Marine Accident Investigation Branch (MAIB) - Safety Digest 02/1999

Contents

Case 20
Mistaken Identity

Narrative

Arctic Corsair, a trawler of 53.85m registered length, grounded in Isfjorden, Spitzbergen, on 16 September 1998.

The vessel left Longyearbyen at 0430 and proceeded to sea. The skipper, who was alone in the wheelhouse, cleared Adventfjorden and set a course of 260° on the autopilot towards a position off Erdmannodden on the north side of the fjord. He intended to alter course to port when 2.5 miles off it and head towards the open sea leaving Festningen Island on the south side of the fjord 2.5 miles to port.

While approaching his intended alteration point and using radar as his primary means of navigation, the skipper misinterpreted the echoes on his radar and thought the land ahead of him was Erdmannoden. He altered course when he assumed he was in the appropriate position, came round to port as planned and, soon afterwards, went aground. He then discovered that the land ahead that he had assumed was Erdmannoden was in fact the next, and much higher, headland some 2.5 miles to the west of it. He ran aground on well charted rocks.

No courses were drawn on the chart and no positions were plotted. The skipper navigated by radar alone with occasional reference to the chart. Two radars were operating; one on 3 miles and the other on 32 miles range. A watch alarm was not fitted.

The vessel had been in port since 1320 to clear a fouled propeller. Since 0600 the previous morning the skipper had only managed to sleep between 0140 and 0345. He was keen to resume fishing as soon as possible and decided to sail before dawn. The mate had been on duty throughout the night and the skipper decided to take the first watch to allow the mate to get some sleep. The vessel also carried a qualified second mate who had been asleep since 2100.

Although company standing instructions required a lookout to be posted, the skipper did not normally do so.

The grounding ruptured two fuel oil tanks and caused extensive damage to the hull but there was no evidence of pollution and flooding was restricted to double bottom tanks.

Following the accident, the master was tested for alcohol by the Norwegian authorities. It proved negative.

The management company has since issued a memorandum to each of its vessels highlighting the lessons to be learned from the accident. The company intends to provide its officers with specific training in leadership skills and to enhance their watchkeeping skills by seconding them to vessels other than trawlers.

 Click on the thumbnail to view the accompanying chart (195 KB)

The Lessons

1. The root cause of the accident was the lack of a proper passage plan. The distance from Longyearbyen to the open sea is about 35 miles. Isfjorden itself is deep and about 7 miles wide at its narrowest. One or two places on the southern shore, including Festningen, are marked by lights. Spitsbergen is not exactly on a main shipping lane and there is only one British Admiralty chart that covers the entire territory known as Svalbard. Nevertheless, study of this chart shows that it is possible to plan a passage to sea through Isfjorden keeping at least three miles clear of danger and without steering for any headland.

2. By any normal reckoning it was a very straightforward passage. Before sailing, courses should have been drawn on the chart, dangers highlighted, minimum soundings identified, the ranges of lights marked and parallel indexes calculated. The range scales of radars should have been selected with care.

3. The lack of any passage planning was aggravated by the skippers total reliance on radar as his prime means of navigation. Had he used any one other skill, the chances of his not going aground would have significantly increased and would probably have been avoided. Had he used all the tools necessary for responsible navigation his passage to sea would have been without incident. So what didnt he do? Not only did he fail to draw a course on the chart but he never plotted a fix. Without a fix, no DR was calculated. He relied totally on radar detecting land ahead. Without parallel indexes he never gave himself an opportunity to check his displacement to one side of the channel or the other. The fjord shoals towards either shore but there is no record of him having used the echo sounder. It would have warned him that he was on the wrong side of the 100 fathom line.

4. A second contributory cause was the choice of radar range scales; one was too high to be of practical use and the other too low to identify the land in sufficient time. An intermediate range scale would have enabled detection of the adjacent headlands and an opportunity for the skipper to recognise his error. Radar is only an aid to navigation, and misidentfying land echoes is one of the oldest mistakes in the book. All conscientious navigators cross-check the positions obtained with a secondary source. If this cannot be done, veer on the side of caution and assume the vessel is in the position nearest to danger. And take the appropriate action.

5. Although there is no evidence to suggest the skipper fell asleep, a tired man can never be as alert as the one who is properly rested. The risks involved in putting to sea when short of sleep and without any navigational planning were very high indeed. The possibility of a lone watchkeeper falling asleep where there is no watch alarm fitted can never be discounted. Without the provision of a dedicated lookout there is always the risk that whoever is on watch will be reluctant to spend too much time attending to basic navigation.

6. The second mate was rested and could have taken the watch. The skipper could have delayed sailing.

Case 21
Two Recent Flooding Cases Vessels Saved by the Bilge Alarm

Narrative I

This 19m long wooden fishing vessel *Helenus* touched bottom. A short time later the bilge alarm in the fish hold went off prompting the crew to inspect the hold. It was flooding. The rate of water ingress was greater than the bilge pumps could handle so the coastguard were contacted for assistance and the vessel headed for the nearest port. Watertight bulkheads either side of the fish hold restricted the extent of flooding and the vessel made port safely. She was met by a fire brigade tender and pumped dry.

The cause of the flooding was damaged planking from the earlier contact with the seabed.

Narrative II

In a severe gale the bilge alarm went off on the 30m long steel beam trawler *Noordpool*. It was found that the engine room was flooding from the fractured casing of the main engine driven cooling pump. An auxiliary driven bilge pump was started. Since the vessel was close to a lee shore it was imperative that the main engine was kept running but, to limit the rate of flooding, it was slowed down.

When the flooding reached the main engine flywheel, water began to be sprayed around the compartment. The engine was shut down and the valve to the sea water inlet closed to stop the flooding. This provided the engineers with an opportunity to investigate why the bilge pumping was so ineffective.

By now the vessel had begun to drift onto the lee shore The coastguard was alerted and a RNLI lifeboat and rescue helicopter were launched to assist.

The engineers discovered that the bilge pump was sucking in air from the fish hold which was known to be dry. Although the bilge line valve to the fish hold had been isolated so that the engine room bilges could be pumped, debris inside the valve body prevented it from being closed fully. Once it had been cleaned the bilge pumping system was returned to full working order. This, together with a salvage pump from the lifeboat, managed to lower the water level in the engine room so that the main engine could be restarted. *Noordpool* was escorted safely to the nearest port by the lifeboat.

The Lessons

1. Both cases illustrate the benefits of bilge alarms, functioning bilge pump systems and watertight bulkheads in limiting the severity of a flooding incident.

2. The second incident shows the importance of maintaining a vessels bilges free of rubbish so it cannot be drawn into the bilge system.

3. Valves on a bilge system must be regularly checked for correct operation.

Case 22
Fishing Vessel Runs aground after Main Engine Failure

Narrative

The 24.5m fishing vessel *Aalskere* was returning to Kirkwall from the fishing grounds west of the Orkney Isles.

A course was set via the Westray Firth, round Kili Holm then south past Egilsay, Gairsay, and through the channel to Kirkwall. The vessels route through the Westray Firth was plotted on the video plotter.

The skipper took the first watch. The mate/engineer made the normal checks in the engine room on the oil/fuel pressures and levels and joined the skipper on watch in the wheelhouse. The remainder of the crew turned in for some sleep prior to reaching Kirkwall.

After rounding Kili Holm in a position approximately 0.5 mile south-east of Mae Ness Point on Egilsay, the main engine began to falter and, after a short period, stopped. The mate/ engineer went down below to investigate.

After informing the skipper that a problem with the fuel system was suspected he by-passed the water trap filter, changed over duplex filters on the in-line fuel supply and tried to restart the main engine. He was unsuccessful. He then proceeded to replace the three main engine filters. The skipper instructed the remainder of the crew to shackle up the trawl doors, and lower them to provide a form of anchor to offset the tidal stream which was setting the vessel onto Mae Ness point.

Before the planned actions were completed, *Aalskere* ran aground. Some 15 minutes had elapsed since the engine stopped.

There was no interior damage or flooding. Once the filters had been changed and the fuel system bled, the main engine was successfully restarted. Using astern power she was refloated with the aid of the Kirkwall lifeboat.

The filters had not been changed for seven weeks prior to the accident.

 Select the thumbnail to view the accompanying chart (227KB)

The Lessons

1. Skippers navigating in confined waters rely on three things, accurate navigation, a good lookout and reliable engines. Remove any one of these ingredients and there is potential for the vessel to go aground. The damage in this instance was only minimal. Next time it could be much worse, so what went wrong?

2. The main engine failed due to fuel starvation caused by dirty fuel oil filters. Always ensure that you have an adequate maintenance procedure in place which includes the regular

changing of all main engine filters. It should also embrace the regular drainage of water and sludge from the main fuel oil storage tanks.

3. When navigating in narrow channels or close to the shore, good seamanship dictates the engine room be manned and the anchor ready for letting go.

Footnote

The MAIB is aware that in many fishing vessels the anchor is rarely, if ever, used. It is often found to be very well secured and obviously untouched over lengthy periods. Skippers should reflect that in extremis it is the one item of equipment that may prevent a vessel from drifting ashore. Before any anchor is used, skippers should know the length of cable attached and be sure the inboard end is properly connected in the chain locker.

Case 23
Deckhands Injured whilst Shooting Pots

Narrative I

The 13m crabber *Bosloe* was re-shooting a fleet of pots when a bight from the back rope caught the leg of a deckhand as he was lifting the pots over the side.

The deckhand was dragged against the vessels bulwark as the bight of rope tightened.

The skipper immediately came full astern on the engine. While one crew member held onto the deckhand to prevent him going over the side, the fourth member of the crew cut the back rope with a knife kept handy for emergency purposes.

Although the deckhand was prevented from going over the side by the quick thinking of the skipper and crew, he sustained heavy rope burns to the lower leg.

The skipper made arrangements for an ambulance to meet the vessel on her immediate return to Plymouth.

After two operations on the deckhands lower leg, he was expected to make a full recovery.

Narrative II

The 13m creel boat *Dunan Star* was also in the process of shooting pots from the starboard side when the back rope, stowed in the fish hold, whipped out so that a bight caught one of the deckhands around his ribs and neck.

Normally a cover was kept over the fish hold to prevent this happening, but it was not being used on this occasion.

The deckhand was dragged against the vessels side as the bight tightened. The skipper put the main engine full astern while another crewman cut the back rope in time to prevent the deckhand going over the side.

The deckhand sustained heavy bruising and rope burns.

The Lessons

Shooting pots is hazardous.

1. When shooting pots always stand clear of them and associated ropes. Pay particular attention to keeping your feet out of the bights of back rope.

2. The operation is safer when the pots are stowed in rotation, with the back rope stowed separately and carefully so that it runs freely and without any snags.

3. A readily available sharp knife played an important part in both incidents.

Footnote

The *Fisherman and Safety* booklet, free of charge and available from the Maritime and Coastguard Agency is a guide to the safe working practices for fishermen.

Case 24
Steering Failure

Narrative

While going about his normal business the skipper of the small fishing vessel *Gillian* S suddenly found he had no steering after the casting around the tiller arm had fractured. He had to be towed in by the lifeboat.

This 7.62m fishing vessel was approaching turbulent sea conditions off Portland Bill when the skipper decided to change from autopilot to hand steering. Shortly after he changed over, he became aware that control of the steering had been lost. He immediately notified the coastguard who arranged for the local lifeboat to tow him in. While waiting for the lifeboat, the skipper checked the steering gear and found that the cast aluminium alloy tiller arm secured to the top of the rudder post had developed a vertical fracture around the tiller keyway and that a large section of the casting had broken away. This allowed the key locking the tiller arm to the rudder post to come free leading to complete loss of rudder control.

After arrival in port, the aluminium alloy tiller arm casting was inspected and the following found:

- Mechanical damage running up the inside face of the casting for a distance of about 25mm and about 10mm wide (the approximate width of the key) with a tapering depth from zero at the base to 0.5mm at the top. This damage ran parallel to the keyway.
- A 10mm crack on the remaining body of the casting running along the bottom of the keyway and extending backwards through the main casting into the tiller arm itself.
- A narrow wedge shaped piece, approximately 48mm long and 15mm wide, had broken away. Discoloured edges where it met the side of the keyway suggested the cracks had developed from the base of the casting upwards, along the bottom corners of the keyway and into the body of the casting.
- A large triangular section of the casting had broken away. The top of the keyway side forming part of the triangular section had mechanical damage with heavy lip, surface cracking and indentations.
- Both the main body of the casting and the triangular section had significant sections of internal porosity adjacent to the working surface of the tiller arm/rudder post interface. In short there was a lot wrong.

There appear to be two parts to the story of this casting failure:

a. the development of a crack in the tiller arm, and

b. the fracture of the casting itself.

The mechanical damage seen in the bore of the main casting was most probably due to casting fragments breaking away from the keyway area and becoming wedged between the rudder stock and the casting.

The origin of the crack in the tiller arm was most probably due to poor fitting of the tiller arm locating key in the keyway. This looseness of the key allowed the key edges to roll into the bore of the tiller arm setting up a wedge between the tiller bore and the rudder post. Once established, normal operational movements of the tiller and rudder would cause rapid local wear and increased stress levels.

The bore face of the tiller arm, although showing no visible evidence of casting porosity, had a number of in hole defects very close to the working face. It is likely that with high stress levels developing at this working face, material breakdown occurred with small particles breaking off and forming wedges between the rudder post and the bore face of the tiller arm.

A combination of a loose key and local weakness in the bore face due to porosity resulted in the failure of the casting due to increasing movement between rudder post and tiller arm. This increasing movement, and the rising stress levels brought about by this movement, eventually led to a torsional failure of the tiller arm casting.

The Lessons

1. The fitting of keys in keyways requires care and the use of good fitting practice. Keys should be a good fit in both the drive and driven keyways. They should be the correct length and thickness for the keyways, with the ends rounded and all surfaces smooth. The keyways should be undercut at the corners and all stress raisers removed.

2. Keys and keyways are often seen as a small part of the whole but they are a vital part and failure here, often results in total failure of the machine and the loss of control.

Footnote

This narrative has a distinctive engineering flavour to it and has been included to remind fishermen that like their big ship brethren, material defects can often occur at the most inconvenient moments. Most fishermen take a keen interest in the repair and maintenance of their craft. This incident should heighten their awareness of the problems caused by the poor fitting of a tiller arm locating key.

Case 25
Fishing Vessel Flooded during Bilge Pumping

Narrative

When hauling the prawn trawl on board, the skipper sensed that his 6m long steel fishing vessel *Val G* was down by the head: he was working in rough seas some 8 miles south of Ayr. The crew lifted the deck hatch to check the condition of the fish room and discovered it was flooded to a depth of about 1.6m. Watertight bulkheads either side of the fish room prevented the spread of the flooding. The coastguard were alerted and the Girvan and Troon RNLI lifeboats were launched to assist, as was a rescue helicopter. The vessel was towed into Troon and pumped dry.

The source of the flooding was the vessels own bilge pumping system which had been recently renewed. The skipper had set the valves with the intention of pumping out from the fish room, but in fact they had been inadvertently set to pump sea water in. A bilge alarm was fitted to the fish room and was in good working order. Unfortunately it had been switched off.

The Lessons

1. Do not switch off bilge alarms when going to sea. A basic pre-sea check is to ensure they are switched on and functioning correctly. A non-operational bilge alarm, or one that is not switched on could be the difference between a successful fishing trip and a disaster. At worst it could result in the loss of a boat and a means of earning money.

2. In small vessels, it is essential that all crew members should know how to operate the bilge pumping system.

3. This accident has once more demonstrated the value of watertight bulkheads in preventing the spread of flooding.

Part 3 Leisure Craft

One of the most safety conscious sectors in the marine community are the leisure craft users. Whereas fishing newspapers rarely devote much space to safety matters except in the aftermath of a tragedy, the yachting and motorboat press devote page after page to safety. Much of it is pertinent, some of it is based on personal experience and all of it provides food for thought. Occasionally the yarns are very amusing. A touch of humour can be very effective in pushing a message home.

This is largely borne out by the relatively small number of serious accidents involving leisure craft. There are any number of small ones and there will be few yachtsmen who can put their hands on their hearts and say that his last time at sea was totally trouble free or that he didnt do something that in retrospect was pretty stupid but thankfully nobody was watching. Where the majority of leisure craft users are at a serious disadvantage over their professional colleagues, is in the accumulation of experience. The person who only goes sailing a few times each year can hardly hope to match the experience of someone who is at sea in all weathers year after year. Even the most experienced and well respected yachtsmen will be the first to admit they always learn something whenever they set sail. Every passage, race, potter or circumnavigation is a learning experience. The important thing is to learn from them.

The *Safety Digest* plays a small part in this process. It describes various accidents and deliberately reflects on certain features for people to think about and, hopefully, learn. It cannot possibly replace real life experience but it might prevent some of the more tragic accidents from repeating themselves.

If the leisure craft sector has a problem, it is with the near misses; the accidents that nearly happened but were somehow avoided at the last moment. In most circumstances the only visible consequence is probably a badly frightened helmsman, or a skipper pouring himself an extra large gin when he finally gets home. None of these near misses are particularly new but are exemplified by the helmsman who insists on crossing ahead of that large container ship bearing down on him in a narrow channel but knows full well he should have given way. Or the man working on deck at night trying to take in a reef but isnt clipped on or wearing a lifejacket. Or the man who thinks he can smell gas and switches on the cabin light so he can see better. Everyone of us has some experience he would rather forget about but it is vital we learn from them, and even better when the lessons stem from somebody elses misfortunes.

Safety briefings are an important feature of life afloat. Skippers are reminded that peoples lives may be placed in jeopardy if those embarked are not given a safety brief before getting under way. This will obviously have to be tailored to the experience and knowledge of those present, but at the very least everyone should know where the lifejackets are stowed and how to put them on. They should also be shown where to stow things so that personal gear doesnt get in the way or breaks loose the first time you go about. The greatest shortcoming in yachts that proudly feature accommodation for eight is that the readily available stowage space is about right for two. Other essentials in safety briefings is knowing where the fire extinguisher is, where the first aid kit is stowed and reminding people of that traditional marine adage, one hand for yourself and one for the boat.

Case 26
Yacht Knocked Down in Bay of Biscay. One Man Lost

Narrative

The Beneteau Oceanis 390 *Ocean Madam* was on the final leg of a delivery voyage from Malta to Plymouth, UK, when she was knocked down twice in a severe gale while sailing across the Bay of Biscay in a force 9 severe gale. She recovered from the first knockdown but remained inverted after the second. Her skipper and one of the two crew members survived but the second was swept away and never recovered.

Ocean Madam was skippered by an experienced yachtmaster but her two crew had little previous sailing experience.

Before leaving her last port of call, La Coruña, weather forecasts had been received indicating strong to gale force winds, up to force 8 from the south-west in the Bay of Biscay. Once *Ocean Madam* was at sea BBC Radio shipping forecasts were taken. Winds up to severe gale force 9 were forecast in the northern part of the Bay of Biscay.

On their second evening at sea and when about 110 miles south-west of Brittany, conditions developed as forecast. Steep seas with wave heights of 79m were encountered with a south-westerly force 9 blowing. Occasional waves were observed to be coming from the east which created a confused sea.

With one of the crew at the helm, and under shortened sail in the dark, the yacht was laid flat by a wave. She righted immediately but the event alarmed both skipper and crew. The skipper took over the helm and retained one of the crew on deck to help him. An hour later the yacht was knocked down again but this time she inverted and failed to recover. Once he realised she was not going to right itself, the skipper extricated himself from the submerged cockpit and found his way to the surface where he managed to cling to the transom-mounted boarding ladder.

After an indeterminate period the yacht righted herself and this enabled the skipper to climb back on board. On regaining the cockpit he discovered that the yacht had been dismasted and that he was alone. There was no sign of the crewman who had been on watch with him. When last seen he been wearing a lifejacket and safety harness and had been clipped on. There was no indication of harness failure so it is assumed he had unclipped himself when trapped under water.

The off-watch crewman came on deck after seeing water pouring into the cabin through the open hatch. The situation was aggravated by the washboards falling out.

The two survivors could hear shouts from the man overboard but were confronted with an inflated liferaft that was flailing around in the wind and required securing. This became their immediate priority. In the meantime the crewman activated the yachts EPIRB while the skipper donned his lifejacket.

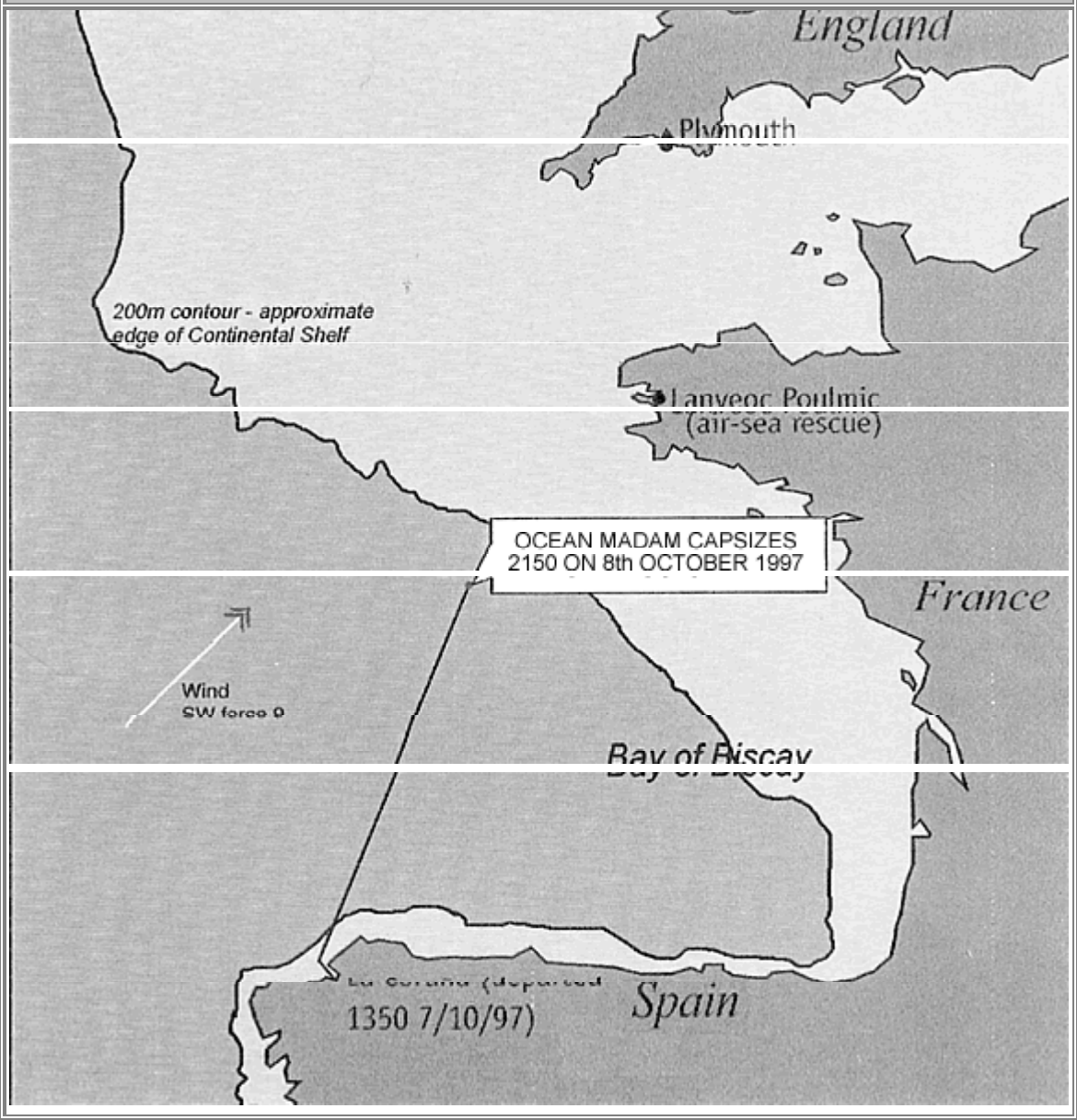
The only way to secure the liferaft in the extremely difficult conditions was for the two men to climb into it and make it fast. With both men in the liferaft another wave broke over them and the painter parted before it could be secured. Within seconds they were being swept away. Although any realistic chance of saving the missing man had now passed, they hoped it could still be achieved. Before anything further happened another wave broke over them and capsized the raft.

Attention then turned to survival. They had great difficulty trying to right the capsized liferaft and were finally forced to climb onto it with it upside down. It capsized again.

They managed to get back on board and spent the next few hours trying to keep warm. They also set off several flares to try and attract the attention of what they thought were passing ships. Meanwhile the EPIRB had successfully operated to alert the French SAR authorities. In the early hours of the morning a fixed wing aircraft found them and at 0530 they were rescued by a French air-sea rescue helicopter.

The missing crewman was never found.

Figure 1: Bay of Biscay showing location of incident



Lessons Learned

Introduction

Any death at sea prompts questions as to whether it could have been avoided. Such questions become more pointed when the events are associated with a leisure activity. Sailing involves many risks and a voyage in bad weather attracts more risks than most. The cause of this accident was bad weather but there were many underlying factors which contributed to the final outcome. As in all accidents there are several lessons to be learned both in the lead up to the capsize and in the hours that followed.

The Lessons

1. The ability to survive in heavy weather is dependent on three factors; a suitable boat, thorough preparation and an experienced and well worked up crew. Providing all three criteria can be met, there are no overwhelming reasons why sailors should not confront these conditions. But as soon as any one of these requirements is ignored, overlooked or underestimated, the risks escalate. If all three are disregarded then the attempt becomes dangerous and the consequences potentially tragic.

2. In deciding whether a boat is capable of standing up to bad weather, there is little to replace practical experience of the actual craft and a sensible appraisal of what it is capable of. This must be supported by an understanding and knowledge of equipment carried and the boats handling characteristics. Once the shelter of the land is left behind, a skipper is placing great trust in the boats design, her rigging, maintenance and watertight integrity. Any small boat is subjected to immense forces in heavy weather and if anything unexpected gives, disaster can follow.

3. *Ocean Madams* skipper knew the boat and had already sailed several hundred miles in varying weather conditions on this voyage without cause for concern. He did not, however, know enough about her stability to predict her performance in the heavy weather likely to be encountered in an autumn gale in the Bay of Biscay. Yachts are designed for particular conditions and should not be deliberately placed in situations for which they are unsuitable. There is a world of difference between a craft suitable for summer cruising and one designed to cross oceans in all weathers.

4. If the stability characteristics of a modern high displacement sailing yacht are unknown, err on the side of caution. Breaking waves in high sea states can be extremely dangerous to this type of craft.

5. The decision to sail is always the skippers. He should not be influenced by perceived peer group pressures but must make a realistic judgement based on sound knowledge. If there is no need to sail when bad weather is forecast, there is nothing to be lost by delaying the departure until conditions improve.

6. Weather forecasting continues to improve but skippers have, ultimately, to make their own judgement based on the best possible data. This includes an analysis of a series of weather reports, in depth study of the sailing directions and local information. Many yachtsmen think of weather in terms of wind strength and the Beaufort Scale. The very experienced sailor goes one further and thinks of it in terms of sea state. A force 9 severe gale in the Solent is one thing; it is something completely different in the shallow seas of the North Sea or the open wastes of the Southern Ocean. High seas can come from different directions; not just the one forecast. This unpredictability is one of the factors that makes them so dangerous. Significant wave height is one thing, the maximum height is another; it can be substantially higher.

7. The skippers greatest asset is a good crew. A well worked up team who get on well together is a pearl beyond price. Leading such a crew is a great challenge and very rewarding. It is as important a function as an in-depth knowledge of the sea and sailing and can be overlooked. Once mutual trust begins to break down, or inexperience creeps in and tiredness takes a hand, the problems escalate. Handling a yacht in rough weather makes huge demands on a crew, especially when their experience of such conditions is either very limited or non-existent. If too much is expected of them, they are unlikely to be sufficiently effective. The problems can also escalate if the crew is short handed or they succumb to sea sickness.

8. Handling a boat well in heavy weather can only come with experience. It is not something you acquire from books, but there is a mass of available literature with some extremely good advice that should not be overlooked. Skippers will devise their own systems and check lists to prepare for, and conduct, heavy weather sailing. Such checks will have two underlying themes; keeping sea water out of the boat and the crew in it. The fitting of washboards falls into one category, the wearing of lifejackets and safety harnesses is in the other.

9. EPIRBs should be registered correctly with the Maritime and Coastguard Agency, and a double check made to ensure it has been done if someone else is doing it for you.

10. The two survivors in this accident had a reason to climb into the liferaft. Under normal circumstances it is invariably more sensible to stay on board. Yacht hulls usually survive the worst the weather can do.

11. Among the most important items of kit carried on board any vessel, including yachts, are those relating to lifesaving. It is too easy to assume that because they are on board they will work when required. Every owner should have a system for ensuring that all lifesaving equipment is thoroughly checked and any requisite servicing is meticulously carried out by the dates due. They should check that flares are in date and kept dry, that jackstays are maintained in good working order, that lifejackets are in good condition and that the effects of UV light do not weaken the fabric of equipment carried on the upper deck. Danbuoys should not disintegrate when removed from their stowage.

12. When planning the contents of a grab or panic bag, give careful thought to the circumstances under which it might be opened. It wont be on the kitchen table at home or the skippers bunk in harbour. It is much more likely to occur in a tossing liferaft in rough weather in the middle of the night, when you are almost certainly feeling distraught, shaken and very distressed. You might even be injured or even very ill. The question to be answered is: what will I need and what am I likely to want first?

13. The skipper of *Ocean Madam* had attended a sea survival course. The MAIB is seeing evidence that attendance on this course is proving to be a life saver literally. It is very highly recommended.

14. Keep the registration details of EPIRBs up to date with HM Coastguard. This can be achieved via a simple fax.

Case 27
Four Die in Narrow Boat Accident

Narrative

The narrow boat *Drum Major* was transiting the Leeds and Liverpool canal during the afternoon of 19 August 1998 with eight people on board. Four were disabled with learning difficulties and were sitting in the lounge area of the accommodation. The rest were social service carers who operated and controlled the boat through the locks.

During their return cruise to the boatyard, *Drum Major* entered Steg Neck lock near Gargrave in preparation to descend in what should have been a perfectly normal, and familiar, operation. However on this occasion she was joined by another similar sized boat. She lay alongside the left hand side of the broad lock with the other boat lying next to her on the other side. In accordance with established practice, care was taken to ensure the rudder was clear of the top gate and the cill that lay beneath it.

Both paddles were opened to release water from the lock and the level started to go down. Shortly afterwards it was realised *Drum Majors* bow fender (commonly known as a turks head) had caught in the narrow gap between the balance beam and the top of the gate. As the water level continued to be lowered, frantic efforts were made to release the fender. They failed and she became suspended by the bow. She assumed an increasing bow up angle until the stern was sufficiently depressed to allow water to start pouring in over the stern and into the accommodation.

As soon as they became aware of what was happening, immediate steps were taken to stop the lock draining and to open the gate paddle at the top end of the lock to refill it. The water released by this action poured into the stern deck but within seconds the suspended bow slipped from the lock gate allowing *Drum Major* to fall heavily into the lock and create a wave that swept through the boat. The surge of water sank her. The four disabled people on board became trapped inside and were drowned before they could be rescued.

The Lessons

1. The procedures for taking a narrow boat through a lock are straightforward and anyone using inland waterway canals should be familiar with them once they have done it a few times. Of the many precautions they need to take when descending, boat handlers should be aware of the need to keep the boat clear of the top end gate and its cill. These precautions were taken on this occasion but less attention was paid to what was happening at the other end. Keep an eye on both ends when ascending or descending in a lock.

2. This accident draws particular attention to the need to check that the bow fender is clear of the adjacent gate and cannot be caught as the level is lowered. Before any paddle is opened to empty a lock, a positive check must be made that it is clear before, and immediately after, they are fully opened. If there is a problem, the paddles must be shut as fast as possible.

Drum Major in Steg Neck Lock

Drum Major fender caught on the lock gate

Appendix A

Investigations commenced in the period 01/05/99 30/09/99					
Date of Accident	**Name of Vessel**	**Type of Vessel**	**Flag**	**Size**	**Type of Accident**
03/05/99	Edinburgh Castle	Cruise	UK	32,753 gt	Accident to Personnel
14/05/99	Wahoo	Small Commercial Sailing	UK	9.2m	Accident to Personnel
18/05/99	Sea Centurion	Royal Fleet Auxiliary	UK	21,104 gt	Accident to Personnel
29/05/99	Unnamed Dory	Pleasure Craft	UK	4.34m	Foundering
06/06/99	Willem B	Tug	Netherlands	42 gt	Accident to Personnel
07/06/99	Purbeck II	Fishing Vessel	UK	11.03m	Accident to Personnel
13/06/99	Toisa Puffin Luc	Offshore Supply Fishing Vessel	Bahamas UK	282 gt 16.95m	Collision
25/06/99	P&O SL Calais	Ro-Ro Passenger	UK	26,433 gt	Dangerous Occurrence
30/06/99	Lord Trenchard	Sail Training	UK	25.03 gt	Explosion Vessel
03/07/99	Random Harvest	Small Commercial Motor	UK	9.86m	Flooding
16/07/99	Dea Fighter	Offshore Supply	UK	1,022 gt	Dangerous Occurrence
17/07/99	Purdy	Small Commercial Motor	UK	10m	Accident to Personnel
03/08/99	Sharona	Fishing Vessel	UK	18.75m	Foundering
06/08/99	Radiant Star III	Fishing Vessel	UK	24.38m	Foundering

07/08/99	Bluebell of Warsash Unknown	Pleasure Craft Unknown	UK	10.44m	Collision
15/08/99	Fraoch Ban	Fishing Vessel	UK	15.12m	Capsize
31/08/99	Donna M	Fishing Vessel	UK	8.80m	Capsize
01/09/99	Sonia	Gen Cargo	St Vincent & the Grenadines	4,659 gt	Flooding
02/09/99	Union Arbo Philomena	Gen Cargo Multi deck Fishing Vessel	Bahamas UK	1,522 gt 27.30m	Collision
10/09/99	Jasper III	Fishing Vessel	UK	24.20m	Foundering
16/09/99	Wilson Flyer	Pleasure Craft	UK	4.2m	Capsize

Appendix B
Inspectors Inquiries

An Inspectors Inquiry is the highest level of investigation carried out by the MAIB. Reports arising from such Inquiries are normally submitted to the Secretary of State for the Environment, Transport and the Regions within twelve months of the date of the incident.

Such reports are published, subject to the approval of the Secretary of State.

The following accidents are at present subject to Inspectors Inquiries and will be submitted to the Secretary of State:

Name of Vessel	**Brief Details**
Island Princess	**Passenger Cruise Ship; Economiser Accident**
Rema	**Coastal General Cargo Vessel; foundered in North Sea**
Multitank Ascania	**Fire on chemical tanker in Pentland Firth**

Appendix C
Reports issued in 1999

Sapphire Sinking of fishing vessel on 1 October 1997 with loss of four lives
Published 18 March 1999
ISBN 1 85112 107 2
£10

Gaul Report on the underwater survey of the stern trawler and supporting model experiments
Published 16 April 1999
ISBN 1 85112 171 4
£20

Sand Kite Collision of dredger with the Thames Flood Barrier on 27 October 1997
Published 24 April 1999
ISBN 1 85112 108 0
£20

MAIB Safety Digest 1/99
Published May 1999

Margaretha Maria Sinking of fishing vessel between 11 and 17 November 1997 with loss of 4 lives
Published 22 July 1999
ISBN 1 85112 109 9
£12

MAIB Annual Report 1998
Published 3 August 1999
ISBN 1 85112 184 6
£16

Green Lily Grounding of cargo vessel on 19 November 1997 with loss of one life
Published 11 August 1999
ISBN 1 85112 183 8
£12

The publications home page contains information on how and where you can obtain publications produced by the Department for Transport.

A list of Stationery Office stockists and distributors outside the UK appears in Appendix D.

SAFETY DIGEST
Copies of this publication can be obtained, free of charge, on application to the Marine Accident Investigation Branch (Mrs J Blackbourn 023 8039 5500).

Appendix D
Stationery office stockists and distributors overseas

If there is no agent in your country and you have difficulty placing an order, please write to:
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