Marine Accident Investigation Branch (MAIB) - Safety Digest 1/2002

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Marine Accident Investigation Branch

The Marine Accident Investigation Branch (MAIB) is an independent part of the Department for Transport, Local Government and the Regions, and is completely separate from the Maritime and Coastguard Agency (MCA). The Chief Inspector of Marine Accidents is responsible to the Secretary of State for Transport, Local Government and the Regions. 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. It contains facts that 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.

The Safety Digest is only available from the Department for Transport, Local Government and the Regions, and can be obtained by applying to the MAIB. Other publications are available from The Stationery Office and the DTLR Publications Sale Centre, Unit 21, Goldthorpe Industrial Estate, Goldthorpe, Rotherham, S63 9BL (Tel: 01709 891318)

If you wish to report an accident or incident please call our 24 hour reporting line 023 8023 2527

The telephone number for general use is 023 8039 5500.

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Summaries (pre 1997), and Safety Digests are available on the Internet: www.maib.dft.gov.uk

Extract from The Merchant Shipping (Accident Reporting and Investigation) Regulations 1999

The fundamental purpose of investigating an accident under these Regulations is to determine its circumstances and the causes with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

Glossary of Terms and Abbreviations

AB	Able Seaman
ARPA	Automatic Radar Plotting Aid
DNV	Det Norske Veritas
DR	Dead Reckoning
EPIRB	Emergency Position Indicating Radio Beacon
ETA	Estimated Time of Arrival
FRC	Fast Rescue Craft
GT	Gross tons
IMDG	International Maritime Dangerous Goods Code
IMO	International Maritime Organisation
ISM	International Safety Management
kW	Kilowatt
MCA	Maritime and Coastguard Agency
MCB	Main Circuit Breaker
OOW	Officer of the Watch
"Pan Pan"	The international urgency signal (spoken)

RIB	Rigid Inflatable Boat
Ro-Ro	Roll-on, roll-off
RYA	Royal Yachting Association
TSS	Traffic Separation Scheme
UMS	Unmanned Machinery Space
UTC	Universal Co-ordinated Time
VHF	Very High Frequency
VTS	Vessel Traffic Services

Introduction

One of the first things a new marine accident investigator learns is that an accident is never the result of a single cause. It happens because a number of things have gone wrong, and the various measures put in place to prevent it failed for some reason. This knowledge prompts the investigator to look beyond the obvious explanations, and to investigate a wide range of factors which could well have been contributory, or underlying reasons, why the incident occurred.

Furnished with the same basic awareness, every one of us at sea, regardless of rank or status, should be in no doubt that everything we do plays a part in preventing accidents. By keeping our eyes open, and having all our senses tuned to identifying that little something which isn't right, we are part way to preventing an accident. The other part is doing something about it. We either take the appropriate action ourselves or draw it to the attention of someone else who has the ability to deal with it. Such actions interrupt the causal chain of an accident.

To many of us this ability to spot the 'something' that isn't right is almost a sixth sense. It comes from sound training and from experience acquired over the years. Very often it is acquired from having got it wrong in the past. We all make mistakes; the important thing is to learn from them.

The opposite, sadly, is also true. We can all too easily find ourselves in the causal chain of an accident because we have either failed to spot a problem, or turned a blind eye to something that wasn't right, or were insufficiently competent to handle a situation. Every one of us is guilty of cutting corners. Most times we get away with it but, sooner or later, we will get caught out. Few of us can resist that siren voice that tells us we can turn a blind eye to something because 'it has always been done that way,' or because someone else is bound to deal with it later. The embarrassment is that something overlooked or ignored today could well come back to haunt you. An accident chain can be very long and the links can appear very minor indeed. Even things as small as failing to eat a proper diet, or being late on watch, or saying you know how to do something when you haven't a clue, can be the cause of something going badly wrong.

The wrong diet can lead to degraded performance. Being late on watch can lead to a very grumpy off-going watchman and a botched handover, and we all know how difficult it is to admit to not knowing how to do something when the person giving the order is being particularly anchor faced.

Being safe at sea means being aware of everything around you. If you detect something isn't right, do something about it. If you don't, the omission could well be that crucial link in the causal chain leading to an accident.

The MAIB's investigations unearth the causes and contributory factors of accidents in detail. They are well worth reading, are free of charge and are now also available on the Internet at www.maib.dtlr.gov.uk.

J. S. Lang
Chief Inspector of Marine Accidents

Part 1 Merchant Vessels

Keeping an anchor watch is among the most straightforward of all tasks falling to the mariner. Get it right and you might, just might, receive a grunt of approval from the old man. Get it wrong and you land up impaled on the rocks or find yourself high and dry on some beach, the ship's name is likely to be spread-eagled across the front pages of the papers. In such situations the owners tend, with a degree of justification, to be a trifle upset. If the grounding leads to pollution, you will have quite a bit of explaining to do to people who will be disinclined to put you on their Christmas card list.

'Getting it wrong' is not recommended, but a month rarely passes without some ship somewhere in the world suffering the ignominy of dragging her anchor and landing up on a lee shore.

The ability to anchor safely is one of the most ancient skills known to the seafarer. In his 'Mirror of the Sea', Joseph Conrad reflected that *'An anchor is forged and fashioned for faithfulness; give it a ground that it can bite and it will hold till the cable parts.'* True enough, but several steps are necessary before this state can be reached.

In selecting a good anchorage and the length of cable to put out, the mariner will assess the degree of shelter afforded, the depth of water, the nature of the holding ground, the length of stay, the strength of the tide or current, the proximity of potential hazards and the predicted weather. In many instances, but not always, the exercise is straightforward.

In deciding how much cable to put out, many of us adopt ready rules of thumb such as four or five times the depth of water. Others will turn to the relevant page of their salt stained seamanship manuals to be reminded that for mild steel cable the number of shackles to put out is one and a half times the square root of the depth of the water in metres. Knowledge of the handling characteristics of the vessel concerned, and the amount of cable available, will influence the decision.

Having anchored and safely brought up, the aim is to stay there until you are ready to weigh. The problem is that certain things, particularly the onset of bad weather, can make life uncomfortable. The start point is to know exactly where the anchor itself is so you can calculate the swinging circle. Providing you remain within it you are likely to be safe but, as soon as you start to move outside that circle, you must act.

Dragging can be a curious sensation. Many who have had the experience will recall the incredulity with which they watched other vessels in the same anchorage all seem to get underway in unison. Those same watchkeepers have invariably taken a moment or two to realise that they were the ones who were moving. Whether at anchor alone or in company, the watchkeeper must always be alert to the possibility of dragging. Once it starts, a ship can move with astonishing speed, and many mariners have been severely shaken by it. Two knots is not unknown.

Preventing a grounding is better than trying to sort the mess out afterwards. If the sheltered anchorage becomes an exposed one, with a rising sea state and an onshore wind, you should consider your options. Should you let out more cable, let go the second anchor, start the engines or even weigh and go somewhere else including the open sea?

Knowing whether you are dragging is crucial. Regular fixing by whatever means are available, and the use of clearing bearings or shore transits, will give an indication. Don't ignore the value of having someone on the fo'c'sle feeling the cable. And once you even suspect you are no longer securely at anchor, don't delay by double-checking everything. Do something about it.

If the lee shore beckons, the one thing you haven't got is the luxury of time.

CASE 1
Fly Spray Bomb!

Narrative

The 1005gt *Colonel Templer* was on passage in Scottish waters. The evening meal had just been finished and the cook was clearing up in the galley. On starting the food macerator, an explosion blew open the under sink cupboard doors and started a fire. The fire was limited to a box containing Brillo pads, and was quickly extinguished. Luckily the cook escaped without injury although, understandably, he was suffering from shock.

Later investigation revealed an aerosol can of flying insect killer lying in the under sink cupboard among some cleaning products. It had obviously been there for some time, since the container had corroded to create a small pinhole, through which the contents had escaped.

The propellant used in most aerosols is gas butane. It is also used for cigarette lighters and camping stoves. Any flammable gas is an explosion risk, but when mixed with air in a confined space it is, effectively, a bomb. The small electrical sparks created when the macerator was started were sufficient to ignite the explosive gas mixture.

The Lessons

1. A safe and healthy ship can only be maintained through good housekeeping, and this is the responsibility of everyone on board. Only keep a minimum of cleaning products in use at any one time. Ensure, through reference to product data sheets and manufactures' instructions, that items can be stored together in the space intended. Under sink cupboards are likely to be wet, and this will lead to corrosion of metal containers.

2. Aerosols present a number of serious risks, and as a result must be treated with thought and respect. Flammable gases are now used as the propellant in most aerosols. This makes every aerosol a potential explosion risk, even when empty. They must be stored in cool, dry, well ventilated areas away from possible heat sources. Any damaged or corroded aerosols must be disposed of safely and in accordance with the manufacturer's instructions. Consideration must also be given to the dangers presented by aerosols in the event of a fire on board.

3. A regular inspection by ship's staff of all spaces, including storage areas and cupboards, will highlight lapses in housekeeping, and allow them to be put right.

CASE 2
Screwing Up!

Narrative

Pride of Bilbao, a 37,583gt ro-ro passenger vessel, was moored alongside in Southampton Docks while undergoing a minor refit. Part of this work involved the fitting of new wire falls to No 15 lifeboat davits. Once the work had been completed, arrangements were made to test the davit system with the lifeboat being lowered under 110% load conditions with an MCA surveyor in attendance.

With the lifeboat correctly loaded, the second officer released the brake and started lowering the boat. When the davit arms had reached their lowest point on the trackway, the brake was re-applied. Almost immediately, the bottle screw securing the new wire on the aft davit parted, allowing the wire and the threaded part of the screw to run free. The wire ran through the sheaves until it jammed, causing a severe shock load to the davit arm. This loading caused the davit arm to pull free of its trackway and drop on to the boat. With the full weight of the lifeboat now transferred to the forward davit it, too, failed and the lifeboat fell into the water.

The subsequent examination of both parts of the bottle screw found that the threaded sections were largely undamaged. Only one or two threads at the ends were affected. The cause of the bottle screw failure was either that it had not been refitted correctly after the new wire had been installed, or that while reeving the new wire, the bottle screw had rotated in its housing.

To prevent a recurrence, existing bottle screws have been "locked" with seizing wire until new bottle screws, fitted with locknuts and anti-twist turnbuckles, are received.

The Lessons

1. On completion of ANY work involving lifting equipment and wires, ALWAYS check and re-check all securing points.

2. Always ensure that any thread-locking devices WORK, and that they are USED.

3. If the work involves any SAFETY OR LIFESAVING EQUIPMENT always check not only the item itself, but also the system. Your life may depend on it.

CASE 3
Collision with Vessel Alongside

Narrative

Xuchanghai was inbound for the Immingham bulk terminal, laden with 27,672 tonnes of Ilmenite and a pilot embarked. *Aberdeen*, a North Sea shuttle tanker, was alongside the Immingham oil terminal and was preparing to sail, having discharged her cargo.

Xuchanghai had a tug connected forward as she lined up to turn off Immingham dock. A second tug was securing a line aft. The pilot reduced *Xuchanghai's* speed as she approached the eastern end of the oil terminal, to make the swing off the dock easier, and was making 3 knots through the water. She had a brisk wind on her port quarter and a 4-knot flood under her. Xuchanghai lost steerage and began to point at *Aberdeen* lying alongside. The pilot took corrective action using helm, engine and the bow tug, but the actions failed to prevent *Xuchanghai* colliding with *Aberdeen*. The aft tug managed to secure her tow line only moments before the collision.

Aberdeen sustained a 20m gash in her No 2 ballast tank, a wing tank on her starboard side. Xuchanghai suffered indentations and buckling to the bulwark on her bow. There was no pollution.

The Lessons

1. The ability to steer depends on numerous factors, but speed is critical. The slower a ship is moving, the less effective is the rudder and the harder it is to maintain control. This is particularly true in strong winds and tidal streams when speed and power are often the only effective means of countering the effects of these forces. Always consider the effects of the elements, and judge speed accordingly.

2. When a tricky manoeuvre or berthing is expected, it is very easy to concentrate on what lies ahead and perhaps take our eye off the ball regarding what is going on around us. In pilotage waters, events happen quickly and, unless they are spotted immediately, the situation can soon spiral out of control. It's human nature to think about what lies ahead, but you might not get there unless you concentrate on the job in hand.

3. To be of use, tugs usually need to be connected. Unfortunately, delays in securing can be caused by a number of reasons such as communications or equipment problems. If this occurs, and the tug cannot be connected by the time she is required, she may as well not be there. Secure tugs in good time if you want to be sure of using them.

4. Had the tanker been laden and not fitted with wing tanks, the potential consequences of this accident could have been disastrous. The wing tanks served their purpose.

Footnote

This incident was the subject of a full MAIB investigation. A comprehensive report, giving details of the causes, an analysis, and recommendations was published in August 2001.

CASE 4
Which Way Was It Wound?

Narrative

At 0600 on Sunday 17 September 2000, *European Leader*, a P&O passenger ro-ro ferry on her regular run from Dublin to Liverpool, had just entered the Mersey Channel. Present in the engine control room were the chief engineer, two third engineers and the electrical officer. At about 0602 the non-essential breaker on the main switchboard tripped. At that time there was an electrical load of 220kW on the two diesel alternators, with in excess of 1000 amps showing on the starboard alternator, a fluctuating voltage on the port alternator, and massive surges on the switchboard caused by the main circuit breakers (MCBs) "chattering".

When main electrical power was lost owing to the MCBs "chattering," the emergency alternator had started automatically, and had attempted to close its own breaker to supply the emergency switchboard. With the main breakers continuing to "chatter", the emergency breaker was unable to engage. As control could not be regained over the MCBs, the port alternator was stopped. The starboard alternator MCB then tripped off the main switchboard under the influence of the over-current trip, and all electrical power was lost. The vessel drifted on to a gravel bank.

At 0604, the process of powering up the vessel from a "dead ship" began. The emergency alternator circuit breaker was manually engaged, followed by the starboard main alternator MCB. Main power was restored by 0610.

With the vessel aground, it was decided to wait for the rising tide before attempting to refloat her. Contingency checks were carried out to ensure the integrity of both hull and machinery, and included an examination of main engine deflections and shaft alignment. Tanks and spaces were also monitored. By 1013, both main engines were running, and 2 minutes later the vessel was refloated.

Once alongside, an underwater inspection confirmed the hull damage was limited to paint coatings forward where she had grounded. The port alternator was removed from service for detailed investigation. To allow the vessel to continue in service, a freestanding alternator set was placed on board. It was connected to the main switchboard and fully tested by DNV.

This incident was the latest in a series of electrical problems the vessel had encountered since the port alternator had been stripped down for overhaul the previous August, during dry dock. Various faults had been found and repaired with apparent success. It had then been put back into service. A log of events revealed:

31 August: Vessel carried out local sea trials; port alternator voltage and current fluctuated wildly. Chaffed cable replaced.

1 September: Voltage fluctuating on port machine. Fault traced to thyristor control unit.

4 September: Voltage began oscillating. Poor connection found on droop transformer.

5 September: Fluctuating voltage occurred again. Thyristor control changed again.

13 September: Fluctuating voltage again. No fault found.

15 September: AVR checked, cleaned adjusted. Droop adjuster cleaned and tested. Thyristor changed. Machine tested off load for two hours, paralleled and test run satisfactorily.

17 September: The machine had been running for about one hour on load when the blackout incident occurred. Vessel grounds.

Following this incident, the port alternator was thoroughly examined. The transformers, diode ring etc were checked, and the varistors between the two rotating rings replaced. The alternator was unbolted and the windings tested and inspected. All control wiring renewed, six new diodes installed in the AVR and a brand new thyristor control box fitted. Alignment also checked.

6 October: Re-built alternator test run, satisfactory at low loads, voltage fluctuation started again at higher loads.

31 October: Original equipment suppliers AEG attend from Germany, for test run alongside using load banks ashore.

1 November: AEG engineer diagnosed cause of problem was that the alternator had been incorrectly wired. It had been wired for CLOCKWISE running and not the ANTI-CLOCKWISE direction in which it rotated. This resulted in the voltage and current transformers being incorrectly wired up in turn.

After wiring altered, alternator loaded up to 500kW successfully.

6 November: Port alternator load tested satisfactorily for DNV. The temporary generator set was disconnected and removed. Ship's power provided satisfactorily by port and starboard generators, singly and in parallel without further problems.

The Lessons

The sequence of events outlined above graphically illustrates the difficulties faced by engineers when confronted with a seemingly random and irrational fault within an electrical system. Even with the combined resources of owner's technical staff ashore, local companies specialising in electrical repairs, and readily available spare parts, the problem could not be identified. It was only when the original manufacturer was consulted, and presented with the evidence of previous attempts at overcoming the difficulty, that the cause of the problem became apparent.

Old seafarers familiar with DC systems will no doubt remember their experimental learning curves, with motors running the opposite way to that intended!

The lessons which can be learned from this incident are:

1. If you send anything ashore for repair, MARK it in such a way that it cannot be assembled wrongly, and ensure its direction of rotation is CLEARLY shown.

2. If you REPLACE an electrical part on the basis that "this might be the problem" always ensure that part is checked to see if it did have a defect. If not, then the chances are the problem was not in that area.

3. The value of a meticulous record of symptoms and measures taken is an invaluable tool when it comes to diagnosing an elusive problem.

CASE 5
Master Overcome by Fumes in Cargo Hold

Narrative

A small coaster was at anchor off the south coast of England sheltering from severe weather conditions. Loaded with a cargo of coal, her hold was fitted with a moveable bulkhead, the position of which was dependent on the quantity being carried. For this consignment it was set about 3 metres forward of the engine bulkhead. The access hatch, fitted with a vertical ladder, opened into the space between the engine room bulkhead and the moveable bulkhead. The only ventilation into this space was that provided naturally through the access hatch.

The master was on the bridge on the morning after anchoring, but it wasn't until that evening that anyone realised he hadn't been seen all day. The chief officer noticed the cargo hold access hatch was open and, on looking into the hold, saw the master lying at the bottom.

The local authorities were called and the master was removed. He was found to be dead, with the cause of death later determined to be asphyxiation. The oxygen level in the hold was less than 3.5% and carbon monoxide, together with higher than normal levels of carbon dioxide, were also present.

The Lessons

1. Anyone who has been at sea for some time in merchant ships will be all too familiar with stories of people who have entered enclosed spaces without taking the necessary precautions, and died as the result. The lessons from such incidents have been hammered home time and time again and still it happens. Although it is impossible to know exactly what victims are thinking before they make an entry, it is feasible to assume they think the space is sufficiently safe to warrant entry. After all, it looks all right, so what could possibly go wrong?

2. Some spaces are evidently dangerous, and there are very sound rules in place to prevent accidents. Consult the IMDG code to know the properties and characteristics of dangerous bulk cargoes before entering a space where such cargo is being, or has been carried. Follow the excellent advice in Chapter 17 of the Code of Safe Working Practices for Merchant Seamen, which documents the procedures for entering enclosed spaces. The main points are: the space must *always* be tested before and during each entry, personnel should be standing by with safety equipment at the entrance, and the space should be well ventilated.

3. Other spaces are not necessarily quite so obvious. They include void spaces not normally entered, compartments that might have been flooded, or areas separated from dangerous cargo by a portable bulkhead. If in doubt, assume the space is potentially dangerous and take the necessary precautions. Remember 3.5% of oxygen looks exactly the same as the 18% which is the minimum required for human beings to breathe safely. Anything below that can lead to loss of life.

4. Never ever carry out an entry alone. A well-formulated plan should always be followed. A short-cut could prove fatal.

5. And one final point. If you see someone lying motionless at the bottom of a ladder in an enclosed space, don't rush in to carry out a rescue without taking all the appropriate precautions. Failure to do so will only result in more fatalities.

CASE 6
Passenger Falls Down Open Hatch on Fast Ferry

Narrative

The fast ferry *Red Jet 3* had just completed a short period of maintenance before re-entering service, and was taken from the maintenance berth by the engineering crew to Town Quay, Southampton. Once alongside, her crew boarded and, being slightly behind the planned schedule, started to embark passengers almost immediately for the short journey across the Solent to Cowes, Isle of Wight.

A passenger boarded the vessel and walked down the port aft aisle towards his intended seat when he fell down an open manhole into a void space. The passenger was treated at the scene by crew members, and taken to hospital by ambulance. He was later discharged with relatively minor injuries.

Subsequent investigations determined that other hatches, on the outside deck, which were opened during the maintenance period, had also been left open.

The Lessons

1. In the litigious society we live in today, an incident like this can have far reaching consequences and can seriously damage a passenger-carrying company's reputation. Before any vessel is put back into service after maintenance or lay-up, it must be checked to ensure no hazards exist to injure or maim embarking passengers. Should it be necessary to leave a manhole open, it should be guarded at all times.

2. No matter what the pressures are to maintain an operating schedule, the normal procedures should always be followed.

3. Time periods for maintenance and pre-sailing checks should always be sufficient to ensure safety is never compromised.

4. Passengers may not be aware of "obvious" dangers which ship's staff are more likely to notice. It should always be ensured that any vessel is fit to board passengers *before* allowing them on board.

CASE 7
Collision Between a Tank Barge and a Vessel Alongside

Narrative

While on passage down the River Thames from Fulham to Gravesend, the 357gt tank barge, *Bruce Stone,* collided with the 10391gt ro-ro cargo vessel *Loverval* which was secured alongside at Purfleet deepwater berth. It was 4 days before Christmas.

After discharging a cargo of gas oil, *Bruce Stone* began her passage downriver late in the evening. A regular crew of three was aboard. The mate was on watch in the wheelhouse, and both the skipper and engineer were turned in. It was not unusual for the crew to work long shifts, and a working week of between 60 and 70 hours was not uncommon. On that day, the mate had started work in the early hours of the morning.

While awaiting completion of the cargo discharge, both the mate and the skipper had been ashore to a local pub for a couple of pints. They had also consumed a bottle of wine with their Christmas lunch earlier in the day.

During the passage downriver, the mate was sitting in the wheelhouse with the doors closed and the heater on. He recalled clearing Crayfordness Point, and visually passing the Tosca barge. His next recollection was seeing another vessel dead ahead. He also heard VTS calling. He put the engines hard astern immediately, but his actions were too late to prevent Bruce Stone from colliding with Loverval. He had fallen asleep while on watch.

There were no injuries or pollution. *Loverval* was holed above the waterline, *Bruce Stone* sustained only superficial bow damage. However, the potential for a more serious accident was there; especially if *Bruce Stone* had been carrying a cargo of fuel.

The Lessons

This accident is one more in a sorry catalogue of marine accidents where fatigue, from a number of causes, has played a major part in what happened. Fatigue continues to be one of the major concerns of the MAIB. Although responsibility for combating it lies largely in the hands of management, there are still lessons for those embarked.

Unlike seagoing vessels, domestic vessels are not subject to regulations governing prescriptive work and rest periods, except in relation to masters of passenger vessels.

1. The immediate cause of this accident was the watchkeeper failing to stay awake. He had worked long hours, had consumed alcohol during the day, was alone on the bridge, was sitting down and was warm. All of these factors contributed to him falling asleep.

2. A feature of being tired, weary, or to revert to the vernacular, just plain knackered, is that you normally know what is happening. Your eyes begin to close and your head suddenly drops to force you into startled alertness. A few moments later the same thing happens all over again. There are few people who admit to an inability to cope at this stage and, human nature being as it is, means you endeavour to keep going. You get away with it 99 times out of a 100, but the 100th time will catch you out.

3. If you are on watch in an enclosed bridge and you note the symptoms of approaching sleep, get out of the chair and let in some fresh air. Start walking about. Keep the mind active. If the symptoms persist, call the master.

4. Establishing the right manning level is a matter for the owner. No two ships are the same, and each must be judged according to the needs of the trade in which she is engaged. There is a tendency to man to the lowest possible authorised levels, but if this means that crews, and especially deck officers, are working long shifts, and are doing so without adequate rest, it may not be too difficult to identify the root cause of the subsequent accident. Had Bruce Stone had a dedicated lookout or been fitted with an operational watch alarm, this accident might well have been avoided.

Footnote

Following this accident, the mate was breathalysed. The test was negative.

This incident was the subject of a full MAIB investigation. A comprehensive report, giving details of the causes, an analysis, and recommendations was published in August 2001.

CASE 8
Something to Gripe About

Narrative

The large, recently built container vessel, P&O *Nedlloyd Hudson,* is equipped with lifeboats designed to be lowered under the control of a person in them, using a remote winch brake release wire. The lifeboat's gripes are designed to release automatically during the initial movements of the davit's arms.

While in Malta during December 2000, the port lifeboat was being lowered. After the gripes released, the steel ring on the freed end of the aft gripe became fouled in an inverted 'Vee', generated between an upright and a stiffener of a guardrail stanchion.

The trapped gripe held the aft end of the lifeboat, while the forward end continued to lower for about 2m; tilting it outboard to approximately 90°. The lowering operation was then halted from within the lifeboat.

Everyone in the lifeboat was secured in their seats and, although shaken, suffered no injuries.

The Lessons

Following this incident, the stanchion has been removed and alternative arrangements have been made for securing the guardrails.

This incident demonstrates that when automatic gripes release, their free ends cannot be controlled, and are likely to swing and become fouled in the most unlikely places. Since at the time of the incident P&O Nedlloyd Hudson was a new vessel, the likely fouling places had not been identified and removed.

Although these lifeboats are intended to be lowered under the control of those embarked, it makes sense for someone else to be on deck for routine operations, to spot unforeseen hazards. This person should have some form of communication with those in the lifeboat.

CASE 9
Twenty Litres of Trouble!

Narrative

The 2386gt bitumen carrier *Petro Avon* arrived in Port Jerome, northern France, to de-ballast and load a cargo at 1712 on Tuesday 3 April. Her cargo tanks were numbered 1 centre, 2 to 5 port and starboard and 6 centre. Surrounding them were the wing ballast tanks numbered 1 to 4 port and starboard. Having de-ballasted at 0045 on 4 April, she started loading bitumen at approximately 180 tonnes per hour and 160°C. It is normal practice to load with the cargo tank lids open so the ullages can be noted.

The first nine tanks were loaded without incident. The last one to be filled was number 6 centre, and this was started at 2345 on the night of 5 April, with the heating coils in this tank being put into operation at around midnight. At roughly 0105, the OOW noticed from the ullages that the tank was filling far quicker than it had been. Realising the danger, he immediately told the AB on watch to leave the area with him. Once clear, he intended to instruct the shore operators to stop pumping, but as they walked forward hot bitumen, followed by a discharge of steam, erupted from the open tank to a height of about 9 metres. It just missed them. Seeing the eruption, the shore operators stopped pumping immediately. The master, woken by the noise, sounded the emergency alarm.

Approximately 3.5 tonnes of bitumen were spilt. Most of this stayed on the deck, with fewer than 150 litres believed to have entered the water.

Later investigation showed that the eruption was due to boil-over, caused by vaporisation of water in the unpumpable residue at the bottom of the tank. A crack had developed between number 6 centre cargo tank and the adjacent ballast tank (number 4 starboard) below the level of the dregs. Water had entered the cargo tank when the ship was in ballast.

In the previous two loads, number 6 centre cargo tank's heating coils had been in use for many hours before it had been filled. On these occasions, steam had been seen coming out of the tank, but sufficient time had passed to allow residual water to be boiled off before loading started. However, when the heating coils were put into operation this time, the cargo was already being loaded. By the time the residue had reached boiling point and the water vaporised, approximately 225 tonnes had been loaded and the ullage was down to less than 5 metres.

At atmospheric pressure, water expands approximately 1760 times when boiling. This expansion caused the rapid rise of the cargo level in the tank leading to the boil-over. It has been estimated that as few as 20 litres of water were required to cause this incident.

When number 4 starboard ballast tank was inspected, cargo leakage into it was visible. The ballast tanks had not been inspected since the ship's last dry dock 15 months earlier.

The Lessons

The incident shows how dangerous and powerful even small amounts of water can be when heated. Were it not for the OOW's good monitoring and quick thinking, two men might have been seriously injured, or worse, by a bucketful of water in the wrong place.

1. The leakage of water into the cargo tank was insufficient to be noticed on any tank sounding. However, steam had been seen coming from No. 6C tank on two previous

occasions. Had this been investigated, the incident could have been avoided. Do not ignore unusual events - investigate them.

2. Ensuring that the heating coils are put into use at least one hour before loading is started will allow any water present to be boiled off. Any steam seen coming from the tanks must be investigated immediately. Where there is steam there is water!

3. Ballast tanks that go from full and cold, to hot and empty, on a regular basis are more likely than usual to suffer from corrosion. A regular routine of tank inspections is the only way to ensure that damage is seen and rectified before it becomes dangerous.

CASE 10
Fatal Accident to Third Officer While Closing Hatches

Narrative

The 17,308gt Cypriot-registered bulk carrier *Evangelos* CH was at anchor in the River Thames awaiting the allocation of a berth.

The deck crew, which included the third officer, was in the process of closing the MacGregor single-pull hatch covers after cleaning out the holds ready for a cargo of grain to be loaded in Tilbury. To close them completely, the wire lead from the winch was unshackled manually, and changed from one position to another while the hatch covers were partially open. The welded eye from which the wire was unshackled was positioned on the leading edge of the hatch cover. Its position had been changed some time in the past, leaving the butt of the original eye still in place.

The vessel was ISM accredited, but there was no written procedure for the operation of the hatches.

No's 1 and 2 hatch covers were closed without incident. When No 3 hatch covers were heaved to a position approximately 1.5m from being fully closed, the winchman slackened back on the wire in preparation for unshackling. The third officer then climbed on to the hatch covers, with the intention of changing the wire lead. He was not wearing a safety harness or helmet.

Shortly after, the winchman and another AB on deck heard a loud thud. The third officer had fallen about 12m into the hold. His fall was fatal. There were no eyewitnesses. Because of the height of the hatch coamings, and the restricted view from the winch, neither AB saw what happened.

It is believed that the third officer lost his footing as he approached the edge of the hatch cover to unshackle the wire. This loss of footing was attributed to one, or a combination of, the following factors:

- an oily substance which covered the side of the deck the third officer was working from;
- rainfall that made the hatch covers wet; or
- a tripping hazard caused by the butt of the old welded eye set back from the edge of the leading hatch cover.

The Lessons

1. The hatch covers were designed so that it was unnecessary for anybody to climb on, or off them when they were being opened or closed. In addition, the original welded eye set back from the edge of the leading hatch cover was properly placed for the opening and closing operation. It is unknown when its position was changed, but it meant that a crew member had to climb on to the hatch covers to unshackle the wire. In so doing, he would have to position himself next to the leading edge of a partly open hatch cover, and therefore be exposed to a high risk of falling. Had this been adequately assessed, and a written procedure adopted for the operation of the hatch covers in accordance with the ISM Code, and then implemented, this accident could have been prevented.

2. There might be a number of practices on board any ship which concern members of the crew, but are allowed to continue on the basis that: "it has always been done that way." Because nothing has ever gone wrong the practice is condoned, and becomes the accepted

way of doing things. When the inevitable accident happens somebody always pipes up and says, "it was an accident waiting to happen", but had done little or nothing about it themselves. One of the marks of the true seaman is the ability to spot the hazard, and do something about it before the accident happens.

3. Closing single-pull MacGregor hatch covers involves a certain technique, and it is good practice to ensure that all deck crew members are versed in it. Apart from anything else, it eliminates the need for anybody to climb on top of the hatch covers during the closing operation.

4. If, for any reason, it becomes necessary to climb on top of partly open hatch covers for maintenance purposes, wear a safety harness and a helmet. Hatch covers coated with anti-skid paint and oil-free decks also make good sense.

Footnote

This incident was the subject of a full MAIB investigation. A comprehensive report, giving details of the causes, an analysis, and recommendations was published in August 2001.

CASE 11
Grounding of General Cargo Ship with Pilot on Board

Narrative

The 151 metre long Panamanian general cargo ship, *New Reach,* sailed from Cairns in Queensland, Australia at 0645 on 16 May 1999 bound for Penang. She was carrying a full cargo of sugar. A licensed pilot was embarked to take charge of navigation through the 480-mile long inner route of the Great Barrier Reef to Torres Island. IMO had declared the Great Barrier Reef "a particularly sensitive area".

The pilot briefed the master on the northbound passage, erased the courses laid off on the chart by the second mate, and substituted his own. These were based on a suitable route for the ship's maximum draught of 8.39 metres, and were shown to the master.

While on passage, the watch keeping officers maintained their normal watches, and plotted the ship's position from time to time. A rating was on the bridge at all times. The normal procedure was to steer by auto pilot, but to switch to manual when approaching a course alteration position. This was maintained until the ship steadied on the new course. When the pilot was not on the bridge, the master stood the watch with the navigating officer. The ship's gyrocompass had an observed error of 2° to 3° high.

Between the time of sailing and the accident, the pilot managed to have three breaks: the first for 2 $^{1}/_{2}$ hours, the second for 1 $^{1}/_{2}$ hours, and the last for less than an hour between 2300 and midnight. The passage thereafter was through a relatively narrow channel, and involved four planned alterations of course. On this particular night there was a concentration of 12 to 18 fishing vessels in the area.

At 0155 the ship reached Magpie Reef where the pilot altered course to 350°to make for a position 0.4 miles west of Heath Reef, about 20 miles further north. He had intended to leave the bridge at Magpie Reef for a rest, but because there were two fishing vessels operating in the area, he remained on the bridge. At about 0232, *New Reach* cleared the fishing vessels and was making about 13.8 knots on a gyro heading of 354°. Heath Reef light could be seen ahead at a range of about 11 miles. With fewer than 8 miles to go to the next alteration of course, the pilot decided to remain on the bridge.

He did not set up parallel index lines for passing Heath Reef at that time, but sat in the pilot chair adjacent to a radar on the port side of the wheelhouse. He apparently fell asleep.

The ship continued on 354°G (to make 350°T) at 13.8 knots, and the tidal stream tended to set the ship towards the east. The second mate fixed the ship's position at 0249 and again at 0307, when the ship was about 3 miles from Heath Reef. Both positions put New Reach east of the intended course line.

At about 0311, the second mate touched the pilot on the shoulder to remind him to make the mandatory report to the Reef Centre. The pilot got down from the chair, and using the VHF, reported the ship's position and speed. As he looked out of the window, he realised that the ship was in the wrong relative position to the light, and ordered an alteration of course to 350°. Realising he was too far to the east, he ordered a series of alterations to port in quick succession. The vessel started to swing to port and the helmsman attempted to comply with the pilot's orders and steady the ship on 344°. However, even with the rudder hard-to-starboard, the swing to port

continued. Although no impact or deceleration was felt, it was evident by about 0320 that the vessel was stopped in the water. She was aground. The engine was stopped, and an onboard check revealed the ship was not seriously damaged, that nobody was injured and there was no pollution.

The Lessons

1. Fatigue: mariners are well used to working long hours and pride themselves on the ability to keep going, despite having had little or interrupted sleep. But even the most diligent and conscientious acknowledge that performance can be impaired by inadequate sleep. On this occasion, the pilot's actions or omissions strongly suggest this state had been reached. He had inadvertently fallen asleep just after 0230 and although he had been woken up in ample time to take the appropriate action to ensure the ship remained safe and, indeed, to register he was off course, he did not establish her position. He also found he was unable to use the radar controls properly to display parallel index lines, despite having used them regularly since boarding *New Reach.* It is the little things that one does instinctively in normal circumstances that are omitted when fatigue kicks in.

2. Mistakes induced by fatigue can only be prevented by having adequate rest and proper sleep. A catnap of a few minutes, or a short sleep lasting an hour or so, can provide temporary respite, but the cumulative effects of being awake too long, without proper sleep, can be disastrous.

3. Passage planning and conduct: the second mate was responsible for passage planning in New Reach, and had drawn course lines on the chart for the inner route through the Great Barrier Reef. In the event, these were replaced by new courses entered by the pilot. Having checked there was nothing to concern him with the revised planned track and ensured the master was content, his task, and that of his fellow bridge watchkeepers, was to monitor the ship's progress. To follow company procedures he should have fixed the position every 15 minutes and, in accordance with good navigational practice, been working up a DR after each fix. In practice the fix interval was erratic, with a fix being plotted about once every 30 minutes.

4. Bridge organisation: communications between the pilot and the second mate were minimal. The pilot did not brief the officer of the watch of his intentions or requirements. For his part, the second officer plotted the vessel as being off the course line, but did not tell the pilot. Had he done so, this grounding might never have happened. This reluctance, hesitation, or acceptance of a rigid hierarchical structure, which prevents junior officers communicating important information or concerns to seniors, or pilots, is often observed. Overcoming any such inhibitions is a crucial feature of good bridge resource management, and should be a feature of any ship at sea today.

Footnote

The Marine Incident Investigation Unit, Canberra, Australia carried out a full investigation of this incident. The MAIB gratefully acknowledges its permission to produce this article.

CASE 12
Compression Couplings Can Spell Danger

Narrative

During September 2000, the UT 704 Mk II anchor-handling supply vessel, *Pacific Champion,* was conducting anchor-handling operations in the Mediterranean.

The anchor-handling winch was hydraulically powered and normally controlled by the chief engineer from the bridge winch console.

The hydraulic system had been in continuous use for about 10 hours when the duty engineer telephoned the bridge to report a leak from the hydraulic system. Also, the system's high temperature alarm sounded. Investigation showed that a compression type coupling on the low-pressure side of the system had failed, allowing a large quantity of oil to enter the bilges. This coupling was renewed and the system replenished.

Anchor-handling resumed two hours later. After a further 3 hours, the hydraulic system's high temperature alarm sounded. Shortly afterwards, the automatic fire alarm did likewise, and the duty engineer reported a fire in the engine room. It was tackled by shutting down the machinery spaces and activating the Halon smothering system. Tug assistance was requested.

The crew's actions extinguished the fire effectively, and the engine room was entered about 8 hours later. It was found that a second 60mm diameter compression coupling, in the low-pressure side of the hydraulic system, had failed. Situated over the starboard main engine, it had leaked oil over the exhaust and ignited.

Further investigation found other similar couplings, also on the low-pressure side of the system, had suffered from movement. This suggested possible overpressure. The single isolating valve between the system's low-pressure side and its header tank was found closed. Seawater cooling through the hydraulic oil coolers was also found to be poor, causing greater thermal expansion in the oil than would be normal. This was principally caused by the vessel's light operating draft at the time, which resulted in the sea-chests aerating when the ship was manoeuvring during anchor-handling. The fact that the pump priming system was inoperative contributed, as the sea-chests could not be de-aerated.

It was concluded that the coupling had failed because of overpressure of the hydraulic system, generated by thermal expansion of the oil. The system's header tank was expected to accommodate this expansion but, with the isolation valve closed, had not done so. The unusually high system temperature was probably caused by the poor cooling water circulation, and this factor had caused the problem to be highlighted on this occasion rather than sooner.

The Lessons

It is common practice to fit pressure gauges to the high-pressure side of hydraulic systems. This incident shows the value of also monitoring the low-pressure side.

If isolating valves are fitted between header tanks and hydraulic systems, some form of lock and/or warning notice might prevent them being closed inadvertently. Having no isolating valve here would remove the problem, but might generate extra work, such as draining the system, when repairs are needed. However, in this case the valve was not marked on the

system's drawings, and those on board were unaware of its significance in isolating the expansion tank.

The owner took the following corrective action during the ship's repairs:

- **The isolating valve beneath the expansion tank was removed to restore the system to its "as designed" condition.**
- **Compression fittings were replaced with bolted flanges in areas where leakage presented a high fire risk, ie over engines and switchboards.**
- **Sister vessels were contacted to determine if they also had a similar isolating valve fitted to the expansion tank and compression couplings in low-pressure hydraulic lines. Where that was the case, systems were modified to remove those features.**

CASE 13
According to the Book!

Narrative

On 20 September 2001, the newly built 25,000gt passenger ro-ro ferry, *Stena Forwarder,* suffered a fire in an exhaust gas boiler while at her berth in Holyhead.

The vessel left Dublin at about 2130 on 19 October for a crossing of the Irish Sea to Holyhead. Owing to a bad steam leak, the forward exhaust gas boiler was isolated from steam and feed lines and drained of water. There was no by-pass facility to divert the exhaust gas around the boiler.

The passage was uneventful, but an exhaust gas high temperature alarm sounded for the forward exhaust gas boiler as she manoeuvred into her berth at Holyhead. An inspection found nothing untoward.

Once the vessel had berthed, main engines were shut down. As this also disabled the monitoring and alarm system serving the main engines and exhaust gas system, the forward exhaust gas boiler continued to be monitored by regular inspections.

Preparations for the vessel's departure were underway at 0230 the following morning. A number of vehicles, some carrying dangerous goods, and 135 passengers, had embarked.

During one of his routine inspections, the third engineer found the lower bellows on the forward exhaust gas boiler to be glowing red. He informed the bridge and the chief engineer at about 0240. Six fire hoses were run out, and the emergency fire pump started to cool the boiler's casing. Holyhead port control was informed, and requested to summon the emergency services. Using hoses, cooling of the outer casing of the exhaust gas boiler continued.

Vehicles carrying dangerous goods were disembarked and, when the fire brigade and police arrived, the vessel's fire alarm was sounded. All passengers were told to leave the vessel on foot, and a search of the accommodation was made.

Once the outer casing of the exhaust gas boiler was sufficiently cool, an access door was removed and hoses were used to spray the tube bank.This continued until its temperature had been lowered enough to enable the tube bank to be inspected. Although the top was apparently undamaged, the lower parts had been partly destroyed and required significant repairs.The tube bank was, nonetheless, still able to pass sufficient gas to allow the main engine to be used.

All passengers were able to return to the vessel at 0500, and she was able to re-enter service. There were no injuries or serious damage, other than to the exhaust gas boiler.

The lessons

1. Most marine engineers will have studied, and been instructed in, the procedures for containing and extinguishing fires in exhaust gas boilers, economisers and superheaters. Many are fortunate to have no need to test or apply this knowledge seriously. This incident, carried out 'according to the book', is a demonstration that the accepted procedures for containment by cooling, using large quantities of water, are effective.

2. At the time of this incident the vessel had been in service for only a few months. Routines for soot blowing of the exhaust gas boilers thus followed the manufacturer's

recommendations of twice per day. This has now been changed to four times per day, equivalent to once each crossing, and is an example of how such procedures need to be modified according to a vessel's service and operational experience.

3. Muster arrangements conventionally cover the need to ensure passenger and crew safety while the vessel is at sea. Different arrangements for evacuation may well be necessary while alongside. Once passengers have left the vessel there are two basic requirements: the need to ensure the accommodation is clear of any passengers, and a headcount once they are ashore. Early identification of any missing person(s) is then possible. In this incident, all the passengers had embarked in vehicles and, since they were all intending to re-embark for the crossing, none of them had dispersed. Had the evacuation occurred at the end of a crossing, and foot passengers been present, a passenger count might have been less accurate, since several passengers might have left before the headcount took place.

CASE 14
Near Miss in the Dover Strait

Narrative

Hoo Swan was on passage from Rochester to Calais in ballast. On approaching the Dover Strait and the south-west traffic lane, she called Dover coastguard at 1952 on VHF radio channel 11. Her course was 132°and her speed 9 knots. A chemical tanker, also in ballast and later identified as Ida Wonsild, was seen visually and by radar on her port bow following the south-west lane. Her course was assessed as about 223°and speed as 9 knots.

As the vessels continued to converge on a steady bearing, and the chemical tanker did not appear to be taking any action, *Hoo Swan* called her via VHF radio on channels 11 and 16. As radio contact could not be established, *Hoo Swan*'s OOW made a VHF radio call to Dover Coastguard, advising them of the situation, and of his intention to stop the engines. After *Hoo Swan* had stopped her engines, *Ida Wonsild* passed ahead of her at a range close enough for the ship's name to be read.

Investigations conducted by *Ida Wonsild*'s ship manager revealed that none of the OOWs had any recollection of a close-quarters situation with Hoo Swan.

The Lessons

This type of situation will be familiar to many. Ship A thinks a close-quarters situation has developed, while Ship B believes everything is normal. Arguments as to who was right, and how close 'being able to read a ship's name' actually was, will rage furiously, but the fact remains that one ship was very concerned about what was happening and tried to do something about it.

1. The importance of keeping a good lookout, particularly in a busy shipping lane such as the Dover Strait, cannot be stressed strongly enough. It means OOWs being very aware of other shipping in the vicinity, and taking responsible action to ensure that risk of collision is avoided.

2. Never assume that another vessel has seen you, particularly if she is the burdened vessel and expected to take action to avoid a collision. This was clearly a crossing situation in which *Ida Wonsild* was the give-way vessel. However, as her OOW was not aware of *Hoo Swan*, it is hardly surprising he was oblivious to the potentially dangerous situation and kept going. This is a good example of why Rule 17 of the Collision Regulations stipulates when a stand-on vessel 'may' and 'shall' take avoiding action, which *Hoo Swan*'s OOW applied effectively in this instance, and ultimately prevented the two ships from colliding.

3. Don't forget the 'wake-up' signal; it costs nothing and might provoke a response.

4. A lot of information can be gleaned from VHF radio in areas of high traffic density, simply by maintaining a listening watch and noting relevant information; particularly when vessels identify themselves at known reporting points. On the other hand, the use of VHF radio to call an unidentified vessel is rarely successful, and frequently causes confusion.

Part 2 - Fishing Vessels

The natural hazards of fishing are the sea, the environment, the constant movement and the cold. Those that confront most fishermen on a daily basis are commercial pressures, fatigue, poor prices and, no doubt, bureaucracy. The item of equipment that has, however, the most infamous record of injuring and killing people is called a block. Just recently there have been a number of incidents in which a block or, to be more precise, its failure under tension, has either maimed or killed the person standing nearest to it.

At one end of the spectrum the accident could be nothing more than a blow on the head from a swinging block. At the other end, a block could fail from a number of reasons and the wire running through it pulls free and flattens or cuts through anything in its way. If someone happens to be standing nearby, the consequences are among the most distressing of any to face a fisherman. The sight of a man being dragged over the side, or having limbs severed, or worse, can linger in the mind for a very, very long time.

It is easy to be fatalistic about such events and put them down to the natural hazards of fishing but the reality is that, in every case investigated, the accident could have been prevented.

Blocks need looking after. Like so many other aspects of life at sea, we tend to take them for granted. They are there day after day, voyage after voyage, in fair weather and foul. They might squeak a bit more after a few years hard labour but, by and large, they perform a functional task to our entire satisfaction. But they are like people. They wear with age.

The shackles and pins to which they are attached wear out. The blocks themselves become distorted and damaged. The swivels and sheaves no longer move freely, and the securing arrangements on the gate of a snatch block are no longer effective. All it requires is a practised eye to check all blocks on a *regular* basis and not only know when it is time to have them tested and, if necessary, replaced, but do something about it. So often it is the 'doing something about it' that is the first casualty when it comes to establishing priorities.

But like all these things, there is a sting in the tail. We have seen instances where a skipper or owner has taken the trouble to replace a well-used or defective block but, for whatever reason, does so without checking the Test Certificate of the replacement. Only strong reliable blocks, manufactured or repaired by a reputable organisation, and properly tested should be used on fishing vessels. Repairs done on the cheap, and then not tested, could be the first link in the chain of someone being seriously injured or losing his or her life.

The sobering thought is that it could be you.

The moral of the story is to make sure blocks are properly maintained and are replaced when necessary. And one way to stop that sore head from a swinging block is a hard hat. One or two have tried it and discovered it isn't such a ridiculous idea after all!

The MAIB wishes to apologise for an error which was printed in Safety Digest 3 of 2001. Sentence 1 of Case 15, Grounding in Restricted Visibility, states:

"The Spanish owned, but British registered fishing vessel Horizonte Claro sailed from Lochinver on the west coast of Scotland at about midnight on 20th October 2000".

The vessel is, in fact, Spanish owned and Spanish registered.

We regret the error.

CASE 15
Near Misses Involving Fishing Vessels

Narrative 1

Having landed her catch, a fishing vessel was returning to the fishing grounds. It was dark, visibility was good, the sea moderate, and the wind south-south-west force 5. On leaving harbour, she was steering 135°at a speed of 7 knots and displaying sidelights, stern light and a masthead light.

When still within 2 miles of her port of departure, the skipper detected a radar contact 2 miles on his port bow, and shortly afterwards sighted masthead and starboard sidelights along the same bearing. He estimated this vessel, a general cargo ship, was on a southerly course at about 8.5 knots, and that a risk of collision existed.

By the time the two vessels closed to within 1 mile, the cargo vessel had failed to take any action as the give-way vessel. This prompted the skipper to call her on VHF radio, channel 16. Unable to get a response, he altered to starboard and eventually took all way off to prevent a collision. Radio contact was finally established when the vessels were very close and the merchant vessel'sOOW felt it was too late for him to alter course or stop. The OOW, who was alone on the bridge, had been working a 6 hour watch routine, and did not detect the fishing vessel by radar, or see her visually, until she was at close range.

Narrative 2

A stern trawler was south of Plymouth, towing her gear on a course of 180°at about 3 knots. She was displaying an appropriate shape to indicate that she was fishing. It was a clear sunny day, visibility was good and the sea was slight. There was little wind. A tanker was sighted about 6 miles on the port beam, on a westerly course and making good about 13 knots. She was on a steady bearing.

As the tanker closed, the trawler's skipper became increasingly concerned and, when the range had closed to about 1 mile, tried calling her on VHF channel 16. There was no reply, and the skipper was forced to increase to maximum speed to pass ahead of the tanker, leaving it very close astern. Her OOW, who was alone on the bridge at the time, did not recollect being in a close-quarters situation, or hearing any calls on VHF radio.

The Lessons

These two instances are representative of many situations which will be familiar to anyone with extensive experience of watchkeeping. You find yourself the stand-on vessel, and detect another vessel on your port bow or beam closing on a steady bearing. The questions you find yourself asking are "has he seen me?" and "is he going to give way?" Too often we find the answer to the first question is "No" because a proper lookout is not being kept and "No" to the second because he is unaware of your presence.

1. Keeping a good lookout and complying with the Rules of the Road are not just good seamanship requirements, but are also imperative to preventing very serious accidents. Had both fishing vessel skippers not maintained a proper lookout, or manoeuvred to prevent a collision, the MAIB would probably be investigating two serious accidents rather than near misses.

2. There are no new lessons about maintaining a proper and effective lookout. The requirements are well known.

Watchkeepers must be alert, look out of the windows, use binoculars, monitor the radar on an appropriate range scale, and listen for sound signals and to the VHF radio. The factors which prevent keeping a good lookout will vary from vessel to vessel, but three reasons seem to feature over and over again. Too often watchkeepers use the opportunity of a seemingly quiet period to do something other than keep an efficient watch. It could be anything from progressing paperwork to reading a magazine. The second reason is being distracted by something such as monitoring GMDSS, making a lengthy telephone call, or spending an unusually long time at the chart table. And the third is the tendency for either a tired or very bored watchkeeper to fall asleep. If you are guilty of succumbing to any of these, you could be endangering people's lives.

3. If you feel you are under pressure to do something that will prevent you keeping an efficient lookout, or you are too tired to do it properly, tell someone. The MAIB receives a number of reports from people in such a predicament, and each one is treated in total confidence. It provides the Branch with the ammunition to do something about it.

4. When the OOW is busy, a dedicated visual lookout is an invaluable safety net. When all is quiet, he is a second pair of eyes and ears, and helps to keep a tired OOW alert. You are required to have a dedicated lookout at night.

5. VHF radio is convenient, but it relies on the watchkeeper in the "other" vessel monitoring the appropriate channel, understanding what is being said, and bothering to reply. Not surprisingly, many calls go unanswered. But there are real dangers to using VHF when the identity of the other vessel is unknown. There are a number of recorded incidents when either the misidentification of the 'other' ship, or a lack of understanding, has contributed to the subsequent collision or incident.

6. If the situation allows, and you need to make your presence known to the "other" vessel use the 'wake up' signal by whistle or horn, and by flashing light. The signal is required by the Rules of the Road and, although an inattentive OOW may not see or hear it, somebody else on board the other vessel might. Don't be shy; it's in your interest to be seen.

7. Navigation lights are no different to car headlights. They accumulate grime and salt in time. An occasional wipe does wonders to improve their effectiveness.

Footnote

The names of the vessels concerned have been removed to encourage the reporting of near-miss incidents. Invaluable lessons can always be learned from such events, and the reporting of them is encouraged.

CASE 16
Fatality on Board Fishing Vessel

Narrative

After a week's break, *Philomena,* a beam scalloper, sailed from Peterhead in the early hours of the morning to return to the fishing grounds. Later that day, and while shooting her gear for the fourth time, one of the deckhands moved from a position of safety and was struck on the head by a towing bar. The sea conditions were rough, and the bar swung in board because of the vessel's movement. It will never be known why the deckhand made the move, but the blow killed him.

The deceased was an experienced fisherman, but had never sailed on *Philomena* before. He had only been onboard for 14 hours when he died.

Safety hats were available, but nobody on board wore them.

The Lessons

This tragic accident will provoke a number of reactions among fishermen. Everyone will have the deepest possible sympathy for the family of the deceased. Many will, rightly, want to know what happened and whether anything could have been done to prevent it. Others will say it was one of those things which happen from time to time in this most hazardous of occupations. The reality is that similar accidents have occurred in the past and are likely to happen again unless measures are taken to prevent them.

Much can be done once people understand that accidents are rarely caused by a single event. It isn't just bad weather, a particularly high wave, an unfortunate swing of the towing bar, or that the victim was new to the vessel. Accidents happen through a combination of things, and it is important to learn from the lessons of this and similar accidents in the past.

1. No two vessels are the same. Variations in equipment, procedures, the way a skipper likes things to be done or even the vessel's motion in a seaway, will differ. When joining a vessel for the first time, nothing should be taken for granted. Make sure you are aware of the various hazards and safety precautions in force. Pay particular attention to anything that swings from aloft such as towing bars and blocks, and make a mental note of how they can be avoided at all times. It is unlikely things will be identical to your last vessel and you must not hesitate to ask questions if you are unsure of any procedures. Doing this does not question your ability or experience; it simply highlights your commonsense.

2. Every year a number of fishermen are either seriously injured, or killed, by being hit on the head. Someone, sooner or later, wants to know whether the consequences could have been prevented had the victim been wearing a safety helmet. The answer is no one knows, but even if wearing one could have prevented it, most people would be very reluctant to try it for a number of reasons. They are uncomfortable, get in the way, restrict vision, allow water to drip down the back of the neck and nobody else wears one. So other workers have said in the past. But now, wearing safety helmets has become second nature to those working on merchant ships or in the offshore sector. It is now so much in the culture that to not wear one feels uncomfortable. The fact remains they provide very good protection, reduce injury and save life. Wear a safety helmet.

3. When hauling or shooting, or conducting any operation on deck, keep an eye on your colleagues and do not hesitate to raise the alarm or stop a procedure if you see something dangerous developing. Safety is the responsibility of everyone on board.

4. When accidents happen at sea, expert medical assistance can often be far away, and the well-being of a casualty is in the hands of others on board. In this case, although the injuries were severe and the efforts of the first-aid-trained crew were sadly unsuccessful, the need for fishermen to complete the mandatory first-aid course was once again highlighted.

Footnote

In the past five years the MAIB has received a number of reports from certain sectors of the fishing industry stating that the wearing of safety helmets is on the increase. In nearly every instance, the catalyst for change was the death of a friend and colleague through a head injury incurred at sea. The sadness is that it takes such an event to make people change the habits of a lifetime. A far happier solution is to do something about it before you become the victim.

This incident was the subject of a full MAIB investigation. A comprehensive report, giving details of the causes, an analysis, and recommendations was published in August 2001.

CASE 17
For Appearance's Sake

Narrative

Atlantic Princess is a large, 92.04m stern trawler, with a crew of 34. At 2015 on 23 November 2000, and following a 12 hour search for fish, she prepared to shoot her nets in the English Channel, about 17 miles south of the Isle of Wight.

Four of her deck crew went aft to shoot the nets under the control of the fishing skipper who was in the wheelhouse. He was positioned at the winch controls overlooking the aft working deck. Shooting began. Two of the crew attached the head line transponder and then moved to two small pound areas at the stern from where they were to attach towing wires to the net's wings.

The man on the port side attached his wire, but then noticed his colleague was not where he had expected to see him, in the starboard pound. Thinking he had gone to the toilet, he moved across to starboard to attach the towing wire. At almost the same time the fishing skipper also noticed the man was missing. He went aft to investigate.

When they failed to find the missing crewman they realised he must have gone overboard. It was dark and the wind was force 4 to 5.

A "Pan Pan" message was broadcast, and the Solent coastguard initiated a search and rescue operation. *Atlantic Princess* recovered her nets and joined the search. A helicopter, a lifeboat and several merchant and fishing vessels also took part. The crewman was not found, but his self-inflating lifejacket was recovered. This was found inflated with its light illuminated and the buckle on its harness fastened.

Nobody saw him go over the side, but the circumstances suggest he was standing in the starboard pound to connect the towing wire to the net. A feature of the pound is its proximity to the stern roller, which rotates as the nets are paid out. It is impossible to say what happened, but the possibility exists that he was somehow taken overboard by the rotating roller.

The crewman had been wearing ordinary clothing: a hard hat and the inflatable lifejacket. Only the lifejacket was found and recovered. Once again, it is impossible to reconstruct exactly what happened, but a properly secured lifejacket should not have become detached. The evidence suggests it was not being worn correctly, and it is likely the victim slipped the lifejacket over his head without passing the harness around his waist. When he entered the water the lifejacket slipped off. The particularly sad feature was the relative ease with which the lifejacket was subsequently seen, but nothing was found of the man.

The Lessons

1. The aft boundary of the two stern pounds is the stern roller. Because this is able to rotate freely it cannot serve the same purpose as a guardrail or bulwark. Without a barrier between the pound and the roller, crew can easily come into contact with the roller. If it is turning, it might then drag them overboard. Stern rollers should be viewed in the same way as any rotating machinery. They are dangerous and must be guarded if personnel are likely to be very close by.

2. *Atlantic Princess*'s crew generally recognised the importance of wearing a lifejacket while working on deck. The victim, however, apparently failed to don his properly, and did no

more than slip it over his head. Perhaps he thought it was unnecessary as he was only expecting to be on deck for a few minutes. To the casual onlooker it would appear as if he was wearing one.

3. The value of a lifejacket is entirely dependent on it being worn properly and secured correctly. A snug fitting model is both comfortable - and a life saver.

Accidents are no respecter of time. Dangers exist no matter how brief the stay on deck.

Footnote

This incident was the subject of a full MAIB investigation. A comprehensive report, giving details of the causes, an analysis, and recommendations was published in August 2001.

CASE 18
Take Your Lifejacket and Phone with you

Narrative

The 5.8m Orkney fast liner open fishing vessel, *Northern Kiwi*, which was powered by a 37.2kW (50 HP) outboard, was being operated single handedly. The skipper was hauling crab pots, and had twelve on board when the line tightened on the hauler. A pot or line had snagged on the rocky bottom in a depth of 46 metres. A northerly force 3 wind was blowing, and the sea was slight with a chop and a southerly ebbing tide.

The normal practice in such situations was to throw the recovered pots back overboard, and then start the recovery from the opposite end of the string. The skipper began this process, but having payed out 2 fathoms of rope, found it had caught in the outboard's propeller. Moments later, the rope came bar tight and the engine cut out. The skipper tried to raise the outboard, but the load on the rope prevented this.

The boat was, in effect, anchored. It was also lying with the stern so low that water had started to come inboard over the transom. The skipper attempted to lighten the boat by ditching some of the embarked pots, but this made little difference. He thought of diving down to cut the rope, but with the tide running, thought better of it and chose instead to contact the coastguard on VHF via a local vessel.

Meanwhile, water continued to be shipped over the stern. The skipper was wearing a lifejacket and, once in the water, began to recall the advice he had received in survival training. It served him well. About 10 minutes later he was recovered by another fishing vessel.

The Lessons

This incident could have turned out so very differently. The skipper owes his life to following the advice so frequently put out by the MAIB:

1. Wear a lifejacket at all times.

2. Let people know if you are in trouble before it is too late.

3. Don't make matters worse by diving in, cutting the rope and then, perhaps, watching your craft drift gently away before you can re-board it.

4. Carry a VHF radio and make sure it works. If battery-operated, ensure the batteries are fully charged, or are connected to a suitable power source such as the boat's batteries.

When looking back on his experiences afterwards, the skipper discussed the advantages of carrying a liferaft for use in such emergencies. As with many similar craft, there was very little room onboard as the pots took up most of the available space.

There is no doubt that when the chips are down, and there is every prospect of your vessel foundering, the existence of a liferaft could well make the difference between life and death. Skippers of small craft must make the choice. Take up commercially useful space or give yourself a good chance of survival. Friends, family and next-of-kin may have uncompromising views about which choice to make. Ask them.

CASE 19
Poor Watchkeeping on Fishing Vessel

Narrative

On 19 June 2001, the fishing vessel *Diana* (SY 86) was on passage between fishing grounds and in the vicinity of the Mallory gas field. Three crew were on board. Two of the crew were carrying out various tasks including cooking breakfast, cutting up bait, pumping out the bilges and cleaning pump filters. They were also responsible for maintaining the watch and keeping a lookout. The third crew member, the skipper, was asleep on the deck of the wheelhouse. The vessel's planned track passed 0.35 miles from a rig, and the radar alarm was set on $^1/_3$ of a mile. The vessel's VHF was turned off, as, in the skipper's opinion, there was too much unnecessary and distracting radio traffic.

The stand-by safety vessel on station in the area, *Putford Apollo*, received a message from her sister vessel *Putford Guardian* saying that she had been plotting the track of the fishing vessel *Diana* since 0600, and she had been seen to pass close to the Santa FE Monarch rig. Despite *Putford Guardian* putting her FRC alongside *Diana*, nobody could be seen on the bridge or on deck. On receipt of the message, *Putford Apollo* also launched her FRC and intercepted *Diana*. *Putford Apollo* and her FRC paralleled the course of Diana and, despite both sounding their horns, they failed to attract any attention. There was no sign of life on board.

The track of *Diana* was estimated to be taking her to within 0.5 mile of the Mallory platform.

Both the platform and the coastguard were informed, and the decision was taken to try to board the fishing vessel. The Mallory platform went to abandon platform stations as a precautionary measure. At 0800 *Putford Apollo*'s FRC went alongside Diana, which was still making way at the time, and one crew member transferred. He went to the wheelhouse and found the skipper asleep in a sleeping bag.

The skipper was awakened and told to slow down and steer way from the platform. He did so. He then protested about being awakened, and claimed the situation was under control. He said he generally slept in the wheelhouse in order to be instantly available if needed, and had two crew "on watch". Furthermore, the vessel was just arriving at her next intended fishing ground, and at no time had a 500m exclusion zone around a rig been breached. He felt that the stand-by vessel had over-reacted to the situation.

The Lessons

Readers can draw their own conclusions as to whether the stand-by vessel had over-reacted on this occasion, and whether the watchkeeping arrangements in this fishing vessel were satisfactory.

1. Skippers should need no reminding that they have a paramount responsibility to ensure a proper lookout is maintained at all times. There is nothing fundamentally wrong with a skipper sleeping in the wheelhouse, provided somebody else is on watch and maintaining the lookout when he is doing so. Watchkeepers employed elsewhere on deck or below, are rarely in a position to keep a good lookout or to listen out on VHF. In some small craft it might be possible.

2. The Maritime and Coastguard Agency (MCA) has published MGN 84 (F) *Keeping a Safe Navigational Watch on Fishing Vessels* in which owners, operators, skippers and crews of fishing vessels are, among other things, reminded that:

A competent alert watchkeeper, keeping a proper all round lookout at all times is absolutely essential.

The wheelhouse must not be left unattended at any time.

The lookout must give full attention to keeping a proper lookout and no other duties should be undertaken which could interfere with that task.

It goes without saying that the watchkeeper cannot keep the required continuous all-round lookout at the same time as cooking breakfast or cutting up bait.

3. Fishing vessels can legitimately work in the vicinity of rigs but if they choose to do so, they should ensure they keep a constant listening watch on Channel 16 VHF. When operating in the vicinity of a gas field, VHF traffic does not fall into the category of 'unnecessary.'

4. Stand-by safety vessels carry out important guardship duties. If contact cannot be established with a vessel which is deemed to pose a potential threat, more direct action may be necessary to ensure the safety of all concerned. In such circumstances, a stand-by safety vessel cannot wait until a vessel breaches the 500m zone before taking action.

CASE 20
Tiredness Can Kill

Narrative

After 3 days fishing in the vicinity of Foula Shoal on the west coast of the Shetland Islands, *Lomur* was returning to Scalloway to land her catch. The skipper, who had only managed about 7 hours sleep during the time on the fishing grounds, was alone and seated in the wheelhouse. From his chair he could see and reach all key equipment, including the watch alarm, which was set at a 10-minute interval. The vessel was in autopilot and the skipper was navigating by eye. The two remaining crew were down below; the engineer was having a coffee in the mess room, and the deckhand was in bed.

As *Lomur* passed to the north of the Cheynies, at the entrance to the Middle Channel, the skipper adjusted course a few degrees to starboard and reset the watch alarm. He then fell asleep. Less than 5 minutes later, the vessel was hard aground.

The Lessons

1. Although 'tiredness can kill' is a well-used cliché, it's as true as it ever was. Fishing is hard work but, on this occasion, the combination of fishing close inshore for 3 days, with several tows as short as 2.5 hours, and with a crew of only three, took its toll on the skipper. Fortunately there were no injuries, and damage was only superficial.

There are no hard and fast rules dictating how many crew a fishing vessel should carry to operate safely. It boils down to experience: what the vessel is doing and how long it will take, her size, the equipment fitted, and finally but, most important of all, commonsense.

2. Every wheelhouse watchkeeper has probably felt tired while on watch. Many, including some of the best, have probably fallen asleep. Fortunately, most of these have been lucky and have got away with it. What makes someone fall asleep is difficult to say. Sometimes tired people want to sleep but can't; yet at other times, people who don't think they are tired doze off at the drop of a hat. Two things, however, are certain. A watchkeeper who is alone, sitting down, and doing nothing is more likely to fall asleep than one who is walking around the wheelhouse, getting fresh air, and using all the navigational aids available to him. The second is that if you are very, very tired and sitting down with nothing to stimulate you, there is nothing whatsoever you can do to stop falling asleep. It takes less than 10 seconds to do so.

3. With many watch alarms positioned within easy reach of the wheelhouse chair, it would not be surprising to discover that some wheelhouse watchkeepers can literally reset a watch alarm in their sleep. Enough said. And having reset it there is nothing to prevent that person falling asleep all over again.

4. The effectiveness of a watch alarm to wake a watchkeeper in time to prevent an accident depends on the time interval set. The longer the interval, the longer the opportunity for something to go wrong. After this grounding, a watch alarm with a 3-minute interval was installed. Had this alarm been fitted before the grounding *Lomur* might have been able to land her fish as planned. What is the interval on your watch alarm?

5. Having a second person in the wheelhouse not only provides a second pair of eyes, but it also gives a tired watchkeeper somebody to chat to. This might prevent him from falling asleep.

Footnote

This incident was the subject of a full MAIB investigation. A comprehensive report, giving details of the causes, an analysis, and recommendations was published in February 2002.

CASE 21
Grounding of a Fishing Vessel

Narrative

The fishing vessel *Resplendent* was heading towards Cullivoe in the Shetland Islands to land her catch when she ran aground in the approaches to the northern entrance to Bluemull Sound in the early hours of 13 June 2001.

Her skipper, who had not slept for about 23 hours and had recently held a mobile telephone conversation with a friend, attempted to alter course while in the Sound. Using the joystick control, he failed to use the correct procedure for changing from automatic to manual steering, and did not realise the vessel was not turning as intended until immediately before the vessel grounded. By the time he did realise there was a problem it was too late for him to do anything about it. When the tide fell, *Resplendent* was embarrassingly high and dry. She was refloated the following day. There was no pollution, and damage to the vessel was minor.

The Lessons

1. Everybody makes mistakes, but we are more likely to do so when we've not had enough sleep. Tiredness makes it difficult to concentrate, and our ability to remain alert to what is happening around us is much reduced. Simple errors occur that would be unthinkable in normal circumstances. Drowsiness is the obvious symptom of fatigue. Other indicators which affect concentration, awareness and alertness are harder to identify, but are just as dangerous. Don't assume that just because a competent watchkeeper is awake that he can do the job. You only have to think what it is like to do a simple task at home at the end of a long day to know how difficult it can be. It is no different at sea even if you think you can do it. People who go without sleep for more than about 18 hours are less able to perform routine tasks than had they exceeded the drink drive limit.

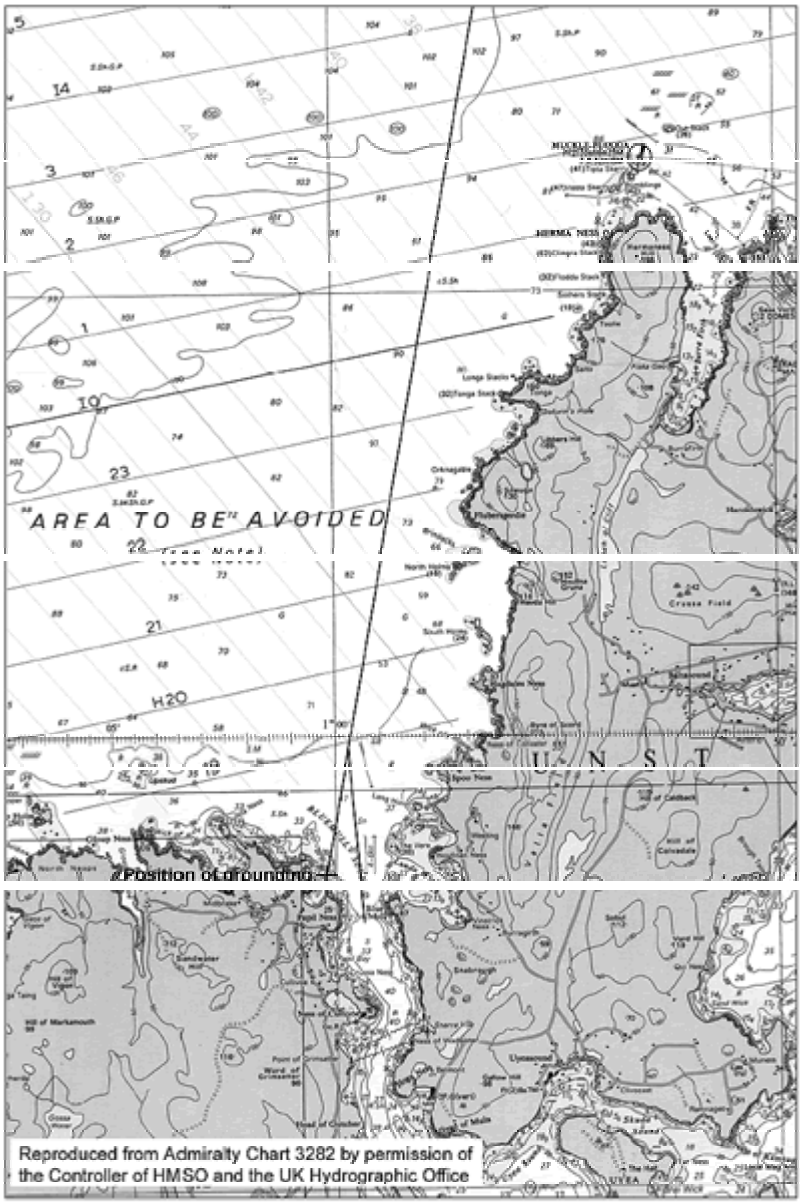
2. A second person in the wheelhouse when in confined waters or entering harbour, when you have been up for over about 18 hours, will do much to prevent mistakes having unfortunate consequences. Many accidents occur between the hours of 0100 and 0600. This one took place at about 0330.

3. Problems or faults with the steering, particularly when changing from auto steering to hand steering need not be disastrous provided they are discovered in time. An instinctive glance at the rudder angle indicator each time you apply wheel, will give you early warning of a problem. If you find the rudder is not responding, and you are trying to alter course, the time available to do anything about it is often very limited. Taking the way off is a possibility. It is far better, however, to reduce the chances of anything going wrong by selecting and testing manual steering before you need it.

4. Mobile telephones have proved to be very beneficial at sea, and are widely used for both commercial and private reasons. As when driving a car, their use at certain times can be a major distraction. Many will argue that transiting confined waters when tired at 0330 constitutes "a certain time."

Footnote

This incident was the subject of a full MAIB investigation. A comprehensive report, giving details of the causes, an analysis, and recommendations was published in March 2002.



Part 3 - Leisure Craft

One of the great attractions about going afloat for pleasure is that wonderful sensation of contentment when everything is well.

You could be crossing the Atlantic in the Trades with the wind on the quarter and flying fish skimming across the surface as dolphins keep you company for hours on end. You could just have anchored in some secluded backwater after working along the coast all day and are watching the sun dip below the horizon. You listen to the sounds of evening; the call of the oyster catcher and the gurgle as the flood makes. You savour the smell of something delicious wafting up from the galley as you sip that first drink of the day. Or you could be keeping the middle watch on a warm overnight passage with nothing in sight. With phosphorescence and the reflection of the sidelights in the bow wave, and a star studded sky above, you realise there is nothing, absolutely, that can match the deep contentment of life afloat.

It almost seems churlish to even think that there are times when things are not, perhaps, quite so idyllic. Even so, it is invariably the more hair-raising moments that tend to become the main topic of conversation in the bar.

But there is one type of event that we all endeavour to avoid, an accident. It really can spoil your entire day. All our training, our hard won experience and our investment in safety is dedicated to not only enjoying what is one of the most fulfilling and rewarding pastimes (or jobs) available, but also to preventing an accident.

If something does go horrendously wrong we could find ourselves having to face the ultimate test of seamanship, survival. A study of a number of accidents in recent years has identified the importance and effectiveness of training in those situations where survival has been a factor. If you land up in the water, or on the hull of an inverted craft, or manage to make the relative protection of a liferaft, your chances of surviving are improved immeasurably if you have undertaken the appropriate training.

Survival training is a mandatory requirement for those seeking to obtain a commercial endorsement to a yachtmaster's certificate but it is strongly recommended that anyone who cruises, races, goes sea angling or just 'messes about in boats,' undertakes such training. Survival courses are well advertised in the yachting press and are recommended by the Royal Yachting Association. The advice is sound.

Of all the lessons learned about survival, the most interesting is the determination of those who are eventually rescued to pull through against the odds. Willpower, and a desire to live, are very strong influences indeed but, unless the basics of survival are understood and tried out, even they could be hard pressed to perform miracles.

Better still, avoid the accident in the first place.

CASE 22
Even Maxis Capsize

Narrative

One of the entrants for the 2000 Atlantic Rally for Cruisers (ARC) from Las Palmas to St Lucia was the 24m ex-Whitbread maxi sloop,
Creightons Naturally. She is now operated commercially for corporate entertainment, as well as providing more adventurous passages for paying guests. The passage to the start of the ARC from the United Kingdom offered such an experience to a number of paying guests.

According to the brochure, her original departure date was 1 November but, in the event, she left the Hamble River 2 days later with a crew of 18. The aim was to arrive in adequate time for the start of the rally on 19 November. She never made it.

Three days later, this thoroughly tested and capable craft capsized in bad weather while crossing the Bay of Biscay. The decision was taken to abandon her, and a few hours later search and rescue helicopters successfully rescued all on board. Some of the crew were injured.

In 2000, *Creightons Naturally* was being used to provide both maxi sailing, and adventure training opportunities, to individual and corporate clients. She had a permanent crew of six and, in November 2000, was skippered by a 35 year old man holding an RYA Yachtmasters' Ocean certificate. He had accumulated some 12,000 miles on board Creightons, most of it as mate, and had been with the boat since 1999. He had been the skipper since September 2000.

The rest of the permanent crew had a variety of experience and qualifications. The mate held an RYA Yachtmasters' Offshore certificate and had previous onboard experience, while the others offered a range of experience.

The passage crew, known as paying guests, mustered a range of experience from extensive to total novice. Some made only a nominal contribution towards the cost of their food, since they were there to strengthen the professional crew on board. They were all aware of the potential challenge they might face for an open sea passage at that time of the year.

Creightons Naturally had been surveyed for a Small Commercial Vessel Certificate in October 1995, and this was due for renewal by 6 November 2000. On sailing, neither owner nor skipper had realised it was about to expire. The yacht was surveyed annually by the MCA for the Passenger Vessel Certificate she carries.

With the corporate season behind her, she spent the month of October at a marina on the Hamble, being prepared for her voyage.Much needed to be done, including resealing a cracked diesel tank and, at the last moment, repairing the engine. There were also problems with the external communications systems, which required remedial work. MAIB inspectors were told that several deck hatches were known to leak, including one situated immediately above the navigators' station, where water had been entering electrical equipment, and which had been repaired.

The plan had been to embark the guests at Ocean Village, Southampton, on 1 November and sail the following day.

In the event, the yacht was not ready for sea at the expected time, and it was necessary to transport the guests from Southampton to Swanwick, where they found the crew fully occupied making last minute preparations.

The joining guests were mainly left to their own devices in the hours prior to departure. There were no introductory or pre-sailing safety briefs, although the skipper talked to each crew member individually to assess their sailing experience and strengths to enable him to allocate crew to the separate watches.

A tide delayed departure, and *Creightons Naturally* finally departed at 0230 on 3 November. In order to embark fuel, the skipper planned to stop briefly at the fuelling pontoon at Port Hamble. However, a combination of weather, and tidal conditions, prevented her from doing so, and the decision was taken to press on westwards to Weymouth to top up with fuel.

She made Weymouth safely, but the refuelling process was interrupted when diesel started to pour into part of the accommodation. The fuelling cap to the diesel tanks had been disconnected during the pre-sailing preparations in the Hamble, and had never been replaced. The resultant mess and smell of diesel were not welcome.

Fully fuelled, *Creightons Naturally* finally set off at about 1400 and made good progress towards Ushant and the Bay of Biscay to follow a passage plan prepared by the skipper. The forecast for Biscay was west or north-westerly 6 or 7 decreasing 4 or 5 with thundery showers.

The sailing conditions were good, and the skipper felt that in view of the predicted weather he would be best placed to make adequate ground to the south, and avoid any developing depressions. He judged they would pass well to the north. As they adjusted to the routine of sea watches, both the crew and guests began to settle in and enjoy the passage, even though the latter were never informed of the planned track, the expected weather or the conditions they might expect.

By dawn the following day, the wind was blowing a steady north-westerly 5, only to ease as Ushant was passed at around midday. The skies had cleared, the sun was shining and, by sunset, the wind had dropped to 9 knots from the west-south-west. As darkness fell the wind began to back and increase and by the early hours of 5 November it was blowing from the south 4 to 5. The forecast issued at 2100 on the 4th had predicted southerly 4 increasing 6 to gale 8.

It also referred to an Atlantic low 998 moving steadily eastward, expected Sole 968 by 1800 on 5 November. The barometer at 2000 was logged as 1013.5mb. She pressed on.

Conditions on 5 November slowly deteriorated. The skipper considered his options and took the decision to remain at sea. He contemplated seeking shelter somewhere in Brittany, but rejected this in view of the dangers involved in closing a lee shore in bad weather. He was in a well-found and tested boat, and was confident of its ability to withstand the severest of weather.

He was also aware that he had to make Las Palmas in time to prepare for the start of the ARC, and for some of the paying guests to fly home. In addition he never forgot that one of the main thrusts of the *Creightons* ethos, so strongly advocated by the owner, was 'adventure'. Rough weather provided it.

The broadcast surface analysis for midday on 5 November and received on board, showed a complex situation in the vicinity of the yacht, with two cold fronts forming what was likely to be a secondary depression. The close spacing of the isobars also indicated the likelihood of high winds in the order of force 8 to 9.

By sunset, sail had been shortened to the main with three reefs and the No. 3 genoa. The headsail was later taken in. The wind had veered to the south-south-west, and by midnight had gone round to the north-west 7 to 9. It was a dark night and the seas had begun to build. When the skies were clear there was adequate natural light to at least be aware of the sea state and its direction, but when

a number of line squalls came through the visibility dropped dramatically. The skipper remained on deck as the wind increased and the seas built up.

By the early hours of 6 November conditions had deteriorated further. From midnight the skipper and mate remained on watch to handle the situation, while the paying guests remained below. One or two people were suffering from seasickness. The sea state became confused, and when squalls hit the boat it was very dark indeed.

The skipper was uneasy with the amount of sail he was carrying, but judged it too dangerous to lower the main and hoist the storm tri-sail. His selected course of action was to run down sea. This gave the impression of relatively comfortable sailing, but the conditions were such that a preventer could not be rigged safely.

At an indeterminate time (accounts differ), but possibly shortly after 0100, *Creightons Naturally* gybed and her mainsail blew out. She was now running in a south-south-easterly direction under bare poles before the seas. An attempt was made to secure the main. Meanwhile the crew were trying to start the engine but were thwarted by water in the fuel system. Seawater had contaminated the fuel tanks from down-flooding through the fuel vents in the sail pit.

The generator was started but this, too, failed after a few minutes. And then the instrument lights failed. The skipper on the helm had no idea in which direction he was pointing and had to rely on feel as he attempted to maintain his downwind heading.

At about 0530 *Creightons Naturally* broached and was knocked down to starboard to an angle judged to be somewhere between 90°and 130°. One account suggested it might have been as much as 160°. Several people were injured, including the skipper when he was thrown against the wheel. The conditions below were chaotic; most people were thrown from their bunks and a number of heavy items, which had not been properly secured, broke loose including the kedge anchor, the spare mainsail, tools and a range of domestic items. Diesel from the earlier spill made the decks slippery and added to the stench and sense of chaos.

Accounts of what happened next vary, and no two versions agree, but it appears the skipper was completely exhausted and stunned by what had happened. Injured when he was thrown against the wheel, he played relatively little part in the events that followed. The last thing he did before coming below was to activate the EPIRB. A decision to initiate a "Mayday" was taken relatively soon after the knockdown.

The professional permanent crew down below, meanwhile, demonstrated complete composure. Despite his apparent condition, the skipper was able to restore sufficient 12v power to enable, among other things, the VHF radio to function. It was then manned by one of the permanent crew, who having been on board for 3 months, was sufficiently familiar with the radio and radio procedures, to be responsible for textbook handling of the "Mayday" transmission, and dealing with other shipping and the helicopters.

The decision to initiate the "Mayday", and abandon the vessel once rescue became possible, appears to have been based on a number of factors: the lack of power, the blown out main, a continuing forecast of bad weather, the damaged steering, injuries, the loss of a liferaft and pushpit-mounted lifebelts, the state of the skipper and the general chaos below.

The factor that caused the most anxiety in the early stages of the post-knockdown phase was the lack of knowing whether anyone had received either the EPIRB transmission or the "Mayday". In the event, and unknown to those onboard, the EPIRB transmission had been received. Once the VHF became operable, communications were established with a nearby Russian vessel that

indicated it was on its way to render what assistance it could. This contact with the outside world lifted everyone's morale.

Although it became clear that those on board were in no imminent danger, and the craft itself was more or less watertight, it was accepted there was no going back on the original decision to seek help. Early thoughts that a tow might be possible were dismissed, and following the loss of a second liferaft, the SAR authorities were informed that a helicopter evacuation was required.

With two-way communications established, there was some discussion as to the best way to evacuate 18 people. Because of the range at which a helicopter would have to operate to carry out a rescue, and the time it could remain on station, it was eventually agreed that two aircraft would be needed, and that each would attempt to lift nine people from the liferafts. Priority would be given to evacuating the injured first, including the skipper.

The evacuation went well once an attempt to launch a liferaft forward, as advocated by the SAR helicopter crew, had been abandoned. A second vessel, a tanker, had also arrived on the scene and was providing a lee. The first helicopter successfully evacuated the first nine members of the crew, and the second aircraft arrived 15 minutes later.

Accounts of the evacuation demonstrated the difficulties involved in trying to launch, and then board, a liferaft in severe weather conditions. The 10-man liferafts were found to be very much heavier than expected, and the lack of suitable handles created unwelcome problems. Once launched, at least one of the liferafts inflated upside down, but one of the crew jumped into the sea and was able to right it. The safety harness of a second person caught in the pushpit. One man, weighing 101Kg jumped on to a liferaft from a height of 2.42m, tore the floor, and caused the raft to flood.

When reflecting on their experiences after the event, those who had received survival training commented on the stark differences between handling a liferaft in a swimming pool for training, and the conditions prevailing in a high sea state. They did, however, feel that this training and a modicum of understanding about what they could expect, helped their self-confidence enormously.

Everyone agreed that the mate handled the evacuation very competently. He was ably assisted by one of the permanent crew who maintained the VHF communication link with the search and rescue aircraft. The mate had recently attended an RYA sea survival course.

All 18 souls on board were successfully evacuated, albeit to different landing sites. Nine went to France, the others to Spain.

Creightons Naturally survived the storm and was eventually salvaged.

The Lessons

A large yacht capsized in severe sea conditions. The decision to abandon her was taken and everyone onboard survived a very harrowing experience, leading to a satisfactory conclusion. There are, nonetheless, some valuable lessons to be learned, and certain aspects will no doubt provide much food for thought and discussion in sailing circles.

The lessons fall into several distinct areas:

- **readiness for sea;**
- **planning and executing the passage;**

- **leadership style;**
- **storm tactics;**
- **the decision to abandon ship; and**
- **the actual rescue.**

There is always a great temptation to criticise people for the way they handle an emergency and Creightons Naturally is unlikely to be an exception. So that as many lessons as possible can be learned from this particular incident, some of the issues have been expanded to draw them out.

Readiness for sea

1. Everyone who has ever planned a long distance passage will recognise the seemingly impossible task of being ready on time. The success of any voyage will, ultimately, depend on how well the vessel and her crew are prepared. Planning what needs to be done, managing the workload, applying quality assurance checks, and delegating responsibility in a sensible way, demands managerial and organisational skills. A sense of humour helps. Failure in any one of these areas will mean that something important will not be ready on time and will return to haunt skipper and crew at the most inconvenient moment.

2. Not only must the vessel be prepared for sea, but also the crew. Failure to welcome newcomers properly, to show them where everything is, how to operate basic safety equipment and where to stow everything, will mean the skipper's greatest asset, his crew, will not be well-prepared for what lies ahead. An untried crew is always an unknown quantity and the more time spent getting to know them, and for them getting to know the skipper is time well spent. Time spent in a shakedown before undertaking the planned passage is time well spent.

3. A feature of the ARC is the meticulous programme of briefings and safety checks made before departure. The passage to the start at Las Palmas is, if anything, even more of a challenge and demands the same high quality preparation.

4. Use a checklist for the safety brief to ensure nothing is omitted. The MAIB has noticed time and time again that one of the most frequently made observations in small craft accident investigations is the number of times the crew was not briefed at the outset on safety procedures or where lifesaving equipment was stowed. Many people are left unaware how to use the lifesaving equipment and do not try on the lifejackets or harnesses.

5. Check that all electrical equipment is functioning satisfactorily and that all pipe runs for water, waste, hydraulics and fuel have been connected correctly. Having diesel pouring into the accommodation spaces is not only a total pain, but very smelly and ultimately dangerous. It is also extremely difficult to eradicate completely.

6. Stow everything away carefully, and make sure it cannot break free in severe weather. The kedge anchor alone on *Creightons* weighed 57kg and was simply resting in a cradle: it could easily have killed someone. Deep lockers, with only gravity keeping stores in place, are fine - until the capsize! Of all the things that can make life difficult for the crew of a yacht in heavy weather, loose gear flying all over the place is guaranteed to be the most frustrating.

7. Break out severe weather equipment and check it for both condition and accessibility. When did anyone last check the trisail and storm jib stowed in some musty locker? Is the stitching intact? Do the hanks move freely?

Planning and execution of the passage

8. Ensure you have plenty of time to reach your planned destination. The Bay of Biscay in November is notorious for bad weather, and a passage to the Canary Islands involves having to cross the edge of the Continental Shelf. Plan on allowing several extra days for such a passage. This will ensure that any decision to do anything other than make for the chosen destination direct can be accommodated without incurring unnecessary risks.

9. The success of any passage depends on three key factors: the state of the boat and her equipment, the competence, experience, knowledge and leadership qualities of the skipper, and the crew. Don't expect a fresh and untried crew to settle in immediately. Plan the passage accordingly. It takes about 3 to 5 days for people to adjust to living on board, and considerably longer to be familiar with all essential equipment. Do not expect a new crew to be in the same league as one that has been working together for some time. The skipper should keep the crew informed about the plans for the voyage and the expected weather conditions. They will be better motivated as a result.

10. Competent helmsmen are vital to safe sailing in bad weather. Do you have the number required and are you confident of their competence? If the answer is no, a change in the basic passage plan may well become necessary. The combination of a well-found yacht and a good skipper can be severely undermined if the crew lack the necessary experience and competence.

11. Start taking weather forecasts several days in advance. Plan which forecasts you expect to read and when, and study all the available information on weather patterns.

12. Plan and prepare your bad weather sailing tactics. What do you propose to do if faced with a storm 3 days out and before the crew has completely settled down? Do you have the charts you may need for a diversion? Do you have warps available, a sea anchor or a drogue, and if so are you confident you know how to stream and secure them?

13. Do not underestimate the seas that can develop in the vicinity of the Continental Shelf in the Bay of Biscay in bad weather. Cross-seas were forecast at the time of this accident, caused in part by the rapidly changing wind direction. Anticipate such conditions.

14. Check your barometer. It remains one of your best friends even if it doesn't tell you what to do. The crucial factor is the rate of change of pressure.

15. Maintain the ship's log up to date. This may not be easy, but experience shows that a record of what has happened can be invaluable.

Leadership style

16. Few things make such a demand on a yacht skipper as providing effective leadership in bad weather. He has one overriding priority: the safety of his craft and all on board her. His ability to provide it will almost certainly be the result of hard-won experience and careful study of how other skippers have responded to heavy weather conditions. To an inexperienced and possibly frightened crew, nothing breeds confidence quite so effectively as demonstrable competence, cool judgment, decisive action and a smile.

17. The skipper, above all, must have the determination to survive no matter how bad the conditions. Fear, apprehension and a negative attitude convey themselves to others very rapidly and could contribute to a tragic, rather than a happy ending.

18. A yacht in bad weather makes great demands on a skipper. If he allows himself to become too tired he cannot give of his best. A skipper must rest no matter how great the temptation to keep going. Failure to do so could mean that when his experience, skill and knowledge is most needed, he may not be able to function as well as he would wish or his crew deserve.

Storm tactics

19. Never allow yourself to be over canvassed. Reduce sail early, while you still can, and before it becomes too dangerous for people to work on deck. Whenever in the cockpit or on deck, clip on and do so before leaving the cabin.

20. A sea worthy yacht can cope with virtually every type of wave except in extreme conditions. Even relatively small craft can cope with the large, but very long, seas of the deep Southern Ocean, but the shorter waves encountered when deep water gives way to shallow in the vicinity of a continental shelf, present a formidable challenge.

21. Seeking shelter might be the right solution if the approach is straightforward and can be guaranteed to offer the quality of shelter sought. It is an attractive option if it can be reached before the onset of the bad weather but, if the severe conditions are already present, the choice may be fraught with danger if there is any uncertainty about one's navigation, or it involves having to cross a bar. A number of people have lost their lives by trying to seek shelter in bad weather. Many others have ridden it out at sea and have survived.

22. Given a choice, many experienced seamen will opt to stay at sea providing there is adequate sea room. Skippers will have their preferred solution for how to handle severe conditions based on personal and other people's experience.

23. Riding out bad weather can involve a variety of techniques, all of which require, in an ideal world, practice. Qualified skippers may not have a vast amount of extreme weather experience. Two basic factors prevail. The bow is the most suitable part of a boat to face very heavy seas, and ample sea room is an enormous asset.

24. Heaving to with minimum sail set is appropriate in the early stages of a blow, or if the sea state is not too severe. It is not for use in very severe conditions with a high sea state.

25. A skipper should aim to place his vessel on a heading that will minimise a broach, capsize, knockdown or pitchpole. A combination of storm jib and trisail might provide the means of achieving this until such time the wind and sea state become unmanageable.

26. If conditions are so severe that it becomes necessary to hand all sail, yachts manage to survive very satisfactorily under bare poles providing they do not lie beam to sea. Parachute sea anchors have proved to be very successful providing they are large enough, well secured to a secure part of the boat and there commended length of parachute line is deployed. The length is debatable, but 120m has been used with success and the line must be protected against chafe where it leads outboard. One overwhelming advantage of a well-deployed parachute sea anchor is that it enables the crew to rest. Bad weather is very, very tiring.

27. And don't forget the crew. Having available food and hot drinks ready in thermos flasks can make all the difference.

Abandoning ship

28. Any decision to abandon ship, which results in everyone being rescued without further harm, must be judged a success.

29. There are no hard and fast rules about abandoning ship, but past experience shows that unless it is absolutely essential to do otherwise because the vessel is sinking rapidly, the best and safest solution is to remain on board. If there is no means of propulsion, evacuation may be necessary, especially if there are other factors present such as drifting on to a lee shore. In general terms, however, your craft is your best lifeboat.

30. If you do have a major problem, do not hesitate to let people know about it. The rescue co-ordination centre watchkeepers can often provide valuable advice, and would always seek to have as much notice as possible. They will not criticise you for sending out a genuine "Pan Pan" or even a "Mayday" when you first realise you are in trouble, but may find a delayed call very difficult to respond to in time.

31. VHF transmissions on channel 16 can be used as a source for direction finding.

Rescue at sea

32. The value of attending a sea survival course cannot be sufficiently over-emphasised. *Creightons Naturally*'s skipper and mate had, and it stood them in good stead.

33. Launch liferafts to leeward and keep them away from any stanchions. Anticipate the liferaft being much heavier than expected, and ensure the painter is properly secured.

34. If at all possible, keep dry. The cold is just as likely to kill as drowning.

35. In severe conditions it is sensible to clip your harness on to the liferaft painter when you are boarding. The wearing of lifejackets should be mandatory.

36. Try and avoid jumping on to a liferaft canopy feet-first. If you can't get on board by more conventional means, a spread-eagled approach is better. The person underneath it might resent your sudden arrival, but you should at least arrive, rather than go straight through.

37. If being rescued by a helicopter, never forget it will be burning valuable fuel all the time it is airborne. Don't keep it waiting unnecessarily.

38. Establish VHF communications early with the aircraft (or other rescue vehicle), but do not underestimate the noise a rescue helicopter makes when overhead.

Footnote

This is an unusually long report to appear in a Safety Digest, but every one of the lessons is worth learning, or relearning.

Lessons on the heavy weather tactics alone could fill several volumes of the Safety Digest. This article strays beyond the experiences of *Creightons Naturally*, but confines itself to some principles.

Above all, it aims to provoke discussion on how you would handle a similar situation.

CASE 23
Kill-Cord Conduct

Narrative

On 7 November, three RIBS, *Kestrel, Eagle*, and *Lanner* had been involved in a corporate sea challenge event with guests embarked. The day finished at Lymington, and once the guests had disembarked, the driver of each boat prepared to return to Southampton. The three RIBS left Lymington at 1730, having called the company engineer to advise him of their ETA. About 10 minutes later, and as they were leaving the Lymington River, the RIB drivers were told over the radio that it was "all clear" to head home in formation. As they were low on fuel, and it was now dark, this would ensure they would remain in company by transiting three abreast or in-line astern.

They headed east along the Solent at between 20 and 25 knots and more or less in-line abreast, with *Eagle* slightly ahead of the others. As they approached Calshot, it became obvious that *Eagle* was accelerating away. Despite radio calls for her to rejoin the formation, and the other two RIBS increasing speed, she continued to pull away. By the time *Kestrel* and *Lanner* had rounded Calshot Spit to the west of the main shipping channel, and were approaching the Fawley jetties, *Eagle* had pulled away. She was in the middle of the channel and travelling fast. Although displaying the correct navigational lights, her rear light had become indistinguishable from the background lights of Southampton.

By now, wake from large vessels was causing difficulties to both *Kestrel* and *Lanner,* prompting them to slow down and alter course to remain safe. They also lost sight of *Eagle*, and subsequent attempts to contact her driver by radio, or mobile phone, failed. Concerned for his safety, they crossed the shipping channel at 90°to see if he was on the other side, possibly having "stalled." They did not find him, so began a search down to the River Itchen, and back up Southampton Water; maintaining contact with their base by radio.

They were then informed that a RIB had gone aground at Hamble Point, so headed in that direction. They found a coastguard helicopter monitoring the situation, while a coastguard RIB was pulling a casualty out of the water some 400 meters from where the grounding had occurred.

When a search was made for the RIB, it was found in the Hamble Point car park after it had hit the boulder sea defences at speed and launched itself into the air. The throttle arm was at half to two thirds power, with the ignition key (and kill-cord) still in place and in the "on" position.

Eagle's driver knew the Solent well, and the track he had taken on this occasion was done in the best interests of safety. He had, however, become caught in the wash from commercial traffic in Southampton Water. Although he had slowed down to 30 knots, his craft pitched so violently that it threw him overboard and into the middle of the shipping lane. He inflated his lifejacket, but the weight of his clothes and boots made flotation difficult. Wash from passing traffic made swimming difficult, and it was only when a sailing vessel, coming up Southampton Water, noticed him that he was rescued. After a brief check-up in hospital, he was released -shaken but unharmed.

The Lessons

***Eagle*'s driver was experienced and well qualified. He was an RYA Powerboat instructor with an advanced driver ability, an RYA Yachtmaster Ocean in Sail and Power, and an RYA Yachtmaster instructor in Sail. As the MAIB has noticed on many previous occasions, small craft accidents often involve people who would appear to satisfy all criteria for qualification**

and experience. We also notice how often something goes wrong right at the end. So what can be learned?

1. Qualifications and experience do NOT guarantee a SAFE and SENSIBLE approach to boat operations.

2. Travelling in company in such conditions is both sensible and seamanlike but, to be really effective, coxswains or drivers should be constantly aware of what the others are doing.

3. No matter who or what you are, you MUST follow standard agreed procedures and instructions. If you do not, you not only place yourself at risk but also everybody else involved.

4. SPEED at sea, like on the roads, can be a killer - your speed MUST be judged according to the conditions.

5. The loading and condition of the boat must be checked before you set out, and a JUDGMENT made as to what effect this will have on its operating characteristics.

6. Above all else, the KILLCORD must be firmly and correctly attached to the driver's harness. The whole point of this is to STOP THE ENGINE in the event the driver falls out or becomes thrown backwards. If you do not do this, there is a strong possibility that the boat will circle and run you down. High-speed propellers can do an awful lot of damage to skin and bone!

7. Give very careful thought to your choice of lifejacket and clothing. Heavy boots and other gear can create enormous problems to people trying to keep their heads above water, especially in rough conditions. To survive, you need equipment which will keep you afloat, is warm, and lets people find you easily.

Footnote

Tiredness might also have had an influence in this accident. After a long and demanding day, a trip back through busy shipping lanes, particularly at night, can be very demanding. The natural tendency is to want to get home as quickly as possible, but judgment at night is a totally different thing to that experienced during the day. Planning an adventure exercise for the clients is one thing, considering the effects on the boat operators is another.

Case 24
Vigilance, ARPA and Relative Speed

Narrative

The skipper of a 13m steel ketch told the MAIB of two separate close-quarters incidents that occurred in the Dover Strait and the Thames Estuary. His yacht was equipped with radar with ARPA, and a high specification radar reflector.

To encourage others to report near miss incidents, the names of the vessels involved are not included.

Incident 1:

The yacht was heading in a northwesterly direction to cross the west-going Dover Strait TSS at right angles to pass south of the Goodwin Sands. The tide was setting SW so, at a speed of 6 knots, the yacht was heading 320°T while making good about 300°T. A ship was spotted to starboard heading south, outside the Goodwins, but to the west of the traffic lane. It was assumed she was intending to join the TSS. The yacht's ARPA predicted the ship would pass safely astern, but when the range was relatively close she made an alteration of course to starboard. This instantly created a collision situation. The yacht had to make a late alteration to starboard to avoid a collision, and the two vessels passed about 1 $^{1}/_{2}$ cables apart.

Incident 2:

The yacht was making passage on a course of approximately 290°T in the Thames Estuary to the northeast of the East Swin, at a speed of about 6 knots. A ship was detected on the yacht's starboard quarter making at least 12 knots on a course of between 240-260°T. She was on a steady bearing, and the ARPA indicated that a risk of collision existed. As the range closed, the overtaking vessel made no attempt to alter course. When the vessels were 3 cables apart, the yacht had to do something to avoid being run down, and made a 360°turn to port while the merchant vessel passed by.

The Lessons

Many yachtsmen can associate themselves with such incidents. Their overriding concern is always to know whether the approaching vessel has seen them and, if so, are they going to do anything about it? Such encounters tend to age yacht skippers prematurely. In this instance the yacht was made of steel, had an effective radar reflector and was, unusually, fitted with ARPA. Her skipper could reasonably expect to be seen both visually and on radar.

1. The overwhelming lesson to arise from these incidents is for all bridge/cockpit watchkeepers to keep a good lookout. Merchant ship OOWs should be constantly alert to the likely presence of yachts and other small craft in coastal waters. In taking action to avoid

close quarter situations they should leave no doubt in the yacht watchkeeper's mind what their intentions are.

2. In both cases the yacht was forced to take avoiding action owing to the questionable actions (or inactions) of a much larger and faster vessel. The yacht skipper's vigilance prevented what might have been worse than a 'near-miss'. Anyone in charge of a vessel at sea must be mentally prepared for the give-way vessel not to take the necessary action to avoid a close quarters situation. The alternative nightmare is for the 'other' ship to do something very odd at the last moment. Collision can sometimes only be avoided by the 'stand on' vessel "taking such action as will best aid to avoid collision."

3. Where two vessels are converging at differing speeds, the importance of taking regular compass bearings is paramount. What might appear to the casual eye as a vessel passing well astern or ahead because of its relative position, could be passing much closer - it is very difficult to assess the speed of another vessel with a quick glance.

4. In a strong current, the aspect of a slow vessel might be very different to its track over the ground.

5. In confined waters, yachtsmen should be very alert to the various constraints that can prevent larger vessels taking the textbook action to manoeuvre freely to avoid a collision. A nearby sandbank, other traffic, deep water channels, a nearby fishing vessel or even confusion as to your intentions, can make life very difficult for the other watchkeeper. Good sea manners, a good lookout, a sound knowledge of the Rule of the Road, and the importance of making your intentions clear, will do much to ensure a safe passage.

A Pause for Thought
Keeping a Good Lookout - Again

Just occasionally it is interesting to read how others keep, or kept, a watch at sea.

A recently published book about life at sea in the Second World War describes how officers kept watch on board a submarine as it transited on the surface in hostile waters. They kept their eyes permanently glued to their binoculars for the entire two hours they were on watch as they swept both sea and sky for sign of the enemy. Failure to do so could have meant disaster for both boat and crew. The need to spot a ship, aircraft or periscope in a hostile environment must have been a remarkable incentive to keep a very good lookout indeed.

The circumstances were, of course, very different to the maintenance of a good lookout in a merchant vessel or fishing vessel today. We are not looking for an enemy, but are there to ensure the safety of the ship, its cargo and everyone on board. A collision or grounding can still lead to people being killed or injured.

The need for a good, effective lookout to prevent collisions and groundings, has never been so important. But if the evidence from a number of recent accidents around the world is anything to go by, there are strong indications to show that the standards in too many vessels have slipped very badly indeed. It may no longer be necessary to keep one's eyes glued to binoculars for the entire watch, but there is abundant evidence to show that many of us have forgotten what it means to keep a 'proper lookout,' to ensure the safe passage of the vessel entrusted to our charge.

Keeping a good lookout means using the many available aids sensibly and understanding their limitations. It means looking out of the window and seeing things. It means correlating the radar picture with the visual and, not only knowing what other ships are doing, but spotting any changes they might make at the time.

It isn't just keeping an eye open for other vessels. It involves seeing hazards along the proposed track. It means noticing the effects of shallow water in the wash astern, or the extra large wave approaching from up sea. It also means listening for sound signals in poor visibility. Despite modern aids, more than one collision has been successfully averted by watchkeepers taking the correct action on hearing 'apparently forward of her beam the fog signal of another vessel'.

Keeping an effective lookout is a demanding task. It is not an alternative to catching up with the paperwork or reading some erudite publication stowed in the bridge bookshelf.

The failure to keep a good lookout has been addressed in previous Safety Digests but it continues to feature as one of the most common causes of accidents at sea. The endless catalogue of new instances only serves to remind us we assume too much and still have much to learn from the shortcomings of others. Why is it, that with so many aids to safe navigation and anti collision available on many bridges, some officers of the watch get it so badly wrong?

Harping back to the watchkeeper on board a submarine, it is interesting to reflect how his successor in a modern boat running on the surface keeps his watch. With only a gyro repeat, a two-way intercom and a lookout to keep him company on the top of the fin, he has absolutely nothing between him and the elements. His co-watchkeepers are closed up in the control room several deck levels below. He has, in effect, uninterrupted 360°vision and virtually nothing, apart from rain water dripping down the back of his neck, to distract him. It could be argued that this provides the perfect environment in which to maintain an effective watch with the added bonus of being able to

look astern and see what the rudder is doing when he orders helm. The top of the rudder is clearly visible above the surface. We do not advocate such austere watchkeeping methods, but it is interesting to reflect that keeping a good lookout in normal visibility does not require much more than excellent eye sight, a compass repeater and the minimum of distractions.

So what are we doing wrong in our well-equipped bridges today? Everyone will have views and many will claim, with justification, that in their ship a proper lookout is kept. But are they right?

Take the modern radar. It is a wonderful aid and together with the ARPA has done much to ensure ships can manoeuvre safely in any conditions of visibility. The danger is that officers of the watch rely on it to the exclusion of all else. Radar is good, very good, but it has its limitations. Officers assume it will pick up everything of significance, but anyone who has made a conscientious comparison between radar contacts and what is actually out there, will know that certain objects, such as small yachts, do not paint with sufficient consistency to generate a track. Some radar echoing areas can be very small and there is every prospect that certain small craft will not be detected until they are close. Running down a fishing vessel or yacht can have serious implications for both master and whoever was on watch at the time.

Radar performance can be affected by multipath propagation effects. Transmissions to a target will either proceed direct or will be reflected by the intervening surface. Given certain combinations of radar and target height, sea state and range of detection, the direct and reflected transmissions can cancel each other out so that no return transmission is possible. Although not a phenomenon encountered that often, it can occur and is all too easily ignored. If any junior officer wants to impress the old man with his knowledge of wavelengths etc, he need do no more than mutter something about Fresnel Zones to earn a Brownie point.

It is all too easy to ignore radar blind arcs created by funnels, derricks and, occasionally, by cargo.

It is worth casting one's mind back to college days and those interminable lectures about ensuring the radar is set to maximum performance. Whenever you use the radar make sure it is correctly set up, especially in rough sea states or when (to use that delightful expression) precipitation is in sight. In a sandstorm you have a further problem, radar performance can be severely degraded.

An awareness of the potential limitations will prompt the conscientious watchkeeper to use radar as an aid, and not rely on it to the exclusion of everything else. The good watchkeeper will also remember that radar will not tell him what the other vessel's heading is should he be altering course.

We see instances of watchkeepers assuming the information radar provides as gospel. In thick fog we assume the radar and ARPA enable us to determine whether a close quarters situation is developing, or risk of collision exists. We convince ourselves we know what the other vessel is doing and do not even consider reducing speed. Very sadly we see too many instances where such faith is overly optimistic. An over-reliance on radar, and the common practice of proceeding at full speed in fog, are contributing factors in many collisions.

Of all the instruments available to watchkeeping, man, the Mk 1 eyeball, is still the best providing the visibility is sufficiently good. Man might not, without extensive practice, be able to range accurately by eye, but in every other respect an eye is a superb complement to radar-derived information. Even in fog, there will be someone on the bridge doing his or her best to see things visually at the earliest opportunity.

The best watchkeepers find visual lookout superior to radar, and instinctively revert to the traditional and extremely effective way of determining whether collision exists by taking compass

bearings of another vessel to see if they change. One reason for not doing so is that many vessels are no longer equipped with an azimuth circle or pelorus. It is great pity, many an ancient mariner has found them indispensable and never had a problem ascertaining whether risk of collision existed.

The ancient mariner also knew a trick or two about keeping a visual lookout and realised he had to adapt his methods depending on the weather and time of day. He knew about glare and the difficulty of finding the horizon on a dark night. If he wanted to spot a very dim light he knew he was better placed to do it if he averted his gaze by about 2°. The eye makes a much better initial detection when it is slightly offset.

He knew that some sightings are not made on the horizon, and would deliberately look below it for the small vessel or yacht that would first be seen at far closer range.

He would know the importance of looking astern from time to time, and always on the engaged quarter before altering course. Some vessels tend to go quite fast these days, and a 5000 teu container vessel proceeding at 25 knots, and overtaking rapidly on the quarter, is a formidable obstacle should you wish to alter course in that direction without looking first.

Maintaining a watch in perfect visibility while 'dipping through the tropics' and not having seen another ship for a week or more, is very different to doing the same thing while 'butting down the Channel in the mad March days.' The watchkeeper in a congested area such as the Dover Strait has to contend with fishermen, yachts, crossing ferry traffic and, perhaps, poor visibility. He may also be tired.

Fatigue remains one of the most common reasons for not keeping an effective lookout. Very often the causes are outside the control of the individual such as long working hours, poor quality sleep, personal worries, and lengthy periods without proper rest. There are, however, one or two things an individual can do to improve alertness and stamina such as drinking a lot of water, taking regular exercise and eating a balanced diet.

But the biggest obstacle of all to keeping an efficient lookout is allowing oneself to be distracted. The MAIB sees it over and over again. It could be paperwork, taking too long to put a fix on the chart or writing up the log. Dealing with the GMDSS can be a major problem, as can sorting out a defect or the investigation of an alarm. Visitors to the bridge, while often welcome and sometimes very helpful, can be a major distraction. And there are many other events that can severely interfere with this most important of all tasks at sea. The list is seemingly endless; a visit to the heads, the prolonged brew up of a cup of coffee at the aft end of the bridge, filling in the garbage book, or even, would you believe, a requirement to conduct rounds in the engine room!

Of course there are distractions, but the important thing is to manage them. If it is busy out there, set your priorities and do not allow the distractions to take over. If they do and something goes wrong, life could become very uncomfortable indeed.

Two pairs of eyes are better than one when heavy traffic exists, visibility reduces or it is dark. Notwithstanding the clear directive to have an additional lookout at night, there is very clear evidence to indicate that some ships do not comply. This failure to appoint a lookout is a prime reason for a number of accidents each year. Accidents also tend to occur when one person on the bridge is overwhelmed by having to deal with several things at once in a busy shipping lane.

A rather curious feature of some accident investigations is the number of times an officer of the watch has dispensed with the rating on lookout duty. The reasons vary, but sending him below to get a cup of tea is often the prelude to an accident. Sometimes these absences can be very long.

Keeping a lookout can be fairly tedious when there is nothing to look at but an empty horizon for days on end. It is slightly different when you are very tired, in a busy shipping lane and are making your way past sandbanks and other obstacles. The fact remains, however, that all your shipmates, let alone the owner, are relying on you to do a responsible job well. It is all too easy to let other things get in the way and prevent you from maintaining that good lookout.

Guidance from your company and the master is one thing, as is advice in a *Safety Digest*, but the penalties of failing to keep a good lookout in 2002 can be very severe indeed. Don't let it happen. Keep a good and efficient lookout - at all times.

MAIB NOTICEBOARD

APOLOGIES

We apologise to all our readers for the 5 month delay in sending out *Safety Digest 2/2001*. Although the Branch had received its allocation at the end of July 2001, we were totally unaware that all copies destined for distribution through the post were languishing in a warehouse and nobody had thought to inform us they were sitting there. We should have realised there was a problem sooner but sadly didn't. We are extremely sorry. Readers on our distribution list can expect to receive regular copies of the Digest during the first week of April, August and December each year. If they fail to arrive, please let us know.

READERSHIP

The MAIB policy for distributing the *Safety Digest* is to respond to any request for copies by sending them, free of charge, to the individual or organisation concerned. Our target readership is the man or woman working at sea in any capacity and in any vessel. We are also anxious to reach students at nautical colleges and sailing schools. The sole aim of the *Safety Digest* is to draw the attention of seafarers to the lessons that can be learned from accidents in the hope that those at sea will learn something from them, and take the appropriate action to prevent the same thing happening again. We do not advertise as such, but encourage existing readers to encourage others who may not be aware of this service, to contact the Branch. We currently distribute some 9000 copies of each edition, and this number includes multi editions to entire fleets, and an increasing quantity to destinations around the world. They can also be accessed by entering our website at www.maib.dtlr.gov.uk

BOOK REVIEW

It is not normal practice for the MAIB to comment on books, but fishermen may be interested in the recent publication of "*The Sea's Bitter Harvest*" by Douglas A Campbell and published by Carroll & Graff (ISBN 0-7867-0970-7). It tells of thirteen days in January 1999 when four commercial clam boats sank in quick succession while operating off the eastern seaboard of the United States. The book reflects, in some ways, some of the characteristics of Sebastian Junger's "*The Perfect Storm*", but those who take the trouble to read it, perhaps by borrowing a copy from their local library, will be struck by the number of lessons that can be learned - about stability.

APPENDIX A

Investigations started in the period 01/11/2001 - 28/02/2002					
Date of Accident	**Name of Vessel**	**Type of Vessel**	**Flag**	**Size**	**Type of Accident**
22/11/01	CEC Crusader	General cargo	Bahamas	6714	Accidents to personnel
26/11/01	Ocean Star	Fishing vessel	UK	231.48	Accidents to personnel
10/12/01	Sally Jane	Fishing vessel	UK	18	Machinery
14/12/01	Rosebank	General cargo	UK	1213	Fires/explosions
01/01/02	Willy	Oil/chemical tanker	Cyprus	3,070	Grounding
06/01/02	Northern Merchant	Ro-ro passenger	UK	22152	Collision
	Diamant	Ro-ro passenger	Luxembourg	4305	
26/01/02	Galateia	Bulk carrier	Bahamas	38,131	Machinery
30/01/02	Charisma	Fishing vessel	UK	16	Capsize/listing
01/02/02	Sardinia Vera	Passenger ro/ro	Italy	12107	Grounding
02/02/02	Kodima	General cargo	Malta	6,395	Heavy weather damage
14/02/02	Tullaghmurry Lass	Fishing vessel	UK	14	Flooding/foundering
25/02/02	Arold	General cargo	Saint Vincent & Grenadines	858	Collision
	Anjola	General cargo	Antigua & Barbuda	1519	

Appendix B
Reports issued in 2001 (unpriced)

Alfa Britannia - parting of a mooring line while Bahamian-registered tanker was berthing at Tranmere oil terminal near Birkenhead on 18 November 1999, resulting in injuries to crew members on board a gig-boat.
Published 31 January 2001

Alma C - death of a fisherman about 55 miles west-by-south of Thyboron in Denmark on 25 January 2001.
Published 31 August 2001

Angela - capsize and foundering of fishing vessel in the North Sea on 6 February 2000.
Published 26 April 2001

Annandale - flooding and foundering of fishing vessel 16 miles NNE of the Shetland Islands on 23 March 2000.
Published 7 March 2001

Atlantic Eagle - capsize of vessel off St Justinians, Ramsey Sound, 28 September 2000. Published 25 May 2001

Atlantic Princess - man overboard incident from vessel in the English Channel on 23 November 2000.
Published 31 August 2001

Baltiyskiy - accident on the general cargo vessel, resulting in the death of a seaman on 10 September 2000 while on passage from Riga, Latvia to Poole, UK
Published 11 May 2001

Brucestone/Loverval - collision between vessels, River Thames, Purfleet Deepwater Berth, 21 December 2000.
Published 23 August 2001

Celtic King/De Bounty - collision between UK-registered feeder container ship Celtic King and Belgian-registered fishing vessel De Bounty, to the south of The Smalls traffic separation scheme off the south-west coast of Wales on 19 March 2000.
Published 2 February 2001

Coastal Bay - grounding of vessel in Church Bay, Anglesey on 21 July 2000.
Published 9 March 2001

Diamond Bulker - incident on bulk carrier with the loss of two lives, when at anchor in Lough Foyle, Londonderry, Northern Ireland on 5 April 2000.
Published 3 April 2001

Eastfern/Kinsale - collision between Irish-registered cargo ship Eastfern and Cyprus-registered bulk carrier Kinsale 10.6 miles SW of Dover on 25 September 2000.
Published 3 May 2001

European Pioneer - grounding off Fleetwood 1 December 2000.
Published 27 April 2001

European Tideway and Vrouw Grietje -collision between vessels in North Sea on 16 October 2000.
Published 25 May 2001

Evangelos CH - fatal accident to a crew member on board the bulk carrier at the Zulu Anchorage, River Thames Estuary on 20 November 2000. Published 10 August 2001

Fivla - death of an engineer on board vessel in the Bluemull Sound, Shetland on 16 July 2000.
Published 17 April 2001

Fleur de Lys - explosion on board vessel, which then foundered 18 miles south-east of Portland Bill on 16 April 2000.
Published 12 October 2001

Girl Alice - loss of skipper from vessel 1.5 miles south-east of Burnmouth on 19 November 2000.
Published 2 May 2001

Happy Lady - grounding of vessel off Shoebury Ness, Thames Estuary, 21 January 2001. Published 11 May 2001

Highland Pioneer - collision between the offshore supply vessel and the DA jack-up rig of the Douglas offshore installation in Liverpool Bay 27 January 2000.
Published 27 April 2001

Horizonte Claro - grounding of fishing vessel on Soyea Island, Loch Inver, 21 October 2000.
Published 18 May 2001

Inga - death of a crewmember on motor tanker after falling down a pumproom hatch at Pembroke on 7 July 2000.
Published 10 April 2001

Lifeboat Safety Study 1/2001 - Review of Lifeboat and Launching Systems' accidents. Published 22 February 2001

Mariama K - carbon monoxide poisoning on vessel in Douarnenez, France 10 June 2000 - one fatality.
Published 20 April 2001

P&OSL Aquitaine - impact with quay by passenger ro-ro ferry at Calais on 27 April 2000.
Published 19 July 2001

P&OSL Calais - failure of No 5 lifeboat winch on 25 June 1999, and related investigation into self-lifting sprag clutch behaviour.
Published 20 April 2001

Philomena - fatal accident on board vessel in the Moray Firth on 6 March 2001.
Published 31 August 2001

Portsmouth Dory - capsize of school boat on Fountain Lake, Portsmouth with the loss of one life on 16 September 1999.
Published 20 March 2001

Pride of Bilbao - rescue boat falling from Pride of Bilbao into Cherbourg Harbour injuring two people on 1 July 2000.
Published 16 February 2001

Ross Alcedo - fire on board vessel while underway about 32 miles north-west of the Isles of Scilly on 16 January 2000.
Published 15 February 2001

Solstice II - investigation of a fatal accident to a crew member, 25 miles south-west of Rockall 13 May 2000.
Published 18 May 2001

Southampton Boatshow RIB - three persons falling overboard from RIB in River Test on 22 September 2000, resulting in one fatality. Published 3 August 2001

St Helena - engine room fire on 25 August 2000.
Published 4 May 2001

Van Dijck - loss overboard of a fisherman from fishing vessel while fishing 30 miles south-west of Guernsey on 16 April 2001.
Published 5 October 2001

Wightstone/Rose Ryal - collision between Wightstone and the moored yacht Rose Ryal in River Medina, Isle of Wight on 9 November 2000.
Published 8 June 2001

Wintertide/MSC Sabrina - collision between vessels off Texel Traffic Separation Scheme on 13 June 2000.
Published 15 March 2001

Xuchanghai/Aberdeen - collision between vessels at Immingham oil terminal on 12 December 2000.
Published 22 August 2001

MAIB Annual Report for the year 2000

Safety Digest 1/2001: Published April 2001

Safety Digest 2/2001: Published August 2001

SafetyDigest3/2001:PublishedDecember2001

SAFETY DIGEST
Copies of the *Safety Digest* publication can be obtained, free of charge, on application to the Marine Accident Investigation Branch (Mrs J Blackbourn (023 8039 5509)).

Appendix C
Reports issued in 2002 (unpriced)

Beatrice - propulsion failure and subsequent beaching of Class V amphibious passenger craft, opposite the River Thames Fire Station, Lambeth, on 31 March 2001.
Published 1 February 2002

Crimond II - loss of vessel 30 miles north-east of Scarborough on 24 April 2001.
Published February 2002

European Highway - accident to lifeboat and fast rescue craft, Zeebrugge, on 1 December 2000
Published 23 January 2002

Gudermes/Saint Jacques II - collision between vessels in the Dover Strait on 23 April 2001
Published 8 February 2002

Lomur - grounding in the approaches to Scalloway, Shetland Islands on 14 June 2001
Published 15 February 2002

Marine Explorer - failure of lifeboat winch brake in Harwich on 14 March 2001
Published 25 January 2002

Our Sarah Jayne/Thelisis - collision between vessels in the Thames Estuary on 20 June 2001
Published February 2002

Pride of Cherbourg/Briarthorn - near miss between vessels in the Eastern Solent on 7 February 2001
Published 4 February 2002

Randgrid - parting of mooring line between the Tetney buoy and the North Sea shuttle tanker Randgrid, resulting in 12 tonnes of crude oil being discharged into the Humber Estuary on 20 December 2000
Published 8 February 2002

APPENDIX D
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