the foc'sle store. Before leaving the vessel, the local emergency services advised the vessel that sawdust was not an appropriate absorbent material to deal with IMO class 5.1 oxidising agents such as hydrogen peroxide due to the risk of self-ignition.

About 1 hour after the sawdust had been cleared, smoke was seen coming from the foc'sle store. The alarm was raised and the crew were again mustered on the poop deck. Two fire-fighting teams, wearing breathing apparatus and fire suits, fought the fire using water hoses, and it was extinguished approximately 20 minutes after being discovered. The local emergency services cleared the compartment of smoke and inspected the damage (Figure 3).

Figure 3

The fire was started by the self-ignition of the hydrogen peroxide-impregnated sawdust, which generated oxygen and heat as it decomposed. All of the contaminated sawdust which had not been burned was taken ashore and disposed of as hazardous waste.

The Lessons

1. The inadvertent release of a harmful substance usually requires immediate action to be taken. However, if such action is not in accordance with the guidance provided in the IMDG Code Emergency Schedules (EmS), the possibility of injury to personnel, harm to the environment, and damage to the vessel is increased considerably. In this case, the applicable schedule recommends that hydrogen peroxide be washed overboard using water hoses, or absorbed with an inert material – NOT sawdust. Had either of the recommended measures been taken, the subsequent fire would have been prevented.

2. The spillage of a dangerous substance cannot be safely dealt with if the equipment recommended in the IMDG Code is not carried, or if insufficient quantities are held. Has your company given any thought to what might be required to deal with the substances carried?

3. Materials impregnated with a harmful substance following a spillage are liable to be hazardous in a number of ways, and therefore must be treated with extreme caution. Disposal ashore – at the earliest opportunity – is the easiest way of minimising the exposure to any risk.

Stopped in Time – Just

Narrative

A ro-ro ferry was fitted with moveable car decks which could be raised to a stowage position at the deck head, or lowered for use. When in use, the deck was lowered to allow the cars access, and then raised to a halfway position to allow further cars to be stowed underneath. When in the halfway position, a series of solenoid activated pins was engaged with the ship's structure to secure the deck in place.

A deck with a full load of cars had been lifted to the half-way position. An attempt was then made to activate the solenoid to engage the forward pins. However, the solenoid failed, and the pins had to be engaged manually. This held the deck safely in position for the voyage. The ship's electrician exchanged the defective solenoid for a spare during the voyage, but he was unable to test the replacement owing to the cars stowed on the deck.

On arrival at the next port, the cars below the moveable deck were discharged. Because of the previous problem, the electrician and the second engineer were in attendance while an AB started the procedure to lower the deck. As he operated the controls for the solenoid to withdraw the securing pins, the fuse blew, leaving the pins engaged. It was decided to operate the deck raising/lowering system on emergency override, which used stored hydraulic pressure. To release the securing pins, the deck first had to be raised to remove the weight on the pins. The electrician tried to do this by manually operating the appropriate hydraulic valve, but there was insufficient hydraulic pressure to lift the deck so the second engineer started the hydraulic pump to pressurise the system. Almost immediately, the deck started to rise. The stop button on the control panel was pushed in an attempt to halt the movement. However, this had no effect, so the second engineer ran back to the hydraulic pump controls to stop the pump. Unfortunately he was unable to do so before some of the cars had been damaged.

The Lessons

1. The hydraulic valve operated by the electrician had become stuck in the "raise" position. This meant that as soon as the system was pressurised, the deck began to rise. Maintenance routines have since been amended to ensure the continued cleanliness of the valves and actuators in all of the hydraulic systems on board.

2. Operating the emergency stop had no effect in this case. The design of the system was such that the emergency stop operated on the Programmable Logic Controller (PLC), the "brain" of the system. Since this had been overridden, it was only when the hydraulic pump was stopped that the deck stopped moving. What does your emergency stop button do?

   Following this accident, the company, in partnership with the hydraulic system's manufacturers, reviewed the emergency stop system on the moveable car decks, and also on the other ramps and doors within the ship to determine what was stopped when the emergency stop button was activated. Where necessary, the system was modified to ensure that the emergency stops not only shut down the PLC, but also shut off the power to the hydraulic pumps, ensuring that in whichever mode the system was being operated, pressing the stop button would stop the operation at source.

3. The practice was to lower the moveable car deck with the passengers seated in their cars. On this occasion, with the operating system not functioning correctly, the passengers remained in their cars, while attempts were made to lower the deck by alternative means. The malfunction which caused the deck to rise, and to continue rising, was fortunately remedied in time to prevent any injuries, but not before some cars had been damaged. This routine has now been changed, such that if the system fails to operate, passengers are instructed to leave their cars until the deck has been safely lowered.

   Manually overriding a system requires careful assessment to ensure that it does not introduce unacceptable risks to the operation.

New Beginning, Old Problem

Narrative

A ro-ro ferry had arrived in a UK port from dry dock, where she had undergone a conversion for operations offshore and been surveyed to start the process for transferring her to the UK flag. The ship then remained in port, completing remedial work identified during the survey. Six weeks later, she prepared to sail for her new task for the first time. She had been issued with an Interim Safety Management System (SMS) Certificate, and had not yet developed full SMS procedures. Due to her size, both lock gates allowing access to the river needed to be open, so departure was timed for high water.

The pilot boarded, two tugs were in attendance and the crew went to stations. The master agreed to the pilot's suggestion that he would manoeuvre the ship off the berth and turn her, and then that the pilot would take over to negotiate the locks and the river passage. During the process of letting go, sailing was temporarily delayed while it was confirmed that all passengers had boarded. Letting go having resumed, the pilot went inside the bridge to collect his radio, and on returning to the bridge wing found the ship already moving off the quay.

The master manoeuvred the ship sideways, parallel to the quay, and then began turning her to starboard. The pilot was standing forward of the engine control console, from where he could see the position of the engine and bow thrust controls. However, he could not monitor the amount of rudder applied because the steering gear was operated by push button controls, and he was unable to see the rudder angle indicator.

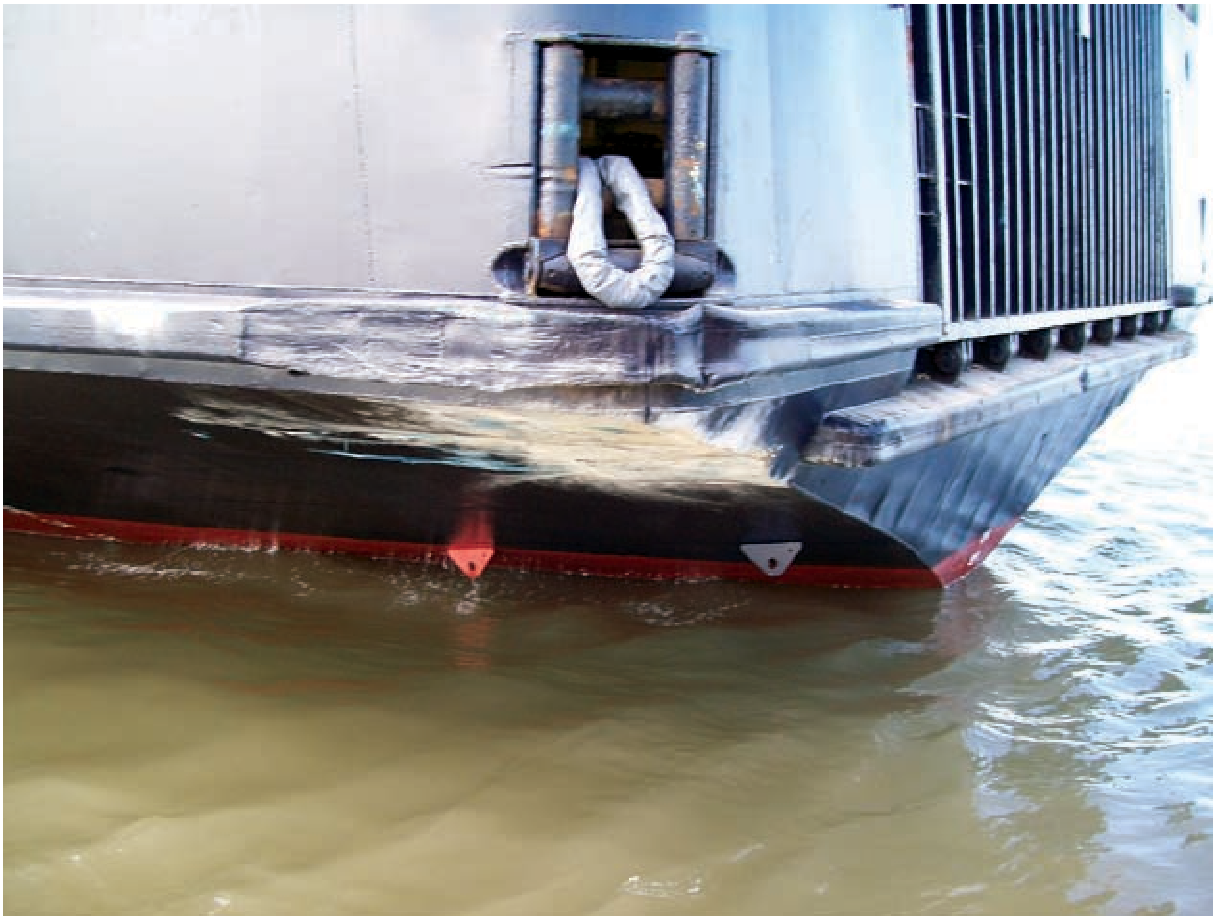


Figure 1: The port quarter

No instructions had been given to the second officer stationed aft on the poop with respect to reporting clearing distances. However, since the poop was divided by the stern door, he had stationed an AB on the port side, with a VHF radio and instructions to call the bridge with distances off the quay if closing. As the turn progressed, and with the port quarter closing the quay, the AB called the bridge by VHF radio several times, counting down the distance. This was heard by the second officer on the starboard poop, but by no one on the bridge. The port quarter made contact, and scraped along the quay for approximately 30 metres, dislodging a set of quayside bollards, before the pilot, who had now taken control, manoeuvred the ship clear.

The ship then continued without further incident into the river. As the pilot boat's coxswain passed the ship's stern to take off the pilot, he reported to the master and pilot that he could see a hole in the ship's port quarter. Having inspected the damage internally and from the pilot boat, the master decided to return to port for repairs.

Figure 2: The hole

The Lessons

1. The ship was new to all the crew and, apart from two moves along the quay, had remained alongside during her 6 weeks in port. This was their first sailing, and it would be expected that the master would talk his team through his requirements for sailing and the information he expected to receive from each member of the team, and how it was to be reported. This failed to happen on the basis that "we all know what we are doing". Did they? Do you?

2. The master's ship handling experience had been mostly with single screw ships. He was confident that his "twin-screw" experience was sufficient to enable him to safely manoeuvre the ship off the berth. However, since this was the first time he had manoeuvred this particular ship, it would have been prudent to have the pilot perform this manoeuvre.

3. The pilot, by positioning himself where he could not see exactly how the master was manoeuvring the ship, was unable to monitor his actions or to offer any advice with respect to the ship handling. There were no other members of the bridge team in a position to monitor the master's actions either.

4. The ship was operating with an interim SMS Certificate, as permitted for a ship new to a company. Although procedures were starting to be developed, these might not have been expected to be perfect for the first sailing. Advice is available from, among other sources, the ICS Bridge Procedures Guide and the MCA 'M' Notices. These will assist in formulating interim procedures which will, at the very least, provide a basis for safe ship operation to which ship specific requirements can be added at a later stage.

During the contact, a set of bollards was knocked over, and the stern scraped along the quay, both of which had the potential to hole the hull. Yet no action was taken to assess the damage, either by contacting the personnel on the quay or by checking internally. Had the pilot boat coxswain not noticed the hole, the ship would have sailed and the damage come to light only once the steering gear compartment began to fill with water. Owing to the position of the hole, this would probably have been during adverse weather, when repair would have been far more difficult to carry out.

Early Preparation Can Save a Lot of Trouble Later On

Narrative

A 77,750 deadweight product tanker, in ballast, with a draught of 8.3m aft, was brought up to 8 shackles on the port anchor in a bad weather refuge anchorage, in 20 metres of water. The ship had been arranged to berth in the nearby harbour to make permanent repairs to a fracture in the hull and to replace the main engine turbo charger, which had failed the day before. The turbo charger had been locked and the ship's speed was reduced to dead slow ahead, giving a maximum speed of about 4.5 knots.

The master had chosen to anchor in the furthest point in the anchorage from the lee shore, which was about 1 mile to the north of the ship's position. He also chose this position because it was in the lee of a prominent headland and it was outside the main tidal stream. Knowing that bad weather was forecast, the master considered using both anchors in an open moor but decided that, in the prevailing conditions, he did not have the engine power to obtain a wide enough spread between the anchors. Consequently, the starboard anchor was not made ready. After anchoring, the engine was placed on 10 minutes' notice.

The wind overnight was south-west force 6 to 7, and the morning's forecast predicted south-west winds of force 7 to severe gale 9, occasionally storm force 10, decreasing 4 at times.

At 0936, the ship began to drag her anchor to the north and towards the shore line. The OOW notified the master and the engine room and, at 0951, the engine was started and the anchor party began weighing anchor. The master intended to anchor again in the original position. Following a temporary suspension in operations due to a hydraulic line failure, the anchor was aweigh at 1039. With limited engine power available, the master was unable to manoeuvre his ship to the south and she was set in a westerly direction towards an anchored coaster. The master went astern on his engine to avoid the coaster, and the ship again drifted to the north towards the lee shore. The anchor party was initially unable to drop the port anchor as the chain had developed a twist. However, at 1111, the twist was cleared, the anchor was dropped and the ship was brought up to 9 shackles in the water. This arrested her drift at about 2 cables from the 10 metre sounding line.

The master requested the assistance of a harbour tug to hold the ship's head into wind, while he attempted to manoeuvre the ship back to her original anchor position. On overhearing communications between the master and the harbour authority, the coastguard mobilised a salvage tug, which was alongside in the nearby harbour. At 1254, the salvage tug made her tow, was made fast, and the ship was towed alongside, arriving at 1700.

The Lessons

1. The master was faced with a bad weather forecast, the ship was anchored in relatively close proximity to land, with a high freeboard giving a large windage area and with very limited engine power. In this situation it would have been wise to have increased the length of cable deployed and to have prepared the starboard anchor for letting go in case the ship began to drag her port anchor. Additionally, the master could have lowered the starboard anchor onto the sea bed to decrease the amount of yawing.

2. Although the engine was placed on short notice, by the time the dragging was detected and the engine started, the ship was already drifting at a significant rate. In not preparing the starboard anchor, an opportunity was lost to immediately deploy a second anchor. Additionally, more cable could have been veered on the port anchor as an immediate measure to bring the rate of drift under control.

3. In this case, the ship's limited engine power gave the master little choice other than to anchor in the shelter of the land. An alternative option would have been to heave to at sea. It must be remembered that anchoring equipment is designed and manufactured only for mooring a vessel in moderate sea conditions, and for relatively short periods, while awaiting berth availability, orders or change of tide. The equipment is not designed for anchoring off fully exposed coasts in rough weather, when high energy loads can cause damage to the windlass and its components.

Oh Dear – It's Happened Again

Narrative

A 79-metre cargo vessel was steaming south-west in calm weather and good visibility. She had loaded a cargo of timber and departed her load port earlier that evening. Although the vessel's passage plan allowed for her to pass outside of a small island, the master, alone on watch and with no lookout, chose to take the inshore route, passing between the inside of the island and the mainland. It was dark, and shortly after making an initial course alteration to effect his chosen route, the master fell asleep. He awoke 20 minutes later as the vessel grounded on the island. It was close to high tide, and she listed heavily to port as the tide fell.

A number of the crew were evacuated overnight as a safety precaution. They returned the following morning when the vessel was refloated on the rising tide, with tug assistance. Fortunately no pollution or injuries occurred, and following a diver's examination, which revealed damage to the forepart of the underwater hull, the vessel was allowed to proceed to a nearby port for further examination and repairs.

While alongside in port, a minor quantity of gas oil was discharged overboard during ballasting operations. This had resulted from a split between the ballast tank and an adjacent bunker tank, which had been caused during the grounding.

Damage to hull

Vessel discharge

The Lessons

1. The vessel was manned in excess of the requirements of its Safe Manning Certificate. However, although her recorded hours of work and rest appeared to comply with STCW requirements, under deeper scrutiny these were seen to be impossible to achieve given the vessel's trading patterns and working time in port. Owners and managers should ensure that the manning of their vessels takes into account the demands of the vessels' trade, and not simply the statutory minimum requirements.

2. All too often, the MAIB receives information about incidents involving lone bridge wachkeepers. A number of factors can affect the lone watchkeeper including fatigue, lack of stimulation and "stuffy" bridge atmospheres. All can lead to drowsiness and, in the worst case, falling asleep. The benefits of a bridge lookout *in addition* to the watchkeeper cannot be overemphasised regarding their contribution to vessel safety. Owners and managers should ensure that, not only are their vessels adequately manned, but also that personnel are utilised to their best effect in providing a safe lookout at all required times.

3. While safety management systems are a prerequisite to any good management system, whether under ISM or not, audit procedures should be robust, to ensure that "what is written is what is happening". Owners and managers should continually review their audit procedures to ensure they remain strong and target all areas of the vessel's safe operation.

4. Following suspected damage, a diver's examination can, at best, give only an indication of the condition of the external hull, and this is very much dependent on the diver's experience, and the conditions during the dive (visibility etc). Masters and superintendents should be aware that following a grounding, internal damage – which is not immediately apparent – may be present, so they should proceed with caution until the vessel has been thoroughly examined, both externally *and* internally, in way of any areas of damage.

Close to the Edge

Narrative

A container vessel was in dry dock, undergoing repairs when a fitter fell to his death in an open cargo hold.

The fitter was carrying out general welding work on deck, which included welding and burning of cargo hatch fittings. Meanwhile, crew were cleaning ballast tanks through accesses in the cargo hold beneath where the fitter was working. The ship's Safety Management System (SMS) required work permits to be issued for confined space entry (ballast tanks), hot work outside the workshop, and for working aloft (higher than 2 metres). Work permits had been issued for the ballast tank and hot work operations, but not for working aloft as, with the hatches closed, there was no danger of falling more than the specified 2 metres.

Despite a requirement under the vessel's SMS procedures for hot work to be supervised, this particular hatch top work was not monitored, and after completing several hot work tasks the fitter left his tools on the hatch cover while he took his lunch break. Meanwhile, the chief officer opened the after half of the hatch cover on which the fitter had been working to allow light into the hold to help the crew who were cleaning in the ballast tank below. Before opening the hatch cover he moved the fitter's tools, leaving them close to the unguarded edge of the adjoining forward hatch cover. When the fitter returned from lunch he found

The tools used by the fitter

Vessel's cargo hold

the after section of the hatch cover open and his tools moved forward. He then continued his work close to the edge of the forward hatch cover some 10 metres above the unprotected open hold.

About 5 minutes into this work, the fitter requested that the after hatch cover be closed, to allow him to continue working safely. However, in response, the chief officer, who was working in the hold below, told him to move his equipment and go and work on the closed hatches further forward. Shortly after this the fitter fell from the edge of the open hatch cover into the hold. He was killed instantly.

The Lessons

1. **The vessel's SMS required hot work to be supervised, more for fire prevention than to avoid accidents of this nature. Had this operation been supervised by a competent person, the fitter would not have been allowed to carry out his welding and burning work above an unguarded 10 metre drop.**

2. **By continuing to work adjacent to the open hatch cover, and a 10 metre drop, a new hazard was created. Crew members must be aware of *their own* personal duty under The Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, whereby *they too* are responsible for their own health and safety and that of any other person on board who may be affected by their actions.**

3. **It was not recognised by anyone on board that the opening of the after hatch had created a "working aloft" situation that required a work permit to be issued. The controls required by the work permit would have prevented this accident.**

4. **Ships' staff should always remain alert to changing circumstances and any new hazards such changes may pose. For example, the proximity of the fitter's tools to the unguarded hatch cover edge exposed the crew, working below, to the potential of being struck by falling equipment. This should have been recognised and appropriate measures taken to protect the crew before the hatch cover was opened.**

5. **The vessel's cargo holds were secured under 2 hatch covers which hinged open into the vertical position and offered the option of opening either one, or both hatches over a common coaming. When only one hatch was opened, a danger was created for anyone remaining on top of the other hatch cover. However, opening both hatches would have blocked off either end of the coaming, thus preventing easy access to the area.**

Part 2 – Fishing Vessels

Having spent the majority of my working life as a deckhand and skipper in the industry, I am delighted to have been asked to write this introduction.

Fishing remains the most dangerous occupation within the UK; fishermen are 115 times more likely to suffer a fatal accident than those within the general workforce, and 24 times more likely than those working within the construction industry. The rates of fishing fatalities have not shown any improvement in recent years.

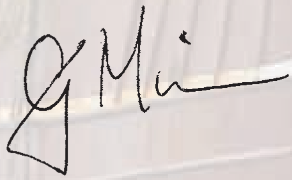
Like most fishermen, I have encountered many 'close calls' which act as a timely reminder as to how dangerous the fishing industry can be. We do learn from these experiences, but we often only learn the errors of our ways by making mistakes. I recall an incident (and I am not ashamed to admit that it involved me) whereby a self-inflating lifejacket which had been worn for months but had not been regularly checked, had to be inflated by mouth as the less than balmy waters of The Little Minch lapped under my chin. The CO_2 canister had not fired due to it becoming unscrewed. Thankfully the incident happened in sheltered waters and I was rescued almost immediately.

We relate these incidents to each other, and they often come to mind when we are in a situation where we are reminded of another's misfortune. The MAIB Safety Digest gives us a wealth of such information, which not only acts as a reminder as to the day to day dangers which we all face, but it is where we can learn from the experience of others. The role of the MAIB is purely to discover the facts, not to apportion blame or culpability. These facts can be sobering reading, but they are beneficial to all mariners.

We read time and again how poor maintenance (how many times have we come across a stuck or seized valve?) or lack of training is the root cause or has been a compounding factor in a predicament. Many incidents which result in a serious emergency can be prevented or the situation can be recovered when crew with the right training are able to act efficiently.

Skippers and engineers employ routine checks such as checking engine and gear oil levels, inspecting bilges for unusual water levels and ensuring bilge pumps are serviceable etc. These can be expanded a little further to the inspection of smoke alarms, fire fighting and life saving equipment and checking that valves can be opened and closed fully. Even a bit of mundane housekeeping can make the difference; keep personal effects stowed away (sea-boot socks that have been worn for several days and then draped over a heater are not only offensive, but are also downright dangerous). Take time to involve the crew in these tasks, which will allow familiarity with procedures and equipment, and in the event of an emergency will buy valuable time.

I left the industry last year to work in marine engineering. There are many aspects I do not miss: fishing is demanding, torturous, frustrating and can be the most demoralising work. However, it is also exhilarating, rewarding and incredibly exciting, and the camaraderie and brotherhood are unique. I wish all fishermen many safe and successful trips.



Gavin Morrison

Gavin currently works as an engineer for SMS Salcombe, Devon. He left the fishing industry in January 2008 to pursue this career. Gavin has been fishing on and off since he left school in 1987; his first job was as a deckhand on a lobster boat in the Western Isles. Most recently, from 2003 to 2008 he skippered a vivier crabber in the English Channel, Irish Sea and waters around the Inner Hebrides. Gavin's fishing career has been punctuated with employment in the offshore oil industry and some time with an airline.

CASE 14

Watch Where You're Going

Narrative

At about 0300, an 18m wooden hulled prawn trawler left her port of landing for her fishing grounds. Once through the breakwaters, the two deckhands, who had helped letting go, turned in, leaving the skipper alone on watch in the wheelhouse. Although the skipper went home at weekends, during the working week he was receiving only about 4 hours sleep a night when the vessel was alongside. He was maximising the time spent fishing for prawns during the long summer daylight hours.

When the vessel cleared the approaches to the harbour, the skipper set a course on the automatic helm to pass on his port side a small island, which lay about 2 miles to the south-west. The tidal stream was flowing north to south.

The skipper then went to the aft-facing chart table to process the previous evening's landing receipts. Shortly afterwards, the vessel grounded on an outlying shoal to the island, waking the deckhands who were all turned in. They quickly checked the vessel and ascertained that she was not taking water. The skipper was unable to drive the vessel off the shoal and he decided to wait until high water before making further attempts to refloat. He did not alert the coastguard of his situation, but he did inform the harbour authority, which later alerted the emergency services. The coastguard dispatched an all-weather lifeboat and an inshore lifeboat to standby the grounded vessel.

The skipper was able to obtain the assistance of two passing fishing vessels to tow his vessel off the shoal at the next high water. The trawler then returned to harbour, where it was found that damage was limited to the forefoot and the steel keel band.

The Lessons

1. It is essential that watchkeepers maintain a proper navigational watch at all times and do not undertake any other duties that would interfere with the safe navigation of the vessel. Further advice on best navigational practice can be found in the MCA's MGN 313 (F).

2. Skippers should take full account of the quality and quantity of rest taken when determining fitness for duty, and use additional crew members as necessary to ensure that a proper lookout is maintained.

3. In this case, the skipper did not alert the coastguard because he believed that he was in a stable position, and that his vessel would refloat safely at high water. It is always wise to alert the coastguard as soon as possible following an accident or incident, even if assistance is not needed immediately. Do not adopt a false sense of security. Incidents can deteriorate rapidly. Forewarned emergency services can respond more effectively.

Lucky to Survive

Narrative

An 8m fishing vessel, trawling in an estuary on the west coast, was preparing to haul her gear when the net snagged on the sea bed. The crew of two attempted, unsuccessfully, to knock the winch out of gear in order to slacken the warp, and also attempted to turn the boat back to starboard as the vessel took a shear and a heel to port.

Before the vessel snagged her net she had been towing down-tide, and when she initially heeled over, waves started to come onto her deck, causing her to heel over even further. A short time later she started to capsize, and the crew were pushed back into the wheelhouse by the power of the onrushing water, leaving them no time to send a 'Mayday'.

After the vessel had capsized, the crew found themselves inside the now inverted and flooded wheelhouse. One of them managed to swim clear quite quickly, while the other relied on a pocket of air to survive the initial capsize

Vessel with illustration of trawler assembly until he, too, was able to swim out of the upturned wheelhouse. Although his clothing snagged on the winch, he was able to get himself to the surface and clear of the vessel just before she began to settle by the stern, shortly after which she sank.

Once clear of the vessel, the crew joined together and clung onto a lifebuoy, which fortunately had floated free as the vessel sank. However, they were now at the mercy of a strong tidal current, and a mile off a sparsely populated shoreline, which they were unable to reach owing to the strength of the tide.

After an hour in the water, the crew were seen from the shore by a member of the public, who alerted the coastguard, and they were soon rescued by the local inshore lifeboat.

Had they not been spotted at that time, they could potentially have been in the water for a very long time as there were no paths or roads close to the shore further up the estuary.

The Lessons

1. **The crew were young and inexperienced; when they got into difficulties they were unable to react quickly enough to release the trawl warp. They also attempted to power the vessel back to starboard, when it would have been prudent to reduce the power and de-clutch the engine. Always ensure that, in accordance with the guidance given in MGN 20 (M&F) and MGN 265 (F), a risk assessment is undertaken of work activities, and personnel are suitably trained and practised in resolving foreseeable problems.**
2. **The crew were fortunate in that they were able to cling to a lifebuoy which had floated free of the sinking vessel. MSN 1813(F) lists the minimum safety equipment requirements for small fishing vessels, and recommends the carriage of a liferaft and EPIRB. In this case neither was carried; had they been, the crew would not have had to place such reliance on good luck and the vigilance of a member of the public to ensure their survival.**

CASE 16

Foundering – Always Check Why Bilge Alarms Sound

Narrative

A successful, wooden gill netter sailed for her routine 7 day trip with a skipper and three crew on board. The team were well trained, they had completed all the mandatory safety training courses and were serving in a vessel that had a reputation for being well maintained and run.

For the first couple of days the fishing was variable, so it was decided to move to new grounds. Luck was not with them. The weather deteriorated and the vessel was hove to for a day. A day later things looked up, at least for while; the weather improved and, with it, the fishing. At about 1400 on the sixth day, the nets were being hauled on board when the engine room bilge alarm sounded in the wheelhouse. The skipper was not overly concerned because this frequently happened during trips. As usual, he cancelled the alarm, switched on the electric bilge pump and continued hauling. Significantly, he did not investigate the cause of the alarm.

At about 1410, the haul was completed. The skipper then went to the engine room to de-clutch the hydraulic pump from the main engine while the rest of the crew made lunch. As he entered the engine room he found that the bilge water level was up to the floor plates, but he could not see where it had originated from, and there were no obvious signs of leakage. He re-configured the on-engine pump from deck wash supply to bilge pump suction but was unable to shut the seacocks as they were under water. The skipper immediately returned to the wheelhouse. He informed the crew about the flooding and, as a precaution, instructed them to don their lifejackets, which were stowed in the wheelhouse.

Immediately afterwards, the skipper started the second electric bilge pump, but the two emergency hand-operated bilge pumps could not be used as these were stripped down for maintenance. The skipper then contacted a nearby fishing vessel and told them of the problem. Afterwards he returned to the engine room and found that the water level had not reduced but had increased by a further 20cm; it was now well above the floor plates and half way up the main engine. To determine the extent of flooding, the skipper checked the fish room and found water at the same level as that in the engine room. He also checked the forepeak and found that to be dry.

The situation was clearly deteriorating. The skipper was unable to determine the cause of the flooding so he made a "Pan Pan" call by VHF radio, to which the coastguard responded. The skipper advised the coastguard that he expected to remain afloat for about 1½-2 hours. Despite this, the coastguard recommended that the skipper remove the EPIRB to ensure that it floated free, and to launch his liferaft. The skipper did this, but it inverted as it inflated. A "Mayday Relay" was also broadcast by the coastguard, and a number of vessels responded. The coastguard then tasked a rescue helicopter and a lifeboat to assist.

Figure 1

Figure 2

The skipper checked the accommodation area and found that the cabin deck was just under water. Sensibly, he did not enter the compartment because at about the same time the vessel made a sudden lurch and began to roll to starboard. The skipper immediately instructed the crew to jump into the water. They had insufficient time to right the still inverted liferaft, so opted to swim approximately 100 metres to the fishing vessel which had responded to the "Mayday Relay".

At 1509, the vessel sank. Fortunately, the rescue helicopter was overhead at about 1510 and winched the crew members to safety (Figures 1 and 2).

The Lessons

Without the vessel being available to inspect, the cause of the flooding is a matter of speculation. However, the rate of flooding calculations suggested that a 60mm diameter hole or comparable split would have caused the conditions which led to the foundering. The skipper was unable to see the source of water ingress, which suggested that it was under the engine room floor plates, below the water level. It is noteworthy that the main engine sea water cooling system used 60mm diameter pipes.

The flooding of the fish room confirmed that the forward watertight bulkhead had been breached. The fish room bilge suction flexible hose had been passed into the fish room through an oversize hole which would have allowed water to enter the fish room from the engine room and vice versa.

Had the cause of the bilge alarm been promptly investigated, there would have been a good chance that the cause of the flooding would have been found and effective measures could have been taken to deal with the problem. The following lessons can be drawn from this accident:

1. **Investigate bilge level alarms on every occasion. It is all too easy to become complacent and switch on the bilge pump without identifying the cause of the alarm.**

2. **Use suitable components when penetrating watertight bulkheads so as to maintain, so far as is practicable, the watertight integrity.**

3. **Consider fitting extended spindles to sea valves that are not already required by regulation to be fitted, and regularly check the condition of related pipework.**

4. **Ensure that all bilge pumps, including hand-operated emergency pumps, are maintained ready for immediate use.**

5. **Conduct regular emergency drills.**

6. **Consult MGN 165 (F) – Fishing Vessels: The Risk of Flooding. This publication, which is available on the MCA's website, provides comprehensive advice on flooding prevention measures, and makes essential reading.**

The Blind Leading the Blind

Narrative

During the first week of a planned 2 week pair-trawling trip, one of the vessels suffered a failure of its satellite gyro compass. The skipper changed over to another compass but was unsure exactly what equipment it now supplied. A check of the magnetic compass revealed that the card was 180° displaced. The skipper borrowed a large magnet from the engine room, placed it close to the binnacle and managed to turn the card 180°, but thereafter the compass's reliability was found to be somewhat suspect.

After some good fishing, the vessel returned early to port and landed its half catch. Visibility was good for entering harbour, the catch was soon discharged, and the crew stood down until the vessel's planned sailing time of 2000 that evening.

When the skipper and mate returned to the vessel, the visibility had reduced to between 20 and 50 metres. The reduced visibility did not change the skipper's plan to sail at 2000.

The bridge equipment was switched on, and at 2010 the vessel left the quayside. With the wheelhouse windows open, the mate stood looking out of the port window and the skipper looked out of the forward facing starboard window. Each had an electric tiller at his side, and they shared the responsibility for the manoeuvring.

Feeling their way out of harbour and only just able to see their own forecastle, alterations of course were made whenever a vessel or structure was identified. The skipper continued outbound, but although becoming more and more concerned as the visibility continued to decrease, at no time did either he

Some of the damage caused by the grounding

Vessel's track – recorded from electronic chart plotter

or the mate make use of the electronic navigational aids – despite the two radars and electronic chart plotter being switched on, and on suitable range scales.

By chance, the mate glanced at the rudder indicator and saw that the rudder was set hard to starboard. He immediately alerted the skipper, who started to bring the helm back to port. As the rudder returned to amidships, the noise of the vessel grounding could be heard. The mate de-clutched the main engine and then reduced the pitch and revolutions to zero.

Port control contacted the vessel when it was no longer held on radar, and the skipper advised them that he had grounded. The crew checked for water ingress; none was found. The skipper decided to wait for a rise in tide before attempting to refloat, and 12 minutes later the vessel was afloat. The skipper and mate carefully made their way back into the harbour, this time making use of the chart plotter. On their arrival, the coastguard noticed a considerable amount of pollution in the vicinity of the propeller, and the decision was taken to remove the vessel to a nearby slipway.

The Lessons

1. It had been some considerable time since the skipper had attended a radar simulator course. Although he was familiar with the electronic navigation equipment on board, he had not grasped the navigational techniques necessary to navigate in fog. The need for continuation training in blind pilotage techniques and electronic navigational aids should not be underestimated.

2. There was no heading readout available because of the defective satellite compass. This was the main factor behind the disorientation suffered by the skipper. The absence of essential navigational equipment, in this case a heading display, changes the risks involved in sailing. A further assessment of the risks should be made and, if necessary, sailing deferred until the equipment is repaired.

3. A probable reason for the rudder being applied hard to starboard was the location of the tiller next to the skipper. With his attention focused on looking for visual navigation marks, he had failed to realise that he had nudged the tiller over to starboard. Given the prevailing conditions, it would have been better to have a dedicated helmsman on the wheel, which would have allowed the skipper and mate to concentrate on navigating and looking out.

4. The echo sounder was switched off while leaving and entering harbour, a scenario often identified by the MAIB. In such waters, the echo sounder is an essential piece of navigational equipment, particularly if it is fitted with a depth alarm facility. However, remember to check whether the datum is set to show depth below the keel, or depth below the waterline.

No Safety Training, Faulty Fire Detectors and Emergency Equipment – A Sorry Tale of Woe

Narrative

A 33 metre, UK registered long-liner left her home port for the 4 day passage to her fishing grounds. The skipper had been with the boat for about a year, but for the majority of the 15 mixed nationality crew, none of whom had completed any of the mandatory safety training courses, this was their first time on board.

Familiarisation training was never carried out and emergency drills were not considered important enough to waste time on. Most of the emergency equipment, including ventilation shut-off valves and the emergency fire pump, were not properly maintained and no-one could remember when they were last tested. To make matters worse, the skipper knew that the fire detector heads in the crew's cabins were routinely covered to prevent the alarms sounding as the crew smoked, but he turned a blind eye to this dangerous practice.

What the skipper did not know was that the cabin dividing bulkheads stopped short of the deckhead, and that cabin power supply cables were draped over the sharp edges, and consequently the insulation had been badly chafed (Figure 1). The crew also connected numerous electrical devices to untested electrical extension leads.

So, all in all, the boat was poorly prepared to deal with the emergency which was just over the horizon.

Figure 1: Cable chafing

Figure 2: Blistering of the paint on the main deck

At 0100 the skipper called the crew to recover the long-line. They left their cabin doors latched open and went on deck. At 0630, a fisherman looked up the accommodation alleyway and saw thick black smoke coming out of one of the cabin doors – notably, the fire detection system had not alarmed. At the same time, a fisherman on the port side heard the shout of "fire" and headed towards its source. But he was beaten back. The second engineer had more success, and tackled the fire with a water extinguisher until he, too was beaten back; no one closed the watertight doors to contain the fire within as small an area as possible.

The skipper sensed something was wrong when the crew mustered in front of the wheelhouse. He opened the rear wheelhouse door to the alleyway below and was confronted by the heat from the fire, and the wheelhouse filled with smoke. It became clear to him that he had a major incident on his hands.

The crew stayed in front of the wheelhouse, unsure of what to do next. Fortunately, the bosun had the presence of mind to confirm the crew were all accounted for. The skipper then decided to establish a fire/smoke boundary, and arranged for the watertight doors to be closed. Because the doors had not been closed early during the incident evacuation, the boundary encompassed over three quarters of the accommodation and fish processing areas. At the same time, the skipper alerted a nearby long-liner of his problems.

At about 0640 the skipper asked the chief engineer to start the fire pump. He could not do so because the electrical control supplies had been burnt through. No attempt was made to cross-connect the general service sea water pump to the fire main, nor was any attempt made to try the emergency fire pump, so there was no pressurised water supply to deal with the fire. It is noteworthy that most of the crew were unaware of the existence of the emergency pump which, in any case, was later proven to be defective.

The situation worsened as the paint on the starboard side of the main deck started to blister (Figure 2). The skipper decided to starve the fire of oxygen. However, the ventilation closing flaps were seized and could not be closed. He then set about stuffing rags around the ventilation outlets to stop oxygen reaching the fire. At about 0700 one of the cabin scuttles fractured from the heat of the fire. The skipper and bosun donned safety harnesses, went over the side, and managed to throw buckets of sea water through the scuttle. However, this had virtually no effect. No thought was given to using the submersible salvage pump to provide boundary cooling, which was later proven during the investigation to have been a viable option.

At about 0815, the skipper contacted the vessel's owners. They advised him to "sit it out" and see if the fire would burn itself out. As the morning wore on, the crew became impatient and persuaded the skipper to try to make a re-entry to the fire despite there being no breathing apparatus on board and no fire suits (none were required by the regulations). At 1215 the rags were removed from the ventilators and large volumes of smoke were seen to issue from the broken scuttle as the fire re-ignited. This finally persuaded the skipper to notify the coastguard of the emergency, some 6 hours after the fire was discovered.

A lifeboat, rescue helicopter, patrol aircraft and a warship were all involved in the rescue. The warship put a fire-fighting team on board and extinguished the fire. The boat, under escort, made her own way into port.

The fire was caused either by a short circuit where the electrical cables were draped over the non-continuous bulkheads, or by an overheating electrical device belonging to one of the crew. It caused widespread damage throughout the accommodation area, alleyways, galley and mess room. The 220 volt electrical distribution panel outside the engine room access was totally destroyed (Figures 3, 4 and 5).

Figure 3: Cabin damage

Figure 4

Figure 5: Damage to the 220v distribution panel

The Lessons

Fortunately there were no serious injuries as a result of the fire. However, the skipper and vessel's owners paid scant attention to the importance of safety training and contracting qualified crew who had attended the mandatory safety training courses. Attending the fire-fighting course would not necessarily have prevented the fire, but it would have enabled the crew to act more instinctively, and they might have dealt with the fire more effectively had the emergency equipment been properly maintained and available.

What perhaps is particularly disappointing is that the fire detection system had been intentionally disabled by the removal of the control panel fuses. The importance of a correct detection system cannot be over-emphasised. It provides the first line of defence and the chance to deal with the fire before it gets a real hold.

The following lessons can be drawn from this accident:

1. Make sure that properly trained crews are employed. Once on board, carry out regular emergency and familiarisation drills – your own survival may depend on it.

2. Maintain and check the correct operation of the emergency equipment – in this case, the emergency fire pump was in an enclosure on the upper deck and suffered from the crew's attitude of "out of sight, out of mind".

3. Make sure that fire detection systems are always fully functional. Test them regularly – especially before sailing – and repair any defects without delay.

4. Adopt a closed door policy. In this case the cabin doors were of B Class standard but were left open, allowing the fire to quickly spread into the accommodation alleyway. In the event of a fire being discovered, establish a boundary as close as possible to the seat of the fire.

5. Skippers should not hesitate to alert the emergency services to a major incident, which this clearly was. Fires can escalate unexpectedly and rapidly, and delays can so easily compromise the chances of a safe rescue.

6. In March 2008 the MCA published the "Fisherman's Safety Guide – A Guide to Safe Working Practices and Emergency Procedures for Fishermen". The guide provides useful information on fire prevention, training, drills, and maintaining emergency equipment, and is available in foreign languages on application to the MCA headquarters. Owners and skippers are encouraged to request copies, which are free of charge.

Part 3 – Small Craft

Safety has been a major concern for seafarers from the earliest days of sailing and whereas in the old days mariners were willing to put their fate in the lap of the gods, today's sailors prefer to play safe by taking additional precautions. The many thousands of miles that I spent sailing on the oceans of the world have taught me to have a profound respect for the forces of nature and not to take anything for granted but be always prepared for the worst. Safety therefore has been my first priority, both on my own yachts and as organiser of various offshore sailing rallies whose commendable safety record speaks for itself.

Over the years my concern with safety prompted me to undertake a number of surveys among my fellow sailors. Puzzled by the large number of groundings, collisions and even fatal accidents that still seem to occur in spite of the recent improvements in navigational and safety equipment my latest survey attempted to find the reasons for this apparent contradiction. By looking closely at recent accidents involving cruising yachts what is striking is that in many of the cases in which boats were lost as a result of grounding, this appears to have been caused, just as in the old days, by a navigational or human error. Looking at a number of incidents of near or total losses, I drew the inevitable conclusion that whereas in pre-GPS days boats were often lost because sailors didn't know where they were, nowadays boats are lost because skippers ***know*** where they are. Or so they think!

Indeed, one conclusion that could be drawn from these findings is that many of today's sailors seem to have a self-confidence that almost borders on arrogance and as a consequence are prepared to set off on a voyage believing that all those wonderful gadgets will make up for their lack of experience. If, as in some of the examples cited on these pages, alcohol is mixed with inexperience and a dash of ignorance, the resulting cocktail can lead to fatal consequences.

The main aim of my latest survey was to answer the question whether sailing generally, and cruising in particular, was safer. Personally I believe that cruising generally is safer, and I am relieved that the findings of my survey bear this out. Boats still get lost but certainly not as frequently as during the days of astronavigation. What I found, however, is that whereas offshore cruising is indeed safer, the situation is not so good when it comes to coastal cruising or navigating close to land. Bearing in mind the thousands of miles travelled by cruising yachts, sailing in distant waters is probably the safest way to see the world. Unfortunately, just as in the case of motoring where most accidents occur within a few miles from home, so with sailing where it is the home waters that pose the greatest risk. This is why the Marine Accident Investigation Branch is so right to focus its efforts on making safety on our very doorstep its main priority. One of the most valuable lessons I learned in my life is to learn from both my own and other people's mistakes and do my best not to repeat them. This is why even the most experienced mariner can still find something to learn from the case studies discussed in this excellent publication.

Jimmy Cornell

Jimmy Cornell

An accomplished sailor and successful author, Jimmy Cornell has sailed 200,000 miles in all oceans of the world including three circumnavigations as well as voyages to Antarctica, Alaska and Spitsbergen. His 43 ft Aventura III is currently based in the Eastern Mediterranean. Jimmy Cornell is a member of the Royal Ocean Racing Club.

Many of Jimmy Cornell's 14 books have been translated into various languages and his World Cruising Routes, described as the bible of offshore sailors, has sold over 100,000 copies and is one of the best-selling nautical publications in the world. Jimmy Cornell's latest book "A Passion for the Sea, Reflections on Three Circumnavigations", which is a memoir of his sailing life, was published in 2007 and can be ordered via his website: www.jimmycornell.com

As the founder of the highly successful ARC transatlantic rally, Jimmy Cornell is credited with having devised the offshore cruising rally concept. Until his retirement in 2000 Jimmy Cornell had organized 24 transatlantic and five round the world rallies. His latest project, the website www.noonsite.com, is currently the main source of practical information for cruising sailors on the internet and lists details of facilities and formalities in 183 maritime nations and over 4,000 ports worldwide. Fluent in six languages, Jimmy holds cruising seminars at various international boat shows.

A Not So Lucky Escape

Narrative

An instructor and three trainees were operating a 5.3m RIB with a 60hp outboard engine during the second day of an RYA powerboat level 2 training course. The weather was fair and the sea state was calm; the wind was force 2. During the morning, the trainees practised manoverboard drills and high speed 'S' and 'U' turns. On completion, the instructor decided to let the trainees conduct 'high speed tight turns', which he demonstrated with the engine fully trimmed down at 5200rpm. He then gave the helm to one of the trainees, who was a teenage boy. The other trainees, a mother and her teenage son, who had been alarmed by the tightness of the turn and the angle of bank during the instructor's demonstration, sat on the starboard inflatable tube in the vicinity of the steering console.

The trainee's first attempt at the tight turn did not go as intended because the wheel was not turned sufficiently hard. During his second attempt, the boat turned tightly to port and heeled over. As it encountered waves created by its own wake, the RIB's hull suddenly and unexpectedly 'dug in'. This caused the RIB to jolt and abruptly change direction, throwing the trainees on the starboard tube overboard. The mother was thrown clear and inflated her lifejacket, but her son was hit by the boat's propeller.

The instructor immediately took over the helm and manoeuvred the RIB to recover the trainees from the water. He quickly realised that the teenage boy was injured and headed back to the training base at best speed, calling the emergency services en route. The injured trainee was landed and taken to hospital by ambulance where he was found to have suffered a fracture, lacerations and bruising to his right arm (Figure 1).

Figure 1

The Lessons

1. Included among the major attractions of a RIB is the ability to turn very tightly at speed. Unfortunately, although exciting, manoeuvring in this manner carries the risk of the boat's bow 'digging in' without warning, causing a sudden jolt and change in direction. Occasionally, this is sufficiently violent to eject people out of a boat; coxswains and overseeing instructors should be mindful of such potential danger when conducting very tight turns at speed, particularly in a seaway or when crossing wakes.

2. The seating arrangements in RIBs vary considerably, and the use of the inflatable side tubes for this purpose is very common. At slow speed or in calm waters, this practice is generally safe and trouble-free. However, when manoeuvring at fast speed or navigating in disturbed waters, the risk of falling off the tubes, either into the boat or over its side, is increased dramatically. The possibility of back injuries to persons sitting on tubes is also considerably greater due to the twisted position of the spine and the shock of the boat hitting the water. Therefore, when operating under such conditions, it is far safer to limit the number of persons on board a RIB to the number of dedicated seating positions fitted, rather than by the maximum number allowed on its builder's plate.

Hold On Tight, If You Can

Narrative

A rigid inflatable boat (RIB) was being employed as a support boat for an event on the water. The 6.3 metre RIB was powered by a 115 horsepower outboard engine, giving a potential top speed in excess of 30 knots. The RIB was just over a year old but had only been used for a 4-month period prior to being bought by the current owner 2 months previously.

On the day of the accident, the boat was being used to transport event personnel out to barges. At the time of the accident, there were three people on board: the helmsman was positioned at the controls, standing astride the starboard seat pod; a passenger was seated in the port seat; and a second passenger was standing behind the two seats, holding on to the seat backs. There was a settee ahead of the instrument console, but this was unoccupied.

Having dropped off his two passengers at a barge, the RIB loitered nearby. To collect them, the helmsman manoeuvred his vessel across the 3-4 knot ebb tide back alongside. With the throttle set ahead to counter the tidal stream, he removed the kill-cord from his left wrist and stepped across to the port side of the RIB to hold on to the barge while his two passengers boarded. He then returned to his seat, replaced the kill-cord and manoeuvred clear of the barge. Having asked his two passengers if they were holding on, he commenced a turn to starboard to head down stream. As the RIB turned, there was a loud crack and all three occupants were thrown into the water, along with the two seat pods.

With no one at the helm, the boat careered on out of control because the kill-cord had fallen off the helmsman's wrist, and not operated. The RIB then collided with another vessel during which the console top was broken free

Vessel's deck showing outline of consoles – note lack of deck preparation and adhesive

of its fixings and the throttle hit the deck, pushing it to full ahead. Fortunately, the crew of a nearby support boat brought the runaway RIB under control very quickly, preventing serious injuries to those in the water. The auto-inflating lifejackets worn by the three men operated successfully, and within a few minutes they were rescued by other support craft, having suffered only minor injures.

The seat pods and boat were examined after the accident. The glass reinforced plastic (GRP) seat pods had each been attached using 6 × 25mm stainless steel self-tapping screws with penny washers and a bead of a sealant-like substance. The deck was constructed from 18mm plywood, with a 2-3mm GRP skin which was impregnated with small plastic granules to create a non slip surface. Analysis of the sealant was unable to positively identify it as any particular product, but it was established that it was polyurethane-based. Polyurethane adhesive sealants normally provide good adhesion, but in this case poor surface preparation had resulted in ineffective adhesion to the deck, leaving the self-tapping screws as the only means of securing the seats. Over time, water had seeped into the six screw holes and softened the plywood, resulting in the screws pulling out as the RIB turned to starboard, and the weight of the occupants was forced laterally against the seats.

Vessel's seat
note: wide spacing of securing screws and poor coverage of sealant

The Lessons

1. The RIB's three occupants were very fortunate not to have been more seriously injured during this accident. The potential consequences of RIB seat pods or consoles coming adrift, especially at speed, can be very serious indeed. Owners and operators should regularly check that their RIB seats and consoles remain secure, particularly if adhesive sealant and screws are the method of attachment. Do not take your seat fixings for granted.

2. The kill-cord must be attached properly if it is to be effective. Either secure it around your leg, or clip it to a hard point on your lifejacket. As demonstrated in this accident, simply looping it around your wrist can result in it pulling free. It was only the skill of another boat's crew that prevented this runaway boat from causing serious harm.

3. Do not force yourself into unsafe practices by being undermanned and for the sake of expediency. The helmsman was leaving his throttle ahead to counter the tide and then removing the kill-cord from his wrist in order to hold on to the barge. A proper assessment of the task would have identified the need, in these conditions, to carry an additional crewman to secure the RIB, leaving the helmsman free to remain at the helm and in control.

4. Where possible, ensure that all passengers on board are seated before increasing speed. Ideally, there should be sufficient seating without employing the RIB side tubes. Having passengers standing up can all too easily lead to injury.

Can't See Him? Then Alter Course

Narrative

A privately owned motor yacht was heading north east in thick fog at night. Heading south west along the same stretch of coast was a small tug towing a dumb barge. On board the yacht were the owner and a friend, and they were sharing the watches "hour about" through the night. The radar was operating, navigation lights were on, and they were occasionally sounding the appropriate fog signal. On board the tug, the skipper was on watch alone. Both the tug and the barge were showing appropriate navigation lights, the radar was operating, and from time to time the fog signal for a vessel engaged in towing was being sounded.

At almost the same time, each watchkeeper noted the presence of the other vessel on radar right ahead. The tug skipper monitored the approach of the yacht, noted that they were on a collision course, and decided to take action once the yacht closed to 1-mile range. The owner of the yacht was on watch. He noted the target ahead, and monitored its movements. However, he became confused because the target appeared to occasionally divide into two separate targets, and he was uncertain whether they would pass to port or to starboard. He decided to maintain course and speed and to trust that he would be able to see whatever it was in time to take avoiding action as necessary.

When the radar target ahead closed to 1-mile range, the tug skipper started to alter course and then to slow down. Both actions were carried out in steps to avoid the tug being overrun by the barge. Continuing to observe the target on radar, he watched as it approached, merged with and moved away from the radar target of the barge.

Concerned that he had not been able to see the approaching craft, the owner on the yacht called his friend to the wheelhouse and asked him to go forward and act as lookout. Shortly after this they saw the lights of the tug to port. However, the radar was still showing a target ahead and, seconds later, the friend shouted a warning that he could see the barge. The owner put the wheel hard to starboard and the engine controls astern, but it was too late; the yacht collided with the barge. The impact threw the owner against the wheel, breaking two of his ribs.

The Lessons

1. The COLREGS require that risk of collision should be assessed, and that early action be taken to avoid collision. There is no doubt that the yacht owner was aware of the risk of collision; it is also clear that he took no action to avoid one until it was too late. Had he altered course when it first became clear that a risk of collision existed, a close-quarters situation could have been avoided.

2. The tug's action, although ultimately resulting in a substantial alteration of course to starboard, was not carried out "in ample time" as required by Rule 19 of the COLREGS. Early action, which is readily apparent to the other vessel, ensures that the vessels involved will pass safely, and avoids any confusion as to actions taken.

3. In restricted visibility, every vessel which detects by radar alone the presence of another vessel, and that a close-quarters situation is developing and/or a risk of collision exists, is required to take avoiding action. There is no stand-on vessel in restricted visibility.

4. Neither watchkeeper had undertaken any formal training in the use of radar. Such training might have highlighted the fact that, at a range of 5 miles and with the vessels approaching at a combined speed of 15 knots, there are only 20 minutes in which to notice the other radar target, monitor its movement and take action to avoid collision. Every minute's delay brings the target ¼ mile closer, and will require a larger alteration of course and/or speed to avoid collision.

"It Can Happen to the Best of Us"

Narrative

The crew of an inshore, rigid inflatable lifeboat were conducting a routine training exercise in coastal waters, close to their base. It was a fine summer's day and the sea was very calm.

The boat was fitted with three seats: for the coxswain, navigator and radio operator. It also had hand-holds intended for passengers seated on the inflatable sponsons around the edge of the boat. In addition to the usual three crew, a trainee crewman was on board. He had been out on the boat many times before and had completed the boat-handling elements of his training.

The crew had been working hard practising manoeuvres to rescue casualties from rocky outcrops, and were intending to move to an open sandy bay to practise anchoring techniques. The boat was stopped in the water and the crew had gathered round, discussing the exercise. Two crew members had sat on the port and starboard inflatable sponsons in the forward part of the boat, facing inwards to the control console. Another member of the crew took the wheel, and the coxswain sat on the starboard inflatable tube, next to the engine throttles, to take control if necessary. They expected to make the short transit to the sandy area and then gather in the forward part of the boat to discuss the next part of the exercise.

The crewman on the helm increased speed to between 20 and 25 knots and, to satisfy himself that the boat was manoeuvring as expected, began to make a series of fast turns to port and starboard. Despite holding on and appearing to be comfortable, the crew member seated on the port sponson near the centre console fell overboard during a turn to starboard. He was struck on the head at least three times by the propellers, piercing his protective helmet in two places. The boat was quickly turned round and the casualty was recovered back on board.

It was clear that the injuries were very serious, so the crew reported the accident to the coastguard, requesting an ambulance to meet the boat as it returned to the beach. The location was not described precisely, and this led to some confusion between the coastguard and ambulance controllers as to where the ambulance should be sent. When the ambulance arrived, it was unable to cross the beach to meet the boat, and there was some delay while the casualty was transferred using a coastguard vehicle.

The casualty suffered severe head injuries.

The Lessons

1. **Fast turns in rigid inflatable boats generate large forces which can throw personnel overboard, despite their best attempts to hold on. Before commencing such manoeuvres, coxswains should ensure that all occupants are aware of the impending manoeuvre and the need to be *securely seated* and "hold on tight".**

2. **The arrangement of the boat and angle of heel in the turn meant that once the crewman had fallen from the boat, it was almost inevitable that he would be struck by the propellers. *It is therefore imperative that all persons are secure within the boat, such that they cannot fall overboard.***

3. **Although the crewman's protective helmet was substantial, it could not protect his head against the rotating metal propeller blades; the boat had not been fitted with propeller guards as it was considered this would compromise its performance and ability to respond to an emergency. Recognising the need for performance in any rescue situation, serious consideration should be given to the use of propeller guards on any boat likely to be used for the recovery of persons from the water, in view of the extreme dangers created by open bladed propellers.**

4. **When reporting casualties, to minimise delay take care to report your position as accurately as possible and seek advice on the best place to rendezvous with the emergency services.**

Excess of Alcohol Contributes to Four Accidents

Narrative

Several accidents to persons on small craft have been reported recently to the MAIB in which the consumption of alcohol has been a contributory factor.

Case 1:
In one, a small boat collided with a police boat as it approached a slipway while travelling at night, at excessive speed and with no navigation lights. Although the police boat took evasive action, a collision occurred, which resulted in injuries to the two occupants of the boat as well as causing it considerable damage. The occupants of the small boat were not wearing lifejackets.

While helping the occupants of the first boat, the two policemen on board the police boat established that the driver had consumed an excessive amount of alcohol, which had affected his judgment and ability to navigate the boat in a safe manner.

Case 2:
In another tragic case, two lives were lost when sailors were returning, in a tender, to their yacht which was on a mooring in the middle of an east coast river. The men were friends, had spent the evening together in local hostelries and were last seen heading back to the tender in the late evening of an autumn day. The two men were experienced yachtsmen who were accustomed to using a tender in similar weather conditions to those prevailing at the time of the accident.

Their bodies were discovered the following morning, close together, on the edge of the river. The tender was recovered nearby and found to be intact and dry. The men had not been wearing lifejackets.

There is no doubt that alcohol affected their judgment and ability to make a safe passage back to their yacht that evening, and this tragic case demonstrates that alcohol and boating simply don't mix.

Recovered damaged RIB

Damage to steering wheel following impact of the skipper

Case 3:

Yachting regattas are a popular and intrinsic part of the summer season for the majority of recreational sailors. However, a number of accident reports received last year indicate that, for a minority of sailors, attending a regatta is synonymous with consuming an excessive amount of alcohol.

Two accidents occurred during the week of a popular south coast regatta, in which the consumption of alcohol was a contributory factor. In the first, several people were injured, +ly, when a RIB (see photographs), with six persons on board, struck a breakwater at night. The boat was proceeding outside the main channel, without navigation lights, and had ignored police advice not to head out to sea.

Witnesses report that several of those on board were drunk and no one was wearing lifejackets.

Case 4:

In the second, a speedboat sank after apparently colliding, at night, with a lit navigation buoy when returning home from the regatta. The seven occupants of the boat included three children, only one of whom was wearing a buoyancy aid; none of the adults was wearing a lifejacket. As the boat sank, one of the adults was able to use a mobile telephone to make a distress call to the coastguard, which organised a search.

Through extreme good fortune, everyone was rescued from the water and transferred, via a lifeboat, to a local hospital where they were treated for the effects of hypothermia. Witnesses remarked on the fact that the adults appeared intoxicated, smelling heavily of alcohol.

The Lessons

1. **Alcohol and boats don't mix. In all the above cases alcohol was a contributory factor to the accident.**

2. **The effects of alcohol on perception and judgment are well known, and mariners should be aware that their ability to perform routine and familiar tasks will be adversely affected if they consume excessive amounts of alcohol.**

3. **Always wear a lifejacket; in all of these cases only the police officers were doing so.**

The Importance of Electrical Isolations

Narrative

A small, wooden, angling charter boat was tied up alongside having completed its last angling trip 3 days earlier. The skipper had been on board during the morning to replace the worn main engine fan belt. Having completed the work the skipper successfully tested the engine. He then checked the boat over, including the bilge levels and mooring ropes before locking the wheelhouse and making his way home.

Significantly, the skipper did not open the main electrical supply switch that isolated the batteries from the rest of the boat. The reason was because the switch was seized and the square headed key, required to operate the switch, was damaged, and had been for some time, so power remained connected to the boat's electrical circuits.

About 30 minutes after leaving the boat the skipper received a call from the harbourmaster telling him the boat's wheelhouse was on fire. The skipper immediately returned to the boat and was astounded to find the main engine running but the wheelhouse still locked. The attending fire and emergency services were at this time cutting through the wheelhouse door lock. They made an entry to the small wheelhouse and found that the fire had self-extinguished through lack of oxygen.

There was smoke damage throughout the wheelhouse (Figure 1). A small plastic cased television had been completely destroyed, and the plastic engine monitoring panel containing the engine key start switch, which was situated directly above the television, was badly burnt.

On investigation, it appeared that the television was left in the stand-by condition because power had not been isolated to the boat's electrical circuits. It is likely that the television's capacitor broke down, igniting the television's plastic casing. The flames from the television then damaged the engine monitoring plastic panel, burning the cable insulation outside the panel (Figure 2). This, in turn, shorted out the engine start circuit, causing the engine to start. Fortunately the wheelhouse was reasonably airtight, and the fire was short-lived.

Figure 1

Figure 2

The Lessons

Battery isolating switches can be troublesome. Switches designed for use in caravans are often fitted to small boats, and these are invariably of the sealed type, making maintenance virtually impossible. These types of switches are not designed for use in the harsh marine environment. Verdigris often builds up on the contacts and the operating mechanisms, causing interruptions to power supplies and making them difficult, and sometimes impossible, to operate.

1. Be cautious about taking the cheap option when fitting electrical components. Select those designed for use in the marine environment and seek professional advice if in doubt.

2. When fitting battery isolating switches, consider the supplies needed to run an automatic electric bilge pump when the isolating switch is in the open position. Normally a separate fused supply is run directly from the battery to the bilge pump, avoiding the need for the isolating switch to be closed.

3. There have been a number of occasions when fires have been caused by electrical circuits remaining powered up on unattended boats. It is always good fire prevention practice to switch off electrical equipment when not in use, and to isolate batteries from electrical circuits when no one is on board.

4. Do not delay rectifying defective electrical components. Short circuits can easily occur, causing excess currents to be drawn, leading to overheating and a risk of fires developing.

Two Wrongs Don't Make a Right of Way

Narrative

It was twilight in the western approaches; the sea was rough and there was a force 5 wind.

A 24m, 250 tonnes displacement steel beam trawler powered by a 500HP engine was working her home grounds. Her beams were down, she was fishing – displaying both day signals and lights – and was making about 4 knots. The mate, who was on watch, saw a blip on the radar and realised that it was a small yacht that he could see about 0.5 mile away. He anticipated that the yacht would pass under his vessel's stern.

The 6.5m carbon fibre yacht displaced about 800kg. A high performance design, it was making over 10 knots upwind on port tack and under autopilot. The mast head tricolour navigation light was on, and a "rain-catcher" radar reflector was hoisted.

On board the yacht the racing skipper was trying to get some sleep. He was training for a major single-handed transatlantic race and, as a result, had been sleeping for variable periods of around 20 minutes per hour during the hours of darkness for the last 4 days. The yacht was fitted with a timing device specifically developed to allow single-handed sailors to

Figure 1: Beam trawler

take short naps. The skipper saw the fishing vessel, and having assessed the situation as safe he went below, set the timer and deliberately went to sleep.

The trawler's mate saw the yacht closing, but decided to act too late; hampered by his gear he was unable to avoid a collision. The trawler's derrick struck the yacht as it passed very close by, destroying the mast, boom and sails, and causing serious damage to the deck and hull mouldings. Fortunately, the trawler's derrick passed over the head of the sleeping yachtsman. The undamaged trawler stopped to provide assistance, and the lifeboat was called. The RNLI towed the yacht in to port; her race was over. Fortunately there were no injuries.

Figure 2: A similar Mini-Transat yacht

The Lessons

1. **The race for which the yacht was training has been described as "A *legendary ocean race…spectacular, adventurous, extreme and dangerous*". The dangers to be faced in training, more than equalled anything that might be encountered during a single-handed ocean crossing.**
2. **Sailing alone, under autopilot in this busy area, in challenging weather conditions and at night was at best foolhardy, and the decision to sleep when a trawler was known to be fishing close-by could perhaps be considered somewhat reckless. When embarking on any single-handed voyage, consider *all* the risks, including the risks to those you encounter and those who may have to rescue you.**

Preliminary examinations started in the period 01/11/08 – 28/02/09

A preliminary examination identifies the causes and circumstances of an accident to see if it meets the criteria required to warrant a full investigation, which will culminate in a publicly available report.

Date of Accident	Name of Vessel	Type of Vessel	Flag	Size	Type of Accident
06/11/08	*Faithful Friend II*	Fishing vessel	UK	54	Foundering
11/11/08	*Queen Elizabeth II*	Cruise ship	UK	70327	Grounding
24/11/08	*Cantara*	Fishing vessel	UK	212	Accident to person (1 fatality)
26/11/08	*Georgie Fisher*	Fishing vessel	UK	15.10	Capsize
27/11/08	*Haven Harrier*	Pilot boat	UK	24	Accident to person
13/12/08	*Ropax One*	Ro-ro vehicle/ passenger ferry	UK	33163	Contact
19/01/09	*Sinegorsk*	General cargo	Russia	7095	Hazardous Incident
06/02/09	*Saline*	General cargo	Netherlands	1990	Fire
11/02/09	*Jubilee Star*	Fishing vessel	UK	29.84	Capsize
18/02/09	*Mercurius*	Fishing vessel	UK	95	Man overboard (1 fatality)
22/02/09	*ANL Wangaratta* *Fu Xin Shan*	Container General cargo	UK China	39906 13823	Contact
25/02/09	*Vallermosa* *BW Orinoco* *Navion Fennia*	Chemical tanker Tanker Oil tanker	Italy Panama Bahamas	25063 43797 51136	Contact

Investigations started in the period 01/11/08 – 28/02/09

Date of Accident	Name of Vessel	Type of Vessel	Flag	Size	Type of Accident
02/11/08	*Abigail H*	Harbour dredger	UK	325	Foundering
03/11/08	*Eurovoyager*	Ro-ro freight/ vehicle ferry	Cyprus	12110	Accident to person
10/11/08	*Maersk Newport*	Container vessel	UK	25888	Heavy weather damage
15/11/08	*Maersk Newport*	Container vessel	UK	25888	Fire
24/11/08	*Princess Rose* *HMS Westminster*	Other passenger vessel Naval craft	UK UK	Unk 3500	Accident to person
28/01/09	*Ville de Mars*	Container vessel	UK	37235	Accident to person (1 fatality)
	Stena Voyager	HSC Vehicle/ passenger ferry	UK	19638	Cargo handling failure
12/02/09	*Maggie Ann*	Fishing vessel	UK	111	Accident to person (1 fatality)

APPENDIX B

Reports issued in 2008

Audacity/Leonis – collision at the entrance to the River Humber on 14 April 2007
Published 25 January

CFL Performer – grounding, Haisborough Sands, North Sea on 12 May 2008
Published 17 December

Costa Atlantica/Grand Neptune – close quarters situation in the Dover Strait on 15 May 2008
Published 19 November

Dublin Viking – parting of a mooring line alongside at Berth 52 in the Port of Dublin, Ireland, resulting in one fatality on 7 August 2007
Published 31 March

Figaro – inadvertent release of carbon dioxide and the disabling of the vessel off Wolf Rock on 6 December 2007
Published 14 August

Flying Phantom – loss of the tug while towing *Red Jasmine* on the River Clyde on 19 December 2007 resulting in 3 fatalities and 1 injury
Published 30 September

***Lady Candida* –** fire and subsequent sinking off Corsica on 28 July 2007
Published 18 February

Lady Hamilton/Blithe Spirit – collision between fishing vessels in Falmouth Bay, Cornwall on 3 October 2007
Published 15 April

Last Call – foundering of the motor cruiser at Whitby on 23 November 2007 with the loss of three lives
Published 30 June

***Logos II* –** two accidents during berthing and unberthing, St Helier, Jersey on 20 and 26 June 2007
Published 22 January

MSC Napoli – structural failure in the English Channel on 18 January 2007
Published 22 April

Pacific Star – heavy weather damage sustained by passenger cruise ship while on passage in the South Pacific Ocean on 10 July 2007
Published 29 February

Partner 1 – console detachment of the rigid inflatable boat, Studland Bay, Poole on 20 April 2008
Published 30 October

***Rigid Raider* (Army Cadet Force Rigid Raiding Landing Craft)** – capsize of craft in Loch Carnan, South Uist in the Western Isles of Scotland on 3 August 2007, resulting in one fatality
Published 18 March

Sava Lake – dual investigation of the deaths by asphyxiation of two crewmen while the vessel was approaching the Dover Strait on 18 January 2008
Published 23 September

Sea Mithril – grounding of the cargo vessel on the River Trent on 18 February 2008
Published 26 September 2008

Shark/Royalist – dual investigation report into fire on board *Shark* on 19 January 2008 and foundering of *Royalist* on 23 January 2008
Published 12 August

Sichem Melbourne – product carrier making heavy contact with mooring structures at Coryton Oil Refinery Terminal on 25 February 2008
Published 17 October

Ursine & Pride of Bruges – contact between two vessels, King George Dock, Hull on 13 November 2007
Published 30 May

Viking Islay – loss of three lives, 25 miles off the East Yorkshire coast on 23 September 2007
Published 9 July

Young Lady – vessel dragging anchor 5 miles east of Teesport and snagging the CATS pipeline, resulting in material damage to the pipe on 25 June 2007
Published 1 February

Annual Report 2007 Published July 2008

Safety Digest 1/2008 Published 1 April
Safety Digest 2/2008 Published 1 August
Safety Digest 3/2008 Published 1 December

Fishing Vessel Safety Study 1992-2006 – analysis of UK fishing vessel safety
Published 28 November

Leisure Safety Digest (2nd edition)
Published March

Reports issued in 2009

Antari – grounding Near Larne, Northern Ireland on 29 June 2008.
Published 19 February

Astral – grounding on Princessa Shoal, east of Isle of Wight on 10 March 2008.
Published 29 January

Moondance – electrical blackout and subsequent grounding of the ro-ro cargo ship in Warrenpoint Harbour, Northern Ireland on 29 June 2008.
Published 10 February

MV *Norma* – hazardous diving incident in the Dover Strait on 21 June 2008.
Published 21 January

Plas Menai *RIB 6* – capsize of the Plas Menai *RIB 6* while undertaking unauthorised RIB riding activity near Caernarfon, Wales on 1 July 2008, resulting in one injured student.
Published 18 February

Pride of Canterbury – grounding in "The Downs" – off Deal, Kent on 31 January 2008.
Published 14 January

Saga Rose – fatality on board the passenger cruise ship in Southampton, England on 11 June 2008.
Published 6 January