MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

Leisure craft

SAFETY DIGEST

2nd Edition

MAIB

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This *Safety Digest* draws the attention of the leisure community to some of the lessons arising from investigations into recent accidents. It contains facts which have been determined up to the time of issue, and is published to provide information about 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.

This *Safety Digest* is comprised of 23 articles written in the past four years.

The *Safety Digest* is only available from the Department for Transport, and can be obtained by applying to the MAIB. Other publications are available from the MAIB.

Marine Accident Investigation Branch

The Marine Accident Investigation Branch (MAIB) is an independent part of the Department for Transport. The Chief Inspector of Marine Accidents is responsible to the Secretary of State for Transport.

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

Extract from The Merchant Shipping (Accident Reporting and Investigation) Regulations 2005

The fundamental purpose of investigating an accident under these regulations is to determine its circumstances and the cause 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.

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

The telephone number for general use is 023 8039 5500.

The Branch fax number is 023 8023 2459.
The e.mail address is maib@dft.gsi.gov.uk

Safety Digests are also available on the Internet: www.maib.gov.uk

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Chief Inspector's Foreword

For those who have not read one, the MAIB produces thrice yearly a Safety Digest, containing anonymised accounts of accidents and incidents at sea, together with the lessons that seafarers should learn from each case. Believing in the principle that it is better to learn from others' mistakes than finding out the hard way for oneself, the MAIB is not in the business of blame or litigation, but is purely interested in future safety.

This Safety Digest is a compendium of 23 cases of leisure craft accidents culled from our regular Safety Digests of the past four years. It is offered to all who enjoy boating of any size or shape, at sea or on inland waters. I urge you to read through both the sailing and the power sections – there are lessons for all of us in both sections.

With this number of cases, it would be simplistic for me to try to stress any lesson as more or less important than any other. What I would ask is that in preparation for each trip you give a thought to safety. "Risk Assessment" has got a bad press, so let us think about risk awareness! A quick mental check of the risks – and how you would avoid them – would make everyone's life safer: How do I ensure no one falls overboard – and how will we deal with it if someone does? What is the weather forecast and are we equipped for both the forecast weather and any unexpected squalls? What will we do in the case of mechanical breakdown? How will we raise the alarm if required – who will raise the alarm for us if we can't? What are the navigational hazards – and how will we ensure we miss them? None of this is difficult, but it is important. And please always brief your crew so that they know what to do in an emergency, particularly if you become incapacitated.

Take safety seriously and *be* safe on the water.

Stephen Meyer
Chief Inspector of Marine Accidents

If you find this interesting and instructive, think about putting your name on the distribution list for our regular Safety Digest – it is free!

Sailing vessels

CASE 1

The Tragic Consequences of Not Wearing a Lifejacket

Narrative

A sailing club was holding its regular summer Wednesday evening race for the keelboat members of its club. That evening, a force 5–6 was anticipated outside the harbour breakwater. After a short discussion with the race officer to decide on a particular course, the yacht crews prepared their boats to race. Seven boats took part in the race, the majority of which were cruiser/racers.

One of the racers was a distinctly different type of boat. This was an 8m sportsboat, equipped with an asymmetric spinnaker on a retractable bowsprit which enabled it to plane at speeds over 20 knots. The boat did not have an inboard engine fitted but, as required by class rules, did have a small outboard which was stored inside the hull near the mast.

The sportsboat had a crew of six on the evening of the accident. Earlier in the year, the sportsboat had been bought jointly by five of the crew on board. The helmsman was a very experienced and accomplished sailor who had sailed a variety of different craft over many years. The rest of the co-owners had only crewed sailing boats occasionally prior to buying the sportsboat. The sixth member of the crew had been invited along by the helmsman. He was an experienced racing crew, but this was his first time on the sportsboat. All of the crew were wearing sailing waterproofs. Two of the crew were wearing no personal buoyancy: the helmsman, who had chosen not to wear a lifejacket, and a crewman who had left his lifejacket in his car.

Prior to the race, the crew on the sportsboat completed some practice manoeuvres, including raising and lowering the asymmetric spinnaker. The race then began and the sportsboat, with the asymmetric spinnaker flying, crossed the starting line on a starboard tack (sails on the port side). Sometime later, the crew successfully gybed the sportsboat on to a port tack (sails on the starboard side) and set course to pass the end of the breakwater into the open sea. The sailing was exhilarating and everyone on board was enjoying themselves.

Just as the sportsboat cleared the end of the breakwater, the retractable bowsprit pole snapped at the point where it passed through the hull. The boat slowed down and the crew lowered the spinnaker and retrieved the broken bowsprit over the open transom on the starboard side. The helmsman asked if everyone was content to continue racing under the main and jib only, to which they all agreed. The helmsman then tried to gybe to head for the first racing mark, but could not as the boat was moving too slowly. All of the crew apart from the helmsman were on the starboard side of boat clearing the spinnaker. After attempting to gybe on two occasions without success, the boat suddenly did gybe and heeled heavily to port. As a result, the helmsman fell overboard from his position on the port quarter.

The crew noticed the helmsman in the water, just as he shouted to them to turn the boat around. The guest crewman took the helm, but was unable to manoeuvre the boat as it had turned bow into wind and was caught ‘in irons’. The crew shouted to another yacht that was racing to raise the alarm. That yacht then started his inboard engine and, leaving his sails to flog, made

towards the man in the water. The skipper on this vessel also called the coastguard, and the inshore lifeboat was requested. Unfortunately, the rescuing yacht missed the man in the water on its first pass.

Meanwhile, on board the sportsboat, another crewman had taken the helm to try and steer the boat towards the casualty, while two crew members stood on the foredeck looking for him. While steering, the helmsman also tried to unlock his VHF hand-held radio in order to change channels to channel 16, but with only one hand free was unable to do so.

The man in the water was spotted floating face-down 10–12m away. One of the crewmen on the foredeck, who was wearing a buoyancy aid, dived in and started swimming towards the casualty. The sportsboat then started to make some progress towards the casualty and passed the swimming crewman. As it approached the man in the water, two of the crew grabbed hold of him, but were unable to hold him because the boat was still moving. One of the crewmen – who was wearing no personal buoyancy – jumped in when he realised he couldn't hold on. He tried to hold on to a line trailing behind the boat, but had to let go. The swimming crewman arrived at about the same time, and took the casualty from the crewman with no personal buoyancy to allow him to swim to the now nearby rescuing yacht and climb out of the water. The rescuing yacht then managed to come alongside the casualty and crew in the water but, with a freeboard of 0.9m, the crew on board the yacht only managed to hold the unconscious casualty vertically, half out of the water with the aid of a rope.

The lifeboat arrived soon afterwards, the casualty was taken on board and first-aid administered – some 10 minutes after the casualty had fallen in the water. The sportsboat crew, meanwhile, had fitted their outboard on to the stern bracket, but the engine would not start.

The casualty was winched aboard a rescue helicopter and taken to hospital, where he was pronounced dead.

The Lessons

1 The sportsboat had a low freeboard and sea conditions were moderate to rough, so the chances of someone falling overboard were significant. As this was a keelboat race, there was no rescue boat. Personal buoyancy was, therefore, important to ensure anyone falling into the water stayed afloat. *In this case two men risked their own lives in an attempt to rescue a man who was not wearing a lifejacket.*

Don't be selfish, wear your lifejacket!

2 The man who fell in the water was the only experienced helmsman on board the sportsboat. No man overboard drills (MOB) had been carried out since buying the vessel and none of the crew knew what to do in the event of someone falling in. *Ensure that at least two members of your crew can carry out an MOB recovery effectively.*

3 Although not a contributing factor to this accident, there was some difficulty using the radio that was on board the sportsboat. The crewman at the helm trying to retrieve the MOB owned the radio, and the rest of the crew were not readily able to use it. *All your crew should be familiar with using the VHF radio, sufficient to raise the alarm in an emergency.*

4 In this case, no first-aid resuscitation could be carried out on the casualty until he was in the lifeboat because neither of the boats involved in the rescue had an effective means of recovering an unconscious person from the water.

Think about how you might get an unconscious person back on board your boat. It could mean the difference between life and death.

CASE 2

Poor Decision-Making Leads to the Death of a Skipper

Narrative

An 11.2m yacht, drawing 1.5m was being professionally delivered from south-eastern Spain to the East Coast of the UK. There was a crew of three, including the skipper who had a Yachtmaster Offshore qualification with a commercial endorsement.

The voyage took longer than planned due to persistent, often light, headwinds and poor performance under power. They were unable to motor at more than about 3 knots.

They began the final leg of their journey in poor visibility, having had a tiring voyage up-Channel. All three were awake in the early hours of the morning, one on the helm, another keeping a lookout, and a third monitoring the radar. They were crossing a major river estuary on the East Coast, notorious for shallows and shifting banks, and were doing so on a falling tide. There was no wind, the sea was smooth, and with the tide in their favour they were making about 4 knots over the ground.

The skipper was navigating using a chart with a scale of 1:250,000, and a small portable GPS chartplotter temporarily fixed just forward of the wheel. They were following a route on the chartplotter to a waypoint several miles distant that would take them into very shallow water. They ran aground with about 1½ hours of tide still to fall, which would have amounted to about 60cm.

Attempts were made to refloat using the engine, and by heeling the yacht by putting the boom to port and adding weight to the end. When this failed, the skipper elected to strip to his underclothes and go over the side with a line tied around his waist, attached to the starboard quarter. This was with the intention of finding deeper water and laying a kedge anchor with which they might winch themselves off.

Folding prop with entangled rope

Later, when in the water, the skipper was speaking to the crew who was on the helm, and had instructed him to leave the engine running astern. Suddenly the line that was round his waist became caught around the propeller and shaft. The skipper was dragged underneath the yacht, where he was trapped below the water with the line tight around him.

The other crew, who had been working with the anchor, quickly went over the side, carrying a knife. He dived underneath, but found it very difficult to free the skipper. Despite the crew himself becoming very tired in the water, on the fourth attempt he managed to free the skipper and bring him to the surface. He was able to be brought back into the cockpit but, despite attempts at resuscitation, he showed no sign of

life. It is probable that he had been underwater for 10 minutes.

A "Mayday" call had been put out as soon as the skipper became trapped and, in due course, two lifeboats and a helicopter arrived. The skipper was flown to hospital where it was confirmed that he had died. The two surviving crew were taken aboard one lifeboat while the other took the yacht in tow.

After the yacht had been lifted out of the water, to remove the rope that had been around the skipper, a further line was found tangled in the folding propeller that was preventing it from properly deploying. The line showed signs of having been there some time, and was probably the cause of their reduced speed under engine power.

The Lessons

1 The danger of being in the water, attached to a rope, close to a turning propeller cannot be overestimated. To reduce the hazard, the engine should have been disengaged. Better still, it should have been switched off altogether while someone was over the side.

2 Thorough passage planning is important at all times; in shallow tidal waters it is essential. The track of the yacht and the waypoints being used were stored in the GPS/chartplotter, and were analysed by the MAIB. The route being followed took the yacht straight over an area of shallow water with charted depths of less than 1 metre, and at one point, a drying area.

3 Charts must be of the correct scale. The 1:250,000 chart showed no soundings for the area being transited, and was better suited to longer range route planning. The chartplotter vector charting contained sufficient detail so long as the chart display was set to the correct scale. This was the prime means of navigation being used, but had a screen size of just 7.5cm x 5.7cm, making it very difficult to see the wider picture.

4 Fatigue was an important factor. The skipper had intended to carry out the voyage with four people on board, but had decided to go with three when one dropped out. Although it is not unusual for a yacht to be navigated shorthanded over long distances, proper rest is essential. It seems very likely that the skipper's decision-making was affected by fatigue.

5 Whenever any type of vessel grounds, it is vital to carry out a quick but rational risk assessment. The action taken will be different if you are being blown onto a dangerous lee shore, compared with gently running onto a bank in calm conditions with no swell, and the prospect of the height of tide and the direction of stream being able to float you off in a couple of hours. The decision by the skipper, to go over the side in the way that he did, was ill thought through.

6 It is important to recognise the differences between navigating in largely non-tidal waters such as the Mediterranean, and the shallow tidal waters that characterise the East Coast of England. It is possible to gain commercially acceptable sailing qualifications without having practical experience of shallow estuaries and shifting banks. There are different challenges presented by the variety of types of waters found throughout the world, but if they are unfamiliar to you, as skipper, extra care must be taken at the passage planning stage.

N.B.
The portable GPS/chartplotter being used on board this yacht was found to have an unusual characteristic within its chart display. As with most units of this type, it was possible to change the units through which speeds, depths, and heights were displayed. As a result of this, the unit was set to display soundings in metres, but *drying heights* in *feet* on the same chart. This almost certainly had no bearing on the circumstances of the accident, but in other situations could easily cause confusion.

Units of this type are sold as an aid to navigation, with strong advice to use them in conjunction with paper charts. It is important to be aware of the multitude of functions and options available so that it is an aid rather than a hindrance.

CASE 3

Knockdown and Total Loss off the Portuguese Coast

Narrative

An 11.3m sailing yacht was being used for an intensive 13 week Yachtmaster training course. The instructor and four crew had already spent almost 2 months on board sailing on the south coast of England and then to the Channel Islands, Brittany and western France before heading across the Bay of Biscay for Spain and Portugal in mid-November.

By this time, the students had amassed a good deal of experience and the instructor decided it was time for them to skipper the yacht without him being on board. A passage of around 75 miles southwards down the coast was planned, and the instructor stepped ashore. Winds were forecast to be a force 4 westerly, veering northerly force 5.

However, while on passage, the winds increased to gale force from the north-west. The skipper on board phoned the instructor ashore and it was agreed that the original destination was going to be too dangerous to approach in the prevailing conditions as there was a bar at the harbour entrance and the pilot book suggested this may be dangerous. An alternative destination was agreed, which was thought to offer a safer approach but which was another 30 miles further south.

The designated skipper became incapacitated with seasickness as the severe conditions continued, so another student, the most experienced of the four, took over. With sails furled and the engine on, they made their approach but were knocked down to an estimated 110° by a breaking wave.

The acting skipper was on the helm and was washed overboard. He had been clipped on but was unable to get back on board. The next wave took the yacht past the harbour entrance, and shortly afterwards she hit the beach. The acting skipper suffered cracked ribs, but he and the rest of the crew were otherwise unscathed. The yacht was damaged beyond repair.

The Lessons

1 The decision to continue to an alternative port further south was understandable, but an approach to any port on a lee shore in the conditions carried risks. Although unpalatable to the crew, staying out at sea would probably have saved the yacht. The MAIB has looked into other accidents where the crew were less fortunate, and such action would have saved lives.

2 Leaving experienced students aboard without their instructor has the value of ensuring that the skipper knows he or she really is in charge, and must stand or fall by the decisions made. However, the instructor should carry out a particularly thorough risk assessment with the full involvement of the students.

Catamaran Capsize in Solent

Narrative

A catamaran was being sailed by her new owners who had taken delivery from Portsmouth. The skipper and three crew were experienced and were wearing suitable clothing for a blustery April evening. The boat was equipped with VHF radio and a good selection of emergency equipment, although no EPIRB was carried.

It was getting dark, and with the wind blowing 20 to 25 knots from SSW, the crew were sailing under a double-reefed mainsail and reefed headsail. They tacked on to starboard and soon afterwards an unusual wave pattern hit the weather hull, reported to be travelling against the direction of the wind and swell. It lifted the hull so far that the boat lost stability and capsized.

The catamaran inverted almost immediately, leaving the crew to find safety on the upturned hulls. Because the capsize had happened so quickly, there had been no time to retrieve the 'grab-bag' containing flares and other equipment. The VHF was now out of action, as well as being inaccessible, and the mobile telephones were down below.

Skipper and crew had no option but to huddle together for warmth, and hope for a rescue. Luckily, they were less than a mile offshore from Stansore Point in the Solent, but it was now completely dark.

It was not until about 0700 the following day, as it grew light, that their distress signals (raised and lowered arms) were spotted from the shore and the alarm was raised. All four were taken off by the inshore lifeboat, and taken to hospital suffering from mild hypothermia. Fortunately, all made complete recoveries.

The Lessons

1 The importance of correct clothing for the conditions cannot be over emphasised. All four members of the crew were wearing thermal underclothing, midlayer garments, as well as heavy weather jackets and high trousers. They were also wearing lifejackets and harnesses. Despite low sea and air temperatures, all four survived eleven hours on the upturned hulls relatively unscathed.

2 Locate the grab-bag somewhere so that it can be reached if the boat becomes inverted. This is obviously particularly important with a multi-hull, which, once inverted, will stay inverted.

3 An EPIRB mounted in the cockpit would have raised the alarm within minutes of the capsize, and would have spared the crew a long, cold and extremely uncertain night.

4 The skipper told the MAIB that he was grateful that they had all eaten a good meal before departure, and had stayed away from alcohol. He also highlighted the importance of keeping morale high and "believing in the rescue".
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CASE 5

The Sailing "Taster" that Left a Bitter Taste

Narrative

Nine people from a social and adventure activities group booked a 1-day "sailing taster", suitable for novices, which was to provide the opportunity to act as crew.

An IMX 38 yacht was designated for the trip. It was certified to carry up to 10 people in Category 2 waters (up to 60 miles from a safe haven). Regulations required it to be manned by the skipper and one other designated crew determined to be "*one other person on board deemed experienced by the skipper*". The operating company had conducted some risk assessments, but none specific for operating with a totally inexperienced crew.

The group arrived at the marina at 0830, full of expectations. For most, this would be a new experience and they were looking forward to testing their sea legs.

Things did not go well from the outset. There was no one to meet and greet the group. The nominated vessel had been changed, but the group were not told this. When they eventually found the yacht, the nominated skipper said that he was unwell and was waiting for the replacement skipper (who was also the director of the company) to arrive. To make matters worse, the boat had been out of the water for 8 months and little had been done to prepare it: the yacht was dirty, both below and between decks; ropes were tangled, some were covered in algae and the locking cleats did not work properly; the deck was slimy; and the impression was, that the yacht had been uncared for and very poorly prepared.

The replacement skipper arrived at about 0920. He agreed that the unwell skipper could remain on board in his bunk during the trip. The skipper then introduced himself and was advised that there was a Day Skipper qualified person among the group, but he was unaware of the group's experience prior to this.

A superficial safety briefing followed. The skipper emphasised the need to keep low under the boom and that the lifelines were to be always clipped onto the jacklines. Contrary to the Company's Safety Policy, there was no mention of the use of liferafts, flares, radio operation or how to start the engine, and the Day Skipper found the VHF radio to be switched off. At this point, some of the group were on the point of leaving, but they decided to see the day out; after all, they were due back alongside at 1700.

There were further delays as the mainsail and genoa were rigged. Fuel and water were then loaded before the yacht finally left the pontoon at 1130 – 2½ hours behind schedule. The group were disgruntled, but at least they were on their way.

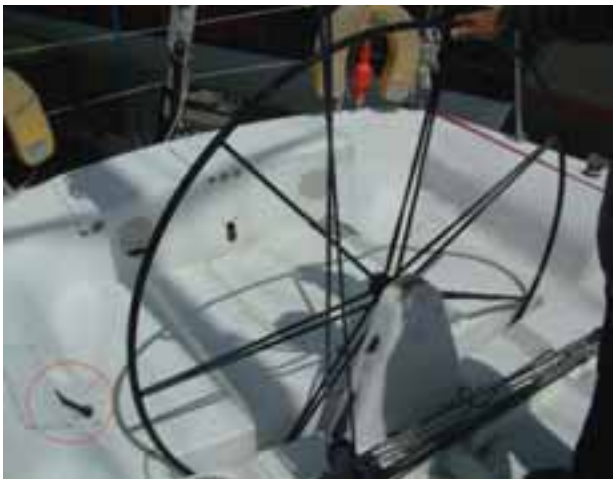


Figure 1 – Position of engine control lever

Once into the wide channel, the group were more relaxed and they settled down to the business of sailing. The Day Skipper was by now on the

Figure 2 – Day skipper's leg position on the traveller rig

wheel, with his safety harness clipped onto the rod backstay. A light lunch was made, and at 1350 the yacht came about and made a straight run back down the channel. The wind was from the WNW at force 6–7 and the yacht was making between 7–8 knots over the ground. As the yacht was heeling to port, the skipper instructed three of the group to sit on the high side to try to bring the vessel onto an even keel. Being inexperienced they felt uneasy about this.

As the yacht approached the channel entrance, the weather had worsened. It began to rain, the wind was gusting force 8 and there were white horses on the wave tops – the group were obviously unsettled. The skipper suddenly decided to return to the marina and, with that, things immediately took a dramatic turn for the worse.

At 1426 the yacht was tacked back up the channel. The skipper then asked the Day Skipper to start the engine. The Day Skipper unclipped his safety line as he prepared to check that the engine control was in neutral, but he found the lever to be seized (Figure 1). He spent the next 2 minutes releasing it; he then moved in front of the wheel to go down below to start the engine, but he was brought to an abrupt halt. His foot became entangled in the traveller because his safety line became taut (Figure 2). His line had not been released as first thought. The skipper, now distracted, turned round to release the safety line and, at the same time, the yacht conducted an inadvertent gybe. The boom moved rapidly from starboard to port, trapping the Day Skipper's leg with the mainsheet, causing multiple fractures to his right leg. The boom immediately returned to the starboard side.

The Day Skipper clambered to the forward part of the cockpit. At the same time, another of the group, with the help of the unwell skipper, managed to start the engine. At about 1432, as the tension increased, the skipper mentioned the need to lower the mainsail, but he did not direct his instruction to anyone in particular. The lady operating the traveller stood up, possibly to help with the sail, and at the same time the yacht conducted its second inadvertent gybe. The boom moved rapidly from starboard to port, hitting the lady on the right side of her head, causing her severe injuries and forcing her partially overboard. The skipper and two of the group pulled her back inboard. Bleeding profusely from her ears, nose and mouth, her situation was potentially life threatening. The skipper now busied himself in trying to get the sail down. A GPS track identifying the accident points is at Figure 3

The injured lady was then attended by the group. They kept her airways clear, but it was a further 5 minutes before a VHF "Pan Pan" call was transmitted to the coastguard. The yacht then motored to a nearby jetty where the emergency services attended to the casualties.

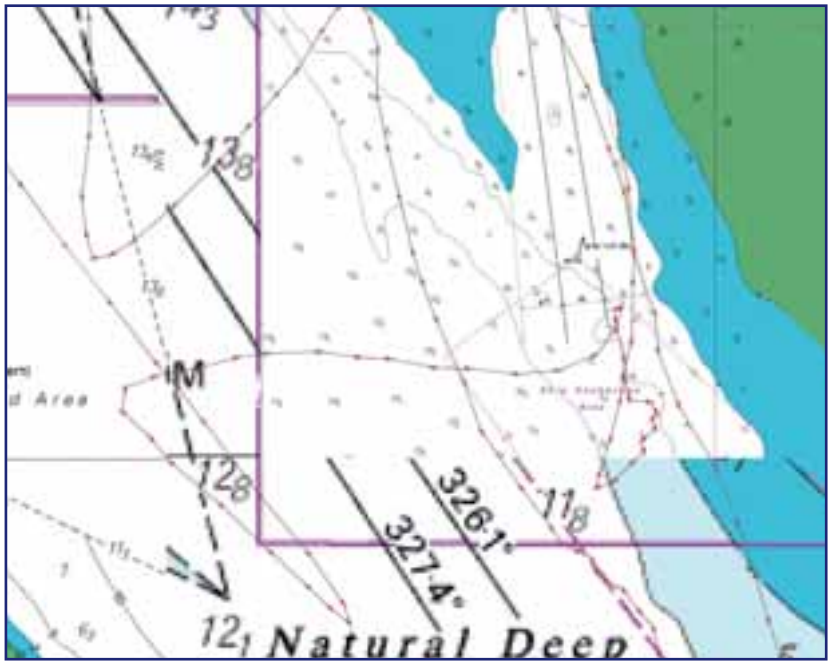


Figure 3 – Detailed GPS track showing key accident points

CASE 5

Continued

The Lessons

The Day Skipper suffered multiple fractures to his leg, and the lady was in a critical condition for a lengthy period. Happily, they both made a full recovery.

The accidents were caused by a combination of the skipper being distracted and the possible snagging of the Day Skipper's lifeline around the wheel, as well as inattention to the weather conditions.

The organisation for the day was very poor, the yacht was ill prepared for the trip, and the manning was insufficient to cope with an emergency and did not comply with the regulations. There was no excuse for the very poor safety briefing, which is fundamental to preparing those on board for an emergency. The delay in alerting the coastguard to an obvious very serious injury was avoidable, and the safety briefing should have included the use of the radio, as promulgated by the company's own Safety Policy.

In this case, the skipper failed to pay sufficient attention to the wind conditions and the limitations of the novice crew. Time spent in preparing the vessel and those on board, is time well spent. Inadequate preparations and planning make stressful situations worse. Once things start to go wrong, anxiety levels increase while confidence fails and apprehension compromises the ability to make clear decisions – think and plan well ahead.

The following lessons can be drawn from this accident:

1 Ensure that vessels are properly prepared and equipped.

2 Take time to give a thorough safety briefing.

3 Ensure that manning levels are sufficient and in accordance with the regulations.

4 Risk assessments should be comprehensive and cover use of the vessel with a completely novice crew.

5 Alert the coastguard promptly about injuries to crew.

6 Wherever there is a serious injury, a "Mayday" call would be appropriate.

Winter Storm in Biscay Claims Life

Narrative

A 24 year old skipper died following an abortive attempt to carry out a transatlantic delivery voyage from a popular sailing port on the west coast of France in December.

He and his two crew had spent several days preparing the new 15m yacht for the voyage that was expected to take up to a month and would take them via the Canaries and the trade winds route to the Caribbean. There, the yacht was to be chartered by a holiday company. The only safety equipment provided was a liferaft, with the skipper and crew being responsible for providing their own lifejackets, harnesses and foul weather gear. The skipper was being paid for the trip via a UK-based agency and, as is common in the delivery industry, was being paid a lump sum from which all expenses had to be met. This extended to other safety items such as flares, and only a minimal set of hand-held flares was purchased. The skipper brought along his own EPIRB, registered in his name, and other safety measures such as jack-lines on the deck were improvised.

On the day of departure, the early morning weather forecast from the French weather service Météo-France, posted up by the marina office, gave SW becoming NW 6-7. It was felt this was going to be a little unpleasant, but would not worry them unduly given the size of the yacht and

CASE 6

Continued

the experience of the crew – they were all qualified RYA Yachtmasters. They sailed at 1200 without seeing the updated forecast at the marina office which showed that the weather situation was deteriorating, with the forecast wind strength having increased to force 8–9.

The UK Met Office had mentioned the possibility of wind strengths up to force 9 in its early morning forecast, and by lunchtime it was forecasting SW veering NW 7–9, occasionally force 10. However, the crew of the yacht had no long wave radio receiver on board and were thus unable to pick up the UK forecasts. Their French was not good enough for them to understand the local radio forecasts so, once they sailed, they had no means of receiving updates.

By 1800 they were 30 miles offshore and the wind had risen to SW force 9–10. Because the wind had increased quickly, the short steep sea was kicking up and they were having difficulty keeping the yacht under control. With no storm sails on board, they were sailing with a double-reefed mainsail (there was no third reef) and a small amount of headsail unfurled. It was now dark and a large wave knocked the yacht down, throwing the two crew who were on deck, flat in the cockpit.

Shortly after this the headsail sheet broke, presumably under the strain of the conditions. It was deemed too dangerous to try to reeve another sheet, so the sail was furled away completely. At this point they decided to turn back to seek shelter in the port from where they had sailed.

Broad reaching under reefed main the return leg was uneventful until they began to pick up the lights that they hoped would lead them to safety. Close to the harbour entrance, and motoring, a large wave caught them and capsized the yacht.

One crew felt himself pinned under the water until his combined lifejacket/harness broke, allowing him to swim to the surface. The other crew had had to cut his harness line to free himself – however, he managed to stay on board the yacht when she righted herself. The skipper was in the water with his lifejacket inflated.

The two in the water were about 100m from the yacht but could see she had been dismasted in the capsize in relatively shallow water. Swimming closer, they shouted to the crew in the cockpit to set off the EPIRB. Hand flares were also set off. The VHF radio was now useless as the aerial had been at the top of the mast – they had no back-up.

However, they were unable to get close enough to the yacht to have a chance of being recovered, and eventually lost contact. The crew whose lifejacket had been ripped off him was being helped to stay afloat by the skipper, and they decided to try to swim to the shore. By the time they reached shallow water, with surf breaking around them, the skipper had lost consciousness and appeared to have stopped breathing. The crew attempted to resuscitate him, but was forced to leave him clear of the water, on a rock, while he sought help. No-one was to be found in a nearby caravan site that was closed for the winter, and the crew collapsed in a service building that had been left open. He remained unconscious for several hours until recovering to flag down a car to take him to raise the alarm.

By that time, the French search and rescue authorities, having been alerted by the EPIRB signal relayed to them by HM Coastguard at Falmouth, had rescued the other crew from the now grounded yacht, and had found the skipper's body on the beach. Both crew recovered in hospital.

The Lessons

1 A yacht equipped primarily for cruising in the Caribbean is not necessarily going to be able to handle everything a winter storm in the Bay of Biscay can produce. There are particular problems facing a delivery skipper of a new yacht in these circumstances. Owners will not want to spend money on equipment that is only likely to be needed on the delivery voyage. Delivery skippers will not want to cut into their profit for the trip by having to buy costly safety items such as flares which they won't be able to recover or use again – such items cannot easily be taken on aircraft. Storm sails are heavy, bulky and impractical for a skipper to take from yacht to yacht. However, had this yacht been better equipped, the outcome might have been different.

2 It is important to have a means for receiving and understanding weather forecasts. An inexpensive LW receiver would have been able to pick up UK Met Office forecasts at least to the latitude of the Straits of Gibraltar.

On a trans-ocean passage it might be tempting to imagine that you will have to put up with whatever the weather will throw at you when over a thousand miles from a safe haven, but in the case of this voyage, the most hazardous part was in the first few hundred miles.

3 Approaching any lee shore in storm force conditions is going to be hazardous. The decision to return to the port of departure was understandable, but events proved that staying out at sea would probably have been safer. There were other options on the west coast of France, but all had their hazards and none were familiar to the skipper or crew. The UK Met Office forecast, broadcast at around the time they decided to turn back, was already predicting that the wind would drop to force 5–7 within the next 24 hours. Had they been able to receive this, they might have chosen to press on.

4 Having a storm jib and trisail which can be properly rigged are essential items for any trans-ocean passage. A mainsail with only two sets of reefing points is not going to be suitable for sailing in storm force conditions. A deep third reef at the very least would have been helpful in these circumstances. A roller-reefing headsail – even if it is almost completely furled away – is not a good substitute for a heavily constructed storm jib.

5 Anyone considering working as a delivery skipper or crew should be aware of the potential problems that exist owing to the fact that a yacht may be being delivered between two relatively sheltered cruising grounds across open ocean. Some yachts, generally those that have already been owned by safety conscious owners, will be adequately equipped. Many, particularly new yachts, will not be. There is therefore a significant difference for the recently qualified Yachtmaster between working for a UK-based sailing school or charter company where the yachts have to comply with MCA Codes of Practice, and the delivery of craft where none of these safety measures apply.

CASE 7

Anything But Plain Sailing!

Narrative

A lone sailor set off early in the morning in his 22ft yacht, which he had caringly restored and had sailed during the summer months over the previous 4 years. This was his first trip of the season in the boat. The intended passage to a nearby yacht haven about 15 miles away required him to cross a narrow channel frequently used by large ships. The sailor wore a lifejacket, but did not carry either flares or a VHF radio.

As the yacht approached the narrow channel, her skipper saw a large ship leaving the port about 2 miles away. The wind was north-west at 20 knots, and the yacht was on a close haul, heading in a westerly direction. The skipper was aware that local regulations required him to keep out of the way of the outbound ship. To comply, he adjusted course to the south-west, which brought the yacht onto a beam reach and increased her speed to about 6 knots.

By this time, the yacht had been spotted by the pilot of the outbound ship, which was constrained by her draught. He was content that the yacht would remain clear of the ship providing the yacht's heading was maintained. However, as a precaution he asked the escorting harbour launch to proceed to the yacht and advise her skipper to keep going towards the south-west. This message was passed by the harbour launch by a loud hailer. The skipper heard the loud hailer but, although the launch was very close, he did not understand the message. Nevertheless, he assumed that the launch would only contact him if it wasn't content with the avoiding action he was taking. Consequently, he decided to tack, and head to the north of the channel. As he did this, he stalled into wind, and lost all headway.

The pilot of the outbound ship, which was now halfway through a 135° to port turn towards the yacht, saw what had happened, and increased the ship's rate of turn to try and avoid her.

The two vessels were now extremely close and the pilot lost sight of the yacht under the bow. The yachtsman decided that collision was imminent, and dived off the yacht. He passed down the port side of the ship and was then recovered by the harbour launch. The yacht passed down the ship's starboard side before being swamped by her wash and foundering. The yachtsman's lifejacket did not inflate because it was not fitted with a CO_2 bottle (Figure).

CO_2 bottle missing

The Lessons

1 Sailing or motor cruising close to large ships cannot be avoided within the confines of many harbours and their approaches. However, the general rule that smaller vessels must keep clear of vessels navigating a narrow channel or fairway, is frequently easier said than done. The visual perspective of a large ship from a small craft can be very deceiving, and it is often very hard to accurately determine how close a large ship will pass, particularly when the large ship is manoeuvring. Also, a planned passing distance can be unexpectedly reduced for sailing vessels by a sudden wind shift or lull, and for motor cruisers by a mechanical failure. Therefore, stay clear of narrow channels whenever possible, particularly when they are being navigated by large ships. On the occasions when this is not possible, remember that a large container ship will probably not be able to see a small craft within 500m of her bow, and she will possibly need up to twice that distance to stand a chance of manoeuvring successfully to avoid a collision with a small craft ahead.

2 The first trip of the season is something to look forward to. Consequently, there is usually a natural wish to get onto the water and get going as soon as possible. However, a few minutes of re-familiarisation of the rigging, and practising of key manoeuvres is time well spent before venturing into a busy shipping area. Otherwise, the first tack of the season might also be the last!

3 A lifejacket that does not inflate is potentially a death jacket. Regular checks are not just recommended, they are essential. If in doubt, consult an approved service agent.

4 Although a VHF radio is a very useful means of raising an alarm, it is not practical for many yachts to carry one. However, flares are very easy to carry, and can be just as effective in summoning assistance in coastal areas. When neither are carried, there is a reliance on other mariners being in very close proximity. There is always a risk that none will be.

5 There are numerous reasons why a harbour launch or a safety boat might try and communicate with small craft on the water. For various reasons, it is sometimes difficult to understand the message being passed. On these occasions, it pays to ensure that you fully understand the message before taking any action.

CASE 8

How Safe is Your Safety Boat?

Narrative

Two young boys were undertaking some sailing training on a privately-owned Hobie Cat dinghy in sheltered waters. Although they had both previously sailed monohull dinghies together, it was their first time in a Hobie Cat. They therefore spent the morning with a sailing coach, who helped them familiarise themselves with the dinghy and then accompanied them in a rigid inflatable (RIB) safety boat from a nearby sail training centre while they got used to the catamaran's characteristics.

The boys continued to sail the dinghy into the afternoon. Although the coach had by now been dropped off ashore, the safety boat, with two qualified Royal Yachting Association (RYA) safety boat handlers on board, continued to keep station about 50 metres ahead of them. All was well until the helm of the safety boat noticed that one of the boys was in the water, with the dinghy still upright.

As the safety boat manoeuvred close, it was evident that the boy helming the dinghy was struggling to recover the other boy, whose trapeze harness was catching on the lip of the dinghy's starboard hull.

Given their ongoing difficulties, the crew of the safety boat decided to help. The helmsman placed the engine in neutral and the crewman began to move across the boat to assist. However, as he did so, he slipped and inadvertently grabbed hold of the throttle to prevent his fall. This forced the engine into gear. Although he immediately pulled the kill cord, the stern of the RIB momentarily slewed to port before the engine stopped, and the propeller struck the boy's left leg, causing serious injuries.

The safety boat crewman immediately called for an ambulance using his mobile phone, and the injured boy was recovered to the safety boat and taken back to the sailing centre. The boy was subsequently transferred to a local hospital, where his left leg had to be amputated above the knee.

Stern view of the safety boat

The Lessons

1 This accident highlights the dangers posed by unprotected rotating propellers. Had a propeller guard been fitted to the safety boat, the terrible injuries would probably have been prevented. Such guards can lead to reduced acceleration, speed and manoeuvrability of the boat; however, the benefits of a safely guarded propeller have to be given consideration compared to the boat's potential loss in performance. It is suggested that the requirement for a propeller guard will depend on the exact role and particular operational conditions that a safety boat is likely to encounter.

2 The throttle on this particular RIB was in a relatively exposed position, which made it vulnerable to unintentional operation, as so tragically demonstrated here. Extra caution must be taken when moving around the area where exposed throttles are situated, particularly when people are nearby in the water. Consideration should also be given to the fitting of guards or rails around such throttles to reduce the risk of accidental operation.

3 If you are in a safety boat which is attempting to recover a person from the water, try to turn the boat's bow towards the person. This will shield them from the propeller as much as possible. When conditions allow, ideally the engine should be shut down when approaching somebody in the water. This will remove the chance of its inadvertent operation.

4 Although both of the boys were familiar with general manoverboard drills, they had not practised these in this particular design of dinghy. Had they done so, they would probably have been aware of the problem with the harness and the lip of the hull, and found a way of overcoming it.

CASE 9

To sail or Not to sail?

Narrative

Three friends in their 60s and 70s joined several yachts from their local sailing club for a summer trip to mainland Europe in a bilge keeled yacht. The trip was intended to take 3 weeks, with the yacht owner's son joining them at some point.

The 11m yacht had been bought new earlier the same year and was described in the owner's manual as "exceeding the minimum requirements for category "A" offshore". It was therefore suitable for the voyage.

The skipper of the yacht had sailed since his youth and had owned progressively larger yachts during the last 25 years. He had sailed his yacht on several occasions along the English coastline in mixed conditions. The other two original crew members were experienced sailors, with many years of sailing around the UK coastline and occasional trips to mainland Europe, although one was physically limited in his ability to move quickly around the boat.

The voyage across was uneventful and very enjoyable, with everything going as planned. The skipper's son joined the party of three on board. Planning to return by themselves, they parted company with the other yachts from the sailing club.

Some days later, the yacht arrived at its last port before sailing to the UK. The crew was in no rush to return home and, having read the weather forecast for the area, decided not to sail and to review the weather later on. The following day, the midday shipping forecast predicted winds veering north force 5 to 7, perhaps gale 8 later in the west, becoming cyclonic, 4 in the east. A further forecast received on a mobile phone predicted winds of maximum force 6, weakening later.

The yacht departed port at lunch time, motoring into winds of force 4 to 5 from the west, with no sails set. The crossing was expected to take about 30 hours. Overnight, as the wind decreased slightly, the jib was unfurled to steady the boat and provide some additional way. The early morning weather forecast the next day gave the forecast wind as increasing to force 7 or gale 8.

During the morning, the weather deteriorated, the wind increased and the yacht crew decided to wear lifejackets on deck and use lifelines when outside of the cockpit. The sea conditions continued to worsen as the wind, now gusting at 40 knots, was against the tide. The waves appeared to the skipper to be "the size of houses". Despite the heavy seas and the conditions being worse than any of the yachtsmen had previously experienced, the yacht seemed to be handling well and the steering remained in autopilot.

Figure 1

As the wind increased, the skipper attempted to contact the coastguard to let them know his position and planned destination. On the third attempt, his call was intercepted by a rig support vessel in the area and relayed to the coastguard. The coastguard passed the report to the RNLI, who agreed to launch a lifeboat to escort the yacht back to safety. The rig support vessel headed towards the yacht to monitor progress and provide a means of communication until the lifeboat arrived.

Meanwhile, one of the yacht's crew had gone below to change into dry clothes when the vessel was unexpectedly "knocked down", rolling heavily to port. The three crew in the cockpit, including the skipper, were washed overboard.

The skipper, by chance, had his hand-held VHF in his hand, and had sent a brief "Mayday" message before being swamped by a wave. The remaining crewman on board also attempted to send a "Mayday" call, but realised the yacht's VHF set had failed. As the "Mayday" message was incomplete, the rig support vessel was unable to confirm the origin of the call, although the radio direction bearing was similar to the heading on which they were proceeding. Shortly after, the coastguard established with the rig support vessel that they had heard a brief "Mayday" distress message, so the rescue helicopter was requested.

Of the three crewmen in the water, two were conscious, with their lifejackets inflated, the third was unconscious and his lifejacket had not inflated. One of the survivors managed to manually inflate this lifejacket, but it rode up under the casualty's arms.

The rig support vessel reached the yacht and after several attempts managed to manoeuvre close to the vessel. The rescue helicopter was now also on scene. A call by loud-hailer finally confirmed that there were three crew members in the water. The rig support vessel gave the last known position of the yacht to the rescue helicopter which, seven minutes later, found the three men in the water and winched them on board. The three men had been in the water for almost an hour. The unconscious crew member was declared dead on arrival at hospital. The skipper and his son both made full recoveries. The remaining crew member on board the yacht was transferred to the RNLI lifeboat and then transferred to hospital for observation.

Figure 2 – Video still of yacht taken after the 3 crew were lost overboard.

(Image courtesy of the RAF)

The Lessons

The professional and proactive actions of the rig support vessel undoubtedly saved the lives of two of the three men washed overboard. In monitoring the progress of the yacht, they ensured their vessel was at the scene as quickly as possible when disaster struck. By noting the radio bearing of the yacht, and persevering in communicating with the remaining crew member by loud-hailer, they were able to direct the rescue helicopter to the position of the casualties in the water and ensured their rapid removal to hospital.

1 Weather forecasts must be carefully studied before embarking on long trips, bearing in mind that conditions may become much worse during the passage. Poor weather options should be considered, including turning back, heading for ports of refuge and "heaving to", and these should be reviewed regularly during passages when the weather deteriorates.

2 Do not rely on the autopilot to helm in heavy seas. A helmsman can react quickly and alter course for individual waves to minimise the risk of broaching.

3 Before commencing a passage with the prospect of bad weather, ensure the physical ability of ALL crew is taken into account. Setting a sensible weather limit is the prudent and safe approach to take.

4 Lifelines should not only be used on deck in heavy weather but also while in the cockpit. A knockdown following a rogue wave is always a possibility in steep heavy seas.

5 Make sure your lifejacket is fitted correctly and has a crotch strap. A badly fitted lifejacket will severely hamper you in the water, at which point it is virtually impossible to make adjustments.

6 When making longer sea passages, ensure your boat has an appropriate level of safety equipment. A liferaft, in this accident, could have been deployed by the crewman on board to provide both protection from the sea and act as a marker for the rescue helicopter. An EPIRB would have made certain the rescue services were alerted when out of VHF range.

Dangers of Rotating Machinery

Narrative

A substantial 10 metre yacht had recently been recommissioned after her winter lay up. The engine had been run and the owner had nipped up the stern gland during one short trip.

On a later occasion, the owner was on board with his son, and was motoring the boat a few cables from her mooring to a marina to take on stores for a weekend's sailing. The weather was excellent, with negligible wind and a flat calm sea.

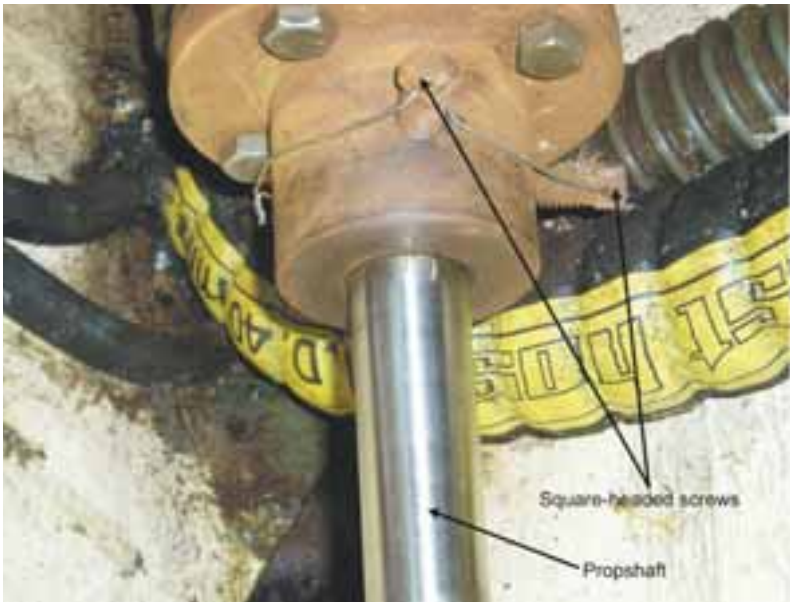
During this relatively short run, the owner decided to again check the stern gland. After checking the cuffs of his jacket were properly secured, he lifted the hatch to the stern gland/propshaft space. To gain the best indication of the rate of water ingress through the stern gland, he decided to remove a small amount of water that had collected in the bilge space beneath. To do this, he used a sponge, wringing it out once saturated. He did this a couple of times without problems.

Unfortunately, on the next occasion, the left sleeve of his jacket became entangled with a coupling on the rotating propeller shaft **(see photograph)**.

His arm was dragged around the shaft and, before he could free it, was very seriously injured.

The owner's shouts were heard by his son on the helm, who promptly stopped the engine and immediately used his mobile telephone to dial 999 and ask for coastguard assistance. He then used the boat's first-aid kit to dress his father's arm, using a wooden spatula from the galley as a splint and cottonwool pads to stem the flow of blood. The injury was serious, with a length of broken bone exposed.

Emergency services were very quickly on scene, with helicopter and lifeboat both available to evacuate the casualty. It was decided to use the lifeboat to transfer the owner to an ambulance and then hospital. Because of the benign weather conditions, the owner was able to climb, unaided, from his boat onto the lifeboat.



Engine/propshaft coupling arrangements

CASE 10

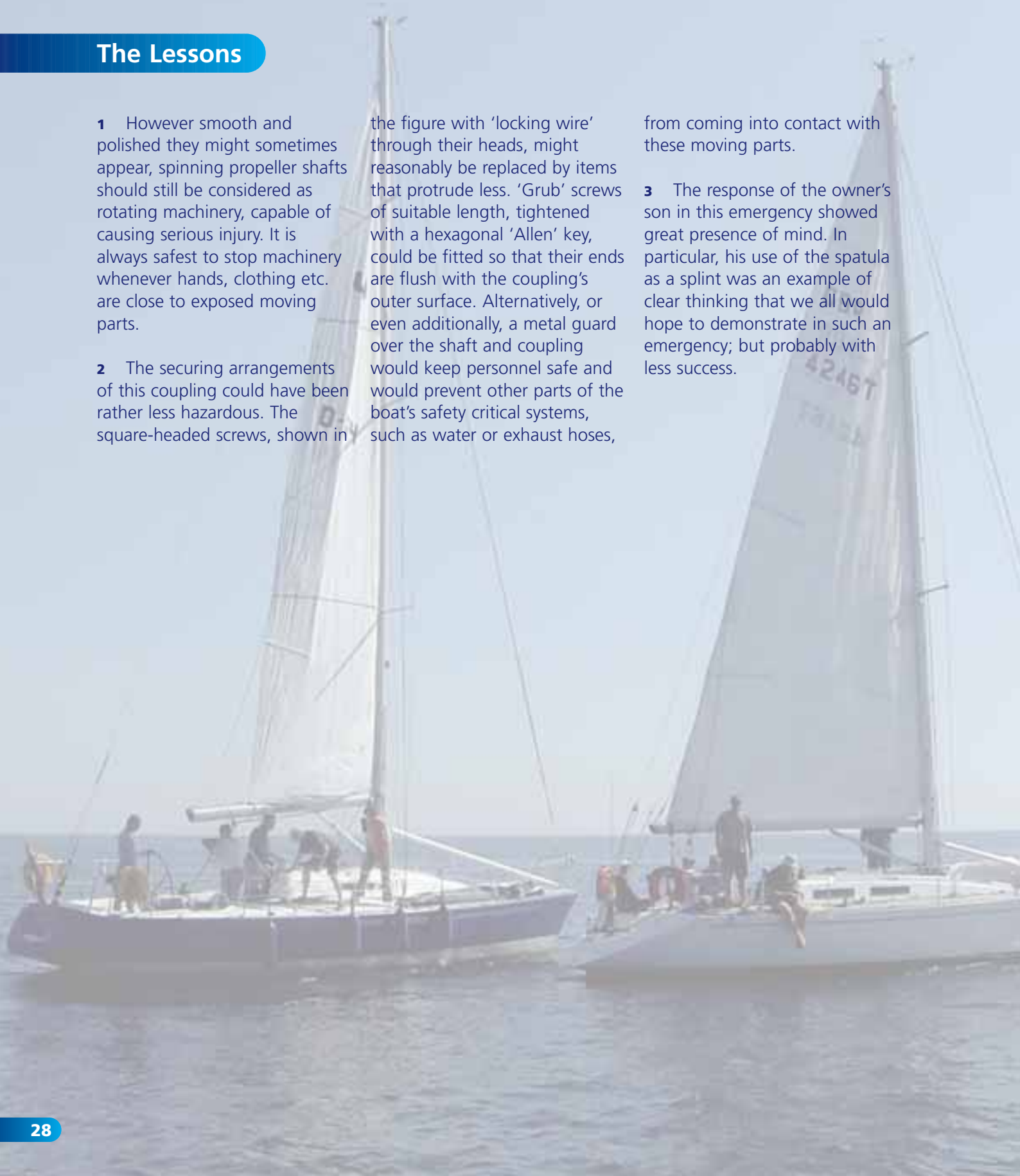
Continued

The Lessons

1 However smooth and polished they might sometimes appear, spinning propeller shafts should still be considered as rotating machinery, capable of causing serious injury. It is always safest to stop machinery whenever hands, clothing etc. are close to exposed moving parts.

2 The securing arrangements of this coupling could have been rather less hazardous. The square-headed screws, shown in the figure with 'locking wire' through their heads, might reasonably be replaced by items that protrude less. 'Grub' screws of suitable length, tightened with a hexagonal 'Allen' key, could be fitted so that their ends are flush with the coupling's outer surface. Alternatively, or even additionally, a metal guard over the shaft and coupling would keep personnel safe and would prevent other parts of the boat's safety critical systems, such as water or exhaust hoses, from coming into contact with these moving parts.

3 The response of the owner's son in this emergency showed great presence of mind. In particular, his use of the spatula as a splint was an example of clear thinking that we all would hope to demonstrate in such an emergency; but probably with less success.



A Cheap but Priceless Early Warning

Narrative

A new, 14m sailing yacht was being manoeuvred from her berth at the beginning of a weekend's sailing. The skipper used the engine and, for just a few seconds, her 12 volt, motor-driven bow thruster, installed in a compartment beneath the double bunk in the forward cabin. She had just cleared her berth when the smoke alarm sounded in the empty forward cabin.

Figure 1 – Bow thruster showing exposed power cables and fire damage

The crew found smoke coming from the space beneath the bunk. They lifted the bedding clear, removed the compartment's covers and pulled out the spare sails and other gear. Using a dry powder extinguisher, they extinguished burning and smouldering material.

Meanwhile, the skipper requested assistance and manoeuvred back to the berth, where shore firefighters assisted in making the vessel safe. Negligible damage was caused to the boat, but most of the bedding and spare kit was affected by fire, heat or smoke.

A closer examination found that a metal cover to the brush gear of the bow thruster's motor had been displaced. The cover had then made contact with a terminal on one of the motor's power cables, causing arcing (Figure 1). This sparking had ignited a sail bag.

Figure 2 – Machinery space with no viable warnings can be easily mistaken for a storage locker

CASE 11

Continued

The Lessons

1 The owner had fitted a smoke alarm in the forward cabin as a sensible precaution. By alerting the crew early, its value was clearly shown and its purchase price of a few pounds showed a handsome return.

2 Kit had been so tightly packed into the space that it enveloped the bow thruster's motor. The resultant loss of cooling air circulating around the motor had the potential to cause overheating, which would normally show when the motor's thermal cut-out tripped, possibly after just a few minutes of operation. This could cause the loss of the bow thruster at an awkward stage of events.

3 The vigour with which gear had been packed around the bow thruster moved the protective cover of the motor's brush gear. Apart from exposing moving parts of the motor, itself.potentially dangerous, it generated a short circuit and a source of ignition as soon as power came on the main cable when the thruster was used.

4 The manufacturer's instructions for the bow thruster were on board the vessel. They quite clearly stated that nothing should be stored close to the motor. When a new boat is taken over, it may not always be possible to read and understand the significance of every detailed instruction, in every instruction book, for all the equipment found on a modern vessel. However, the principle that nothing should be stowed close to machinery is universal.

5 Spaces having every appearance of being stowage lockers, as in this case (Figure 2), almost invite gear to be crammed in them, and it is certainly very tempting to do so. Without clear warnings that the space contains machinery, the potential hazards may not be obvious or recognised. This could be overcome by labels on the doors or covers, of spaces that may not have been seen as obviously containing machinery, designating the space as a machinery space and not for storage purposes.

6 Bow thrusters are being fitted into many existing yacht designs. Such retrofits or design modifications are not always as well considered as they could be. If you have, or are buying, a yacht with a bow thruster (or any other additional mechanical or electrical device) ensure that they are properly protected from accidental contact.

Double Tragedy

Narrative

When on a short coastal passage, a 4m trailer-sailer capsized about 1300 metres from the nearest point of land. On board were its owner, an adult crewman and two children. All were dressed in shorts and 'T' shirts. The owner was wearing a lifejacket, and the remainder of the crew wore buoyancy aids. Following capsize, two attempts were made to right the boat, which had fully inverted. Despite the wind being between force 5 and 6, and waves at a height of about 1.5m, the boat was rotated to an upright position on both occasions, but quickly capsized and inverted again.

Figure 1 – Owner's lifejacket

Following the attempts to right the boat, it was noticed that the boat's owner had not been able to inflate his lifejacket. Consequently, the adult crewman located and pulled the toggle fitted to his lifejacket (Figure 1), which then inflated. However, the lifejacket did not appear to be fitted correctly, and the owner struggled to keep his mouth clear of the water. He died from a combination of hypothermia and drowning about 10 minutes after the initial capsize.

The remaining crew held onto the upturned hull, until they were seen by a passing charter fishing vessel, and recovered on board. They had spent at least 1½ hours in the water. Both children were taken to hospital by helicopter, but the youngest child was pronounced dead on arrival; he died from hypothermia. The boat was towed to the shore and beached in its inverted condition. The flares carried inside the boat's cabin were found to be out of date.

Figure 2 – Test report photograph – small trailer-sailer being capsized

CASE 12

Continued

The boat was purchased at a boat show 4 months before the accident. Its crew was very inexperienced, and was not aware of the predicted wind or sea conditions. Affixed to the boat was a builder's plate which indicated that its maximum occupancy was three persons, and that the boat conformed to the stability and buoyancy requirements of the Recreational Craft Directive for a boat of Design Category C (Inshore Waters). However, tests conducted after the accident (see figures) showed that the boat did not meet these requirements. Although a generic manual relating to maintenance was provided with the boat, information specific to the operation of the boat was not.

Figure 3 – Test report photograph – cockpit fully swamped

The Lessons

1 Although the conditions might appear to be benign when taking to the water, it is wise to bear in mind that they can change very quickly. Many boat owners have been caught out in this respect. Before putting to sea, where adverse conditions threaten the safety of many small boats, the checking of the local inshore weather forecasts, via the radio, internet, local newspapers, or coast radio stations, is a simple and cost free precaution to take.

2 When putting on a lifejacket, take a few seconds to ensure it is worn correctly. If it is not, the jacket will tend to ride up when inflated, and will be more of a hindrance than assistance. This will decrease, rather than increase, an individual's chances of survival.

3 Even in the summer, when the temperature of the sea around the UK is about 16°C, its debilitating effects should not be under-estimated. This is still 20°C below body temperature, and well below the temperature of most swimming pools. When in boats such as sailing dinghies, where the danger of capsize is ever present, and when in remote areas where assistance is not readily at hand, the effects of cold water immersion must not be ignored when deciding what clothes to wear.

4 Flares need to be accessible and in date if they are to be of use when needed.

5 Experience cannot be taught, however many of the dangers associated with sailing and power-boating, along with the tips of the trade, can be learned through various levels of RYA training courses. The completion of such courses provides a sound foundation from which to start, and to increase proficiency in these activities.

6 The maximum loading of a boat should be shown on the builder's plate affixed to its hull, and in the owner's manual provided by its manufacturer. The risk of capsize and swamping is increased when this is exceeded.

7 When buying a boat, it is important that the purchaser is fully aware of its limitations. For new under 24m recreational craft, purchased within the EU, this information should be available on: the affixed builder's plate; the owner's manual provided by the manufacturer specific to the boat model; and the manufacturer's declaration of conformity with the Recreational Craft Directive. It is worth taking the time to check this information, and where such information is incomplete, or contains anomalies that cannot be reconciled by the vendor, further investigation is probably warranted before completing the purchase.

Steering Seizure

Narrative

Three crew on board their 11m yacht left their home port in the early morning, having determined that the weather should be good for their intended passage. The wind was south west force 5-6 and good progress was made, the yacht sailing first on a beam reach and then a broad reach. The mainsail had one slab reef taken in, and the roller reefing foresail was also reduced.

Some way into the passage, when the yacht was about 1 mile off a lee shore, the steering wheel mechanism started to make a clicking noise. Soon afterwards, the mechanism jammed completely, leaving the yacht with no steering.

The boat gybed, and swung round 180 degrees, through the wind and into a hove-to position with the genoa secured on the windward side. The crew rigged the emergency tiller, but the rudder would not budge. At this time, the depth of water was 25m, but the yacht only had 20m of anchor chain attached to the anchor.

The crew tried to investigate the steering mechanism further, but at 1350 the skipper decided to make a "Mayday" call, following which the local lifeboat and SAR helicopter were launched. The yacht drifted inshore, but once in a water depth of 15m, the jib was furled and the anchor let go. Despite using the engine to alleviate the drift, the snatching of the anchor on the bottom caused such loads that the rope connecting the bitter end of the chain to the anchor locker failed and the anchor was lost.

Figure 1

CASE 13

Continued

With nothing now to restrain it, the yacht continued to drift ashore.

At about 1415, and with the lifeboat in sight, the yacht beached. The lifeboat manoeuvred in close to the shore to try and pass a tow line, but grounded on a small reef. After freeing itself, the lifeboat stood further offshore and the crew fired a rocket speed line to the yacht. It missed, but a passer-by ashore helped get the speed line to the crew on the yacht, which allowed a tow line to be passed. The tow line was secured and the lifeboat started to pull the yacht off the beach but, unfortunately, the line parted and the yacht beached once again.

At this stage, the lifeboat coxswain decided that the risk to the yacht's crew was too great, and they were evacuated from their vessel by helicopter. The crew suffered no injuries during their ordeal, and returned to the vessel at low tide to salvage some belongings. The yacht, however, was not able to be salvaged and became a total

Figure 2

Lessons

1 If your yacht has wheel steering, make sure you are fully conversant with the emergency tiller system. The chances of needing it are probably remote, but solving a steering problem quickly will keep you out of trouble. Pay particular attention to the linkage between the rudder stock and the wheel because, as was the case in this accident, disconnecting the two can be the only way the rudder becomes free to move.

2 Be alert to navigational dangers and, where possible, keep well clear of a lee shore. On this occasion, there was no great need to be sailing 1nm off a very rocky coast. Standing further off will give you extra breathing space to deal with emergencies and the unexpected.

3 Ensure you have sufficient chain and rope attached to your anchor, and that it is of the correct size. For the yacht in this accident, 20m of chain was half the amount recommended. If weight is a major consideration on your yacht, then rope and chain can be used; but ensure you have sufficient chain to assist holding. The prudent mariner will also carry a kedge anchor, which can be used as a back-up in an emergency.

Power vessels

Fishing for Disaster

Narrative

An amateur fisherman and his teenage neighbour set out on a pre-dawn mid winter fishing trip in a recently acquired and repaired, 5 metre long, relatively old speedboat. They launched in a relatively sheltered area, but had intended to move out to a more exposed position on the coast to fish. They wore warm clothing, waders and old solid buoyancy aids. They also carried a spare outboard engine and a torch.

When the two men set out, within the sheltered area a 25 knot wind was blowing, gusting to 35 knots, there was a significant wave height of 0.8m and the sea was between 6 and 8°C. The tide was on the ebb.

About 40 minutes after launching the boat, a 999 call was made from the fisherman's mobile telephone. The caller requested the telephone operator to put him through to the coastguard. He provided no information to the operator on his location.

The call was quickly transferred to the local coastguard station, but the station officers could hear only the noise of the wind and sea during the brief remaining time of the call. They attempted to return the call, but without success. Without any further information available, and bearing in mind hoax and accidental calls are not uncommon, no further action was taken.

Later that day, the family of the fisherman raised the alarm that he had not returned at the expected time. A large-scale search and rescue operation began immediately, involving many search and rescue units over a considerable area. Only scant information was available on the probable destination of the fishing trip, and the length of time involved between the two men launching the speedboat and the time of the alarm being raised, meant that the area to be covered by the search units was extensive. Despite the efforts of the rescue services, the search was unsuccessful, and the two men were not found.

A day and a half later, a buoyancy aid was found washed ashore, which was identified by the family of the fisherman. About 10 days later, the body of the teenager was washed ashore, still wearing his buoyancy aid and chest-high waders.

CASE 14

Continued

Lessons

1 The fisherman and his friend were inexperienced in boat operations. The boat's history was unknown; what is known, however, is that repairs had been carried out to its hull and engine. Without any trials having been carried out in a safe environment, it was launched in darkness, in mid winter and in poor weather conditions. Also, the boat did not carry the required navigation lights. The decision to launch it was, at the very least, unwise.

2 Survival equipment consisted of warm clothing, old solid buoyancy aids and a torch. Additionally, a spare engine was carried on board. The waders that were worn, probably to protect the fishermen from the cold and sea spray, would have counteracted any useful buoyancy afforded by the old buoyancy aids. The boat was not properly equipped for the planned activity.

3 A relative had been told when the two fishermen were expected home, about 10 hours after their launching time. This alerted the coastguard to their plight and is good practice. It would have been better, however, if the skipper had agreed to call in every hour throughout the day.

4 The mobile telephone was the only method of communication available to the pair. This was inadequate and is not advised for maritime use because it causes genuine difficulties for the emergency services. A VHF radio can transmit emergency calls via channel 16 (the emergency channel) directly to the coastguard, and a quick response can be assured. Other methods of raising the alarm include personal locator beacons, which are readily available and are becoming increasingly cheaper.

5 The RNLI provides a free, friendly and confidential sea safety advice (SEACheck) service, which is available countrywide through a system of co-ordinators and volunteers. This service can provide guidance on effective lifesaving apparatus (LSA), and other equipment that would prove useful in different sea conditions, as well as distress and emergency procedures. Other free guidance for leisure craft users is available from the Maritime and Coastguard Agency (MCA).

6 It's not always easy to cancel a planned and eagerly awaited fishing trip at the last moment, but commonsense and good seamanship must prevail. The decision to launch should be based on such things as the weather, sea conditions, experience of the crew, state of the boat and adequacy of the equipment. When difficult decisions need to be taken, never ever forget that the power and danger of the sea should be respected at all times.

Alcohol Ends a Weekend Pleasure Trip

Narrative

Four married couples set out from a marina for a weekend trip on board an 8 metre long, fast motor boat. Their destination was a popular small harbour, where they intended to stay overnight in a hotel.

The couples were in high spirits, and they had brought with them alcohol and food for the trip. During the passage, one of the men water skied behind the motor boat, and they stopped at a landing stage and had lunch in a waterside hotel. Later in the afternoon, they anchored the boat in a bay, and two of the wives went swimming.

Alcohol was consumed throughout the passage and at the hotel.

The owner of the boat had taken the helm for most of the day, but, as they approached their destination, one of the other husbands took over. They entered the harbour, and the boat was made fast to one of the pontoons. The couples went ashore and enjoyed an evening of singing, dancing, eating and consuming more alcohol.

At 12.30am, three of the couples took the boat out again, to visit a prominent tourist feature

Figure 1 – A view looking forward from the stern of the cockpit area

about 2 miles away. They reached the feature and then began their return to the harbour. The owner was sitting in the port cockpit chair, with the other man sitting in the starboard chair and in control of the steering and the engine throttle control. One of the wives was standing between them. It became cold during the return passage, so the other two wives and one of the husbands moved forward and stood behind the chairs to take shelter behind the windscreen. The boat turned into the outer harbour, which funnelled down to a narrow entrance to the inner harbour. As the boat approached the entrance, it made a sharp turn to starboard and crashed into an unlit low cliff.

A yachtsman had seen the navigational lights of the motor boat travelling at speed and approaching the harbour. The boat disappeared from view and he heard a loud crash.

Realising something had happened to the boat, the yachtsman called the emergency services immediately. He and his crew headed for the stricken motor boat. When they reached it, they found it lying heavily in the water, with only one man and one woman still conscious. They took them on board the yacht and, concerned that the motor boat was in danger of sinking, the yacht towed the motor boat to a slipway on the other side of the harbour where medics and ambulances were waiting.

Three of the boat's occupants were killed during the accident; the other three sustained serious injuries.

The survivors cannot remember the events at or around the time of the accident, so it is not known why the motor boat turned suddenly to starboard.

Figure 2 – Damage to starboard forefoot and bow forward

Post accident investigations found:

- The three fatalities resulted from severe chest injuries, which were caused by being thrown against the forward part of the cockpit at the time of the impact with the low cliff.
- The severe damage to the motor boat, and the spread of debris field on the low cliff, showed that it must have been travelling at high speed when it approached the narrow entrance.
- The toxicology tests at the post mortem examinations showed that those who lost their lives had levels of alcohol in their bloodstreams which were more than twice the legal limit for driving a car.
- There were no other vessels moving either in the outer harbour, or the inner harbour, and the navigational light at the entrance to the inner harbour was clear and un-obscured.
- There were no mechanical faults with the boat.
- The weather was fine and calm, and the visibility was good.
- The owner and the helmsman had many years of experience on motor boats and yachts, and held RYA Powerboat Level 2 certificates.

The Lessons

1 Don't drink and drive – on land *and water*.

2 Travelling in restricted waters, in darkness and at high speed, requires good vision, good judgment and quick reaction times. Alcohol causes reduced vigilance, lower inhibitions, poor night vision, affected perception and deterioration of judgment: all of which played a large part in this accident.

3 Even experienced and qualified people, travelling on well founded vessels, can make fundamental mistakes when adversely affected by alcohol.

4 It is wise to gradually reduce a boat's speed when approaching a narrow entrance, where manoeuvrability is restricted. This gives those in control more time to assess the situation and the hazards to navigation.

CASE 16

Early Warning Headaches

Narrative

Four members of a family were on their 15 tonne, twin screw motor yacht for a winter holiday. She was berthed at a marina. It was cold, so they turned on the oil-fired cabin heater during one evening.

While the family was having an evening meal, two of them complained of feeling unwell. It was suspected that they were suffering from the early stages of 'flu and they went to bed with headaches and sore throats. The cabin heating was turned off overnight, and all felt fine the next morning.

The following evening, the heating system was again used. This time, all four members of the family began to feel unwell. It was at this stage that suspicion fell on the heating system.

These suspicions were confirmed when a professional examination showed that there were various defects which allowed exhaust gases from the heater to be drawn into the cabin.

It is most fortunate that nobody suffered anything worse than a headache. Fatalities from carbon monoxide poisoning could so easily have resulted.

Lessons

1 A simple carbon monoxide detector in the cabin could have given an early warning of the problem.

2 In the absence of a detector, complaints of headaches or sore throats from anybody on board should be taken seriously when any gas or oil-fired cabin heater is in use. It is better to turn off the heater, and shiver, than to suffer fatalities.

3 Because of the dangers that may be caused by poor or defective installations, it is always prudent to use qualified and experienced personnel to install and routinely check these systems to ensure safe operation.

Don't Underestimate the Familiar

Narrative

On a windy spring morning, two professional mariners from a popular, small, estuary harbour went out within the mouth of the estuary to lay a yacht mooring, which was required for the following holiday weekend.

Both men were very experienced in small boat work and knew the area intimately. The weather conditions were, however, very poor. The spring tide was in full ebb, running about 6 knots, and the winds were gusting up to force 7, against the tide. This led to breaking crested waves throughout the harbour and especially at the estuary mouth. The sea temperature was 9°C.

One of the men was wearing a dry suit and swam out to his boat, a 4.5m dory, on its moorings near the quay. Having prepared the boat, he then motored to the quay to collect his assistant who was wearing jeans and a hi-vis jacket. They then loaded the mooring onto the dory.

The mooring consisted of two legs of chain, each leading from a mid-link to an anchor. A chain riser then ran from the mid-link to a hippo buoy. The complete mooring weighed 240kg and was placed on the bow of the dory (see photo).

Once loaded, they were seen motoring away from the quay towards the mouth of the estuary, which they would have to cross to reach the intended site of the mooring.

When they could not be found at 5 o'clock that evening, the alarm was raised. Tragically, and despite an extensive search and rescue operation, they were not found until their bodies were washed ashore some time later. Both men had drowned.

One of the men's lifejacket was found washed ashore on the evening of the accident and, while it was inflated, the seat belt-style buckle was not done up. The other man was not wearing a lifejacket, but was relying on a buoyancy aid; this too was found washed ashore that evening.

The outboard motor on the dory had failed on a number of occasions in the past and, based on its condition after the accident, it is likely that it failed as the dory was crossing the mouth of the estuary. The vessel would have been swept out into rougher water very quickly and foundered. The position in which the dory and the mooring (which was recovered from the seabed) were subsequently found supports this scenario, although it will never be known exactly what happened.

Photograph showing the mooring placed on the bow of the dory

Lessons

1 The more senior of the two professionals was very conscientious and had (as part of his job) assessed the risks of the harbour during a series of written risk assessments. He had revised these only months before the accident, and they had covered all of the dangers present on the day of the accident. Specifically, they made reference to the danger of small dinghies capsizing, or being carried away to heavy seas at the mouth of the estuary, by strong tidal streams within the harbour, especially during spring tides or in the event of machinery breakdown. The control measures identified for these risks included to arrange a system to establish successful transit with someone ashore and for people to wear lifejackets. Unfortunately, these risk assessments were aimed at leisure users of the harbour, and he had not assessed the risks involved in his own work.

2 The dory was completely unsuitable for the task of laying moorings. While it was designed as a stable platform for fishing, it was not designed to have 240kg of steel sitting on the bow. It was not overloaded, but the loading led to very little freeboard forward, and the boat would have been shipping a considerable amount of water in the prevailing conditions. This would have made the boat less stable and brought the outboard motor closer to the water, allowing it to become swamped more easily.

3 While one of the men was wearing a dry-suit, it would seem that his lifejacket was either not done up or not worn. The other man was not wearing appropriate clothing or a lifejacket. Buoyancy aids are never suitable replacements for lifejackets.

4 Had a specific risk assessment been done on the work to be carried out that day, it is likely that the dangers of the weather, the unsuitability of the boat and the need for appropriate clothing and lifejackets would have been addressed. Unfortunately, this was not done and two experienced professionals died as a result.

5 Quite apart from the tragic consequences of this accident, professional mariners who work closely with the public have a duty to lead by example. They must ensure that they are seen to be taking all the necessary safety precautions and apply best practice at all times.

Kill Cords Save Lives, When Used Properly

Narrative

It was a lovely sunny, calm day in spring, just right for taking a boat out for a spin. This boat was a rigid-hulled inflatable boat (RIB) with a 225hp outboard engine. The owner and a friend planned to take it out for an hour or so and then stop off for a meal before returning to a local boatyard where they could leave the RIB for the night.

In the early afternoon, they stopped off at a marina, and after a lengthy meal with wine started the return journey. The boat was well maintained. As they set off, both occupants were wearing flotation devices and the driver had looped the engine kill cord around his wrist. The boat left the harbour and initially steered a straight course, but the RIB unexpectedly swerved to port, throwing the two people into the water.

It is thought likely that the driver had seen an object in the water close in front of the boat, and his instinctive reaction had been to turn to avoid it. This had occurred at high speed and at a time when the passenger had momentarily released his grip on the steadying grab handles to retrieve an object from the floor of the boat. While the boat heeled in the sudden turn, the driver reached across the controls to try to steady his friend. This left neither the driver nor the passenger holding on tightly, and resulted in both men being tipped from the boat. In reaching to steady his friend, the kill cord had become entangled with the throttle controls, and despite the cord being stretched as the driver entered the water, it slipped off his wrist before it acted to stop the engine.

Figure 1 – RIB photographed after accident

The RIB continued at high speed, constantly turning in a spiral and, fortunately, moving away from the people in the water. It grounded at speed and climbed to eventually come to rest on a footpath on top of a sea wall (Figure 1).

Figure 2 – Vessel's actual GPS track after incident

At first, the two friends spoke to each other in the water, but soon, the driver stopped talking and the two drifted apart. The passenger was not a strong swimmer and only had a 50N buoyancy aid on. The driver had been wearing a manually inflatable 150N lifejacket which, for some unknown reason, he did not inflate. After about 30 minutes, they were seen from a passing ferry, which used its rescue boat to pull them from the water. The passenger was unhurt, but suffering from the cold. Unfortunately, it was not possible to revive the driver.

Figure 3

The postmortem report on the driver confirmed that, at the time of the accident, he had been almost twice the legal alcohol limit for driving cars on British roads.

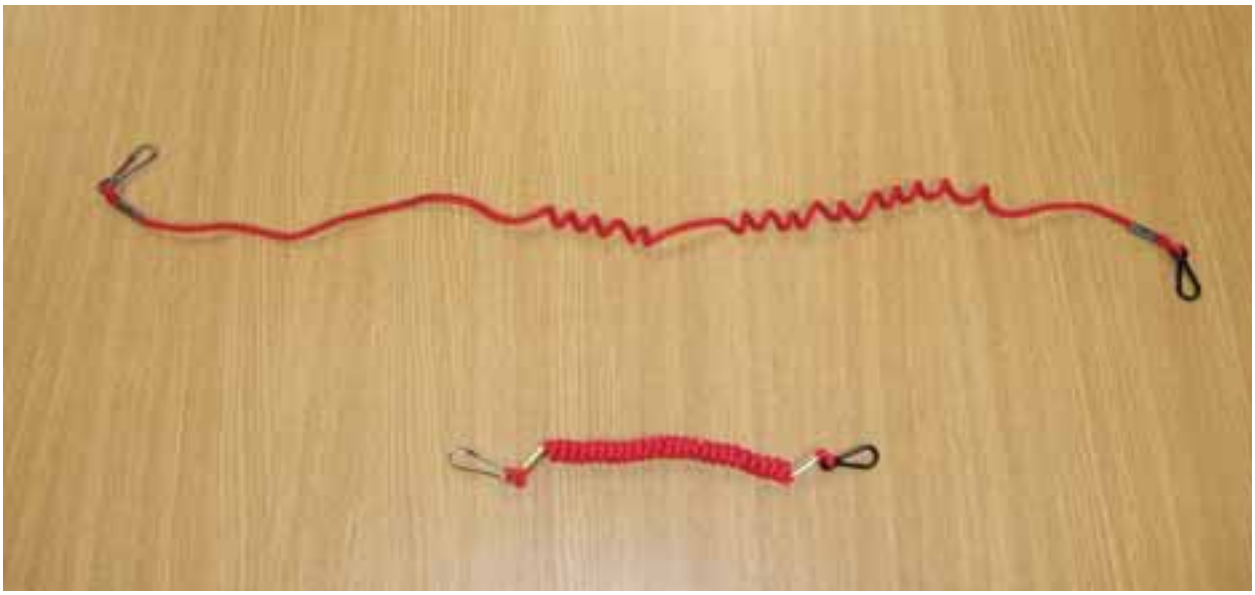


Figure 4 – Stretched kill cord in comparison with new item

The Lessons

A number of factors to this accident have also been contributory in other recent leisure craft accidents. Most are obvious, and they include:

1 Don't drink alcohol and then take a high speed boat onto the water. You never know when you may need quick reactions and all your wits to save your own or someone else's life. Furthermore, if you do end up in the water for any reason, your survival time will be significantly reduced if you have alcohol in your blood stream.

2 The engine kill cord should be connected to the driver's leg or lifejacket harness. Had the kill cord operated correctly in this case, the boat would have remained in the immediate vicinity to provide a possible lifesaving platform. If neither man had been hurt, they might even have been able to reboard the boat and restart the engine. It is also worth noting that the consequences in this case could have been even worse had the boat circled, as a number have done in the past, and then run over the people in the water.

3 A boat should be equipped with safety equipment that is appropriate for the area of intended operation. In this case, the use of buoyancy aids during an offshore passage is not advised; they are only designed for use "by those who can swim and are close to help". When you purchase any flotation device, check it is up to the task you are going to use it for and that it is approved to CE standards. There should always be a picture or written information which identifies its intended use (Figure 3). If in doubt, discuss what you are going to use it for with the vendor.

4 It is so easy to underestimate the reaction this type of performance vessel will have to a high speed turn. Get to know the limitations and capabilities of your craft, preferably through an approved familiarisation course.

Ouch! One Very Badly Cracked RIB

It was another very pleasant, balmy summer's day in a popular seaside resort; just the sort of day to take the family out for a short, exhilarating, boat trip. Indeed, what better way to round off a holiday than to do this onboard a high speed, 12 passenger, 9 metre, Rigid Inflatable Boat (RIB) (Figure 1).

Full of expectations and a little trepidation, 12 passengers, 6 of whom were children, were given a rudimentary safety briefing by the fiancée of the RIB's skipper. She had no marine experience. The briefing only covered the use of the lifejackets, and emphasised that the "red" manual inflation toggle should not be pulled while in the RIB. Unfortunately, the passengers were not told when the toggle should be pulled. With the passengers now safely on board, the skipper and his fiancée took up their positions at the steering console.

The skipper rounded off the safety briefing by instructing his passengers to raise a hand should they become concerned at any time during the trip.

The skipper connected his engine kill cord to the steering console, started the engines and left the harbour entrance, while the passengers settled down for their big treat. They were not disappointed. With the wave height at about 0.5 metre, the skipper conducted a number of exhilarating, high speed manoeuvres before reversing his course to pass the nearby headland and into more open seas.

By now, the wave height had increased to about 1 metre. The passengers, now a little more nervous, were being bumped about their seats as

Figure 1 – Broad on, port perspective

they passed a nearby, small, single handed fishing vessel at about 25 knots, but none raised a hand to indicate concern. After manoeuvring off a nearby beach, the skipper set his course to return to the harbour. Soon after, the RIB drove into the back of a wave in the following sea.

The skipper felt the RIB's handling characteristics change. The deck heaved slightly, there was a loud crack and the forward part of the hull momentarily adopted an angle of about 45 degrees from the horizontal. The front bench seat was torn from its deck mountings, plunging two of the children into the water (Figure 2). One female passenger also trapped her legs between

the split sections of the marine ply deck before being pulled back by her husband. In the meantime, the skipper ran forward, the engines stopped as the kill cord was activated, and he dropped both his anchors and launched the lifeboat, although he was unsure how to do this. The RIB, although still afloat, had its bow section fully open to the sea, with port and starboard splits to the hull extending to over half the RIB's length (Figure 3).

Luckily, the two children in the water were quickly recovered by their father, who had dived into the sea to rescue them. The skipper of the fishing vessel saw the RIB in difficulties and immediately hauled in his lines and made his way towards the RIB. Lifeguards from the nearby beach also sped to the scene on a jet ski as the emergency services were activated.

The passengers were transferred to the fishing vessel, a jet ski, and the inshore lifeboat, and were landed at the harbour shortly afterwards. Surprisingly, none suffered serious injury.

The subsequent investigation found that the RIB was supposedly built to the European Craft Directive's standards, but there was no documentation to support this claim. In particular, there was no specification for the hull structure or its construction to justify its designation to cope with 4 metre seas, the structure lacked longitudinal stiffness and was of extremely light construction (Figure 4). As this vessel was used for commercial purposes, it was subjected to detailed examination under the auspices of the MCA. However, in common with many other RIBs, there was no access to the under deck areas, so it was very difficult to assess the true condition of the hull.

It was also found that the operating company had conducted no risk assessments of their operation, and neither was it aware of the need to do so. The skipper lacked some of the mandatory qualifications and endorsements, and the local harbourmaster was unaware of the qualifications required for the RIB's operation, despite having endorsed the venture. Although the RIB had been examined for commercial use, the required certification had not been issued. While this had no impact on the accident, the vessel was, nevertheless, ineligible to carry fee paying passengers.

Figure 2 – Front bench

Figure 3 – Hull lifted to expose split

Figure 4 – Construction

The Lessons

The owner of the RIB operating company identified a niche in the leisure market for high speed boat rides. He purchased the RIB, and operated it in good faith, believing that it had been built to the European Recreational Craft Directive (RCD) standards (which came into force in 1996 for recreational craft between 2.5 and 24 metres). As such, the craft should therefore have been able to withstand the loads expected for its intended operation. This assumption was further reinforced because the RIB had been examined for commercial use.

Fee paying passengers should expect to be carried in a safe manner, in a seaworthy vessel capable of coping with the predicted in service loads. Equally, they should expect that the operation has been assessed as being safe, part of which includes the skipper being fully trained and qualified for his role in order that he can competently deal with emergency situations.

In this case, the crew and passengers were very lucky to escape serious injury.

This accident has highlighted the following lessons appropriate to operators of small, high speed leisure craft, especially for those in commercial use:

1 If you are considering buying a boat that has been built since 1996, ensure that it carries a CE identifying plate confirming it has been built to the RCD standards.

2 Purchasing a new build vessel is a major financial undertaking – check with the builder that he holds a comprehensive Technical File supporting his build process. This should contain the necessary calculations proving the hull strength is suitable for the intended operation.

3 If considering buying a re-sale boat, you will wish to check the condition of the hull structure. This is often difficult with a GRP RIB as under deck access is frequently impossible. If this is the case, the builder may well have a set of photographs taken during build. These, coupled with the information in the Technical File, will aid you and your surveyor to determine the suitability of the vessel's construction for your needs. It is also wise to check the vessel's history for any major hull repairs.

4 Are you aware of the qualifications and endorsements required to skipper a commercial craft, and of the need for risk assessments? These are laid out in the MCA's Marine Guidance Note 280(M) colloquially known as the "Harmonised Code".

Perilous Propellers

Narrative

A 12 metre long, twin screw charter boat was hired by a team of divers for 2 days of diving. This vessel had been used by one of the team on a previous occasion, with good results. It was known to some of the others by reputation and was operated under the Maritime and Coastguard Agency's Code of Practice; it was a Coded boat.

The boat's skipper met with the team the evening before the first dives and discussed buddy arrangements and dive sites.

The following morning all met at the boat, which then headed for the area of the first dive. This was just off an area of rocks where seals were common. Once at the site, the boat's skipper gave the dive team a briefing. This included details of the underwater terrain, an area of possible strong tidal streams, the use of delayed surface marker buoys and procedures to be followed after surfacing. Water depth was between 20 and 24 metres.

Four pairs of divers entered the water. Surface conditions were reasonable, with only a slight swell and breeze. After about 30 minutes, they began to surface close to the rocks. The swell had increased noticeably, as had the wind, which was tending to blow the boat towards the rocks; a lee shore. As instructed in the briefing, they swam towards the boat, and the first pair of divers boarded without incident.

One of the second pair to surface had difficulty getting on the boarding ladder. On the first attempt, he slipped off, largely because of the boat's movement in the swell. He again swam towards the boat for a second attempt. However, the skipper was concerned that his boat was being pushed too close to the rocks. Thinking the diver was still on the ladder, having not seen him slip off, he put his engines in reverse gear to move away from the rocks.

The diver quickly found himself beneath the boat, with his regulator knocked out. He tried to lose buoyancy, to get clear of the boat, but before he could do so his legs became caught in one of the propellers. He lost one leg and seriously injured the other.

Another, much faster boat in the area recovered the injured man and his buddy, and landed them ashore. During this short trip, the coastguard was alerted by VHF radio and arranged for both an ambulance and an air ambulance to attend.

The Lessons

1 The Maritime and Coastguard Agency's Code does not cover the safety of recreational diving operations; it is concerned primarily with the safety of the boat and those on board. A boat's compliance with the Code does not automatically indicate its suitability for diving.

2 Many Coded boats still operate with just a skipper; he may have no second crewman. A skipper working alone may not always be able to take steps to ensure his boat's safety, and at the same time monitor divers at the surface or coming to the surface. If possible, any of the dive party already on the boat should act as a second pair of eyes for the skipper, monitoring divers at or near the surface and making the skipper aware of their position.

CASE 21

Lookout – Above and Below the Water

Dive vessel displaying the Alpha flag and the American Territories flag

Narrative

A 30 foot (9.1m) yacht was returning to the UK at the end of a charter period, heading for a breakwater entrance.

Eight divers from a diving vessel positioned between the yacht and the breakwater entrance had begun diving operations.

Weather conditions were good, the wind northerly at 15 knots and visibility excellent. The yacht was on a north easterly heading and making good a speed of about 7 knots. It was close hauled and intended to pass to the north of a 'fishing boat' that the skipper and his crew had already identified.

Similarly, the diving vessel had identified the yacht and assessed that it was heading for the western breakwater entrance, and continued monitoring diving operations; the skipper had probably underestimated the speed made good by the yacht.

The diving vessel was displaying clearly and conspicuously the international code flag Alpha, drawing attention to the fact that it was engaged in diving operations and that vessels were to keep well clear and pass at slow speed.

As a precautionary measure, the dive vessel was also displaying the American Territories flag, orange with a white diagonal stripe, which had the same meaning as flag Alpha. Both flags were $1m^2$ and were hoisted 2.5 metres above deck level but, contrary to the Collision Regulations, flag Alpha was not displayed as a rigid replica and measures had not been taken to ensure its all round visibility.

As the yacht approached, the divers released two orange inflatable delayed surface marker buoys, which indicated that they were returning to the surface. Although the marker buoys were shielded by the sails, the skipper had identified two orange markers and assumed that they were lobster pot marker buoys. His intention was to clear them, all be it at close range.

At no point prior to the incident had the skipper positively identified the flags displayed by the diving vessel. As a result, the yacht passed over the top of the divers as they surfaced, blissfully unaware of the diving operations beneath them. Attempts by the Coastguard and the dive vessel to contact the yacht by VHF radio failed. Thankfully on this occasion there were no injuries sustained by any of the diving party.

The Lessons

1 A proper lookout must be maintained by all vessels at all times. Remember that a proper lookout means not only identifying the presence of another vessel, but also checking whether that vessel is displaying lights, shapes or flag signals that indicate it is engaged in special operations.

2 Once the lookout has identified a shape or flag, the skipper and the crew must be familiar with its meaning. Specifically, crews should actively familiarise themselves with the International Code of Signals.

3 Maintaining a good VHF listening watch should be a standard part of every vessel's watchkeeping arrangements. Owners spend significant sums of money to purchase the latest hi-tec radio equipment; unless the radio is turned on and set to the correct frequencies, with the volume control properly adjusted, it is of little use to anyone.

Relaxing Canal Trip Ends in Tragedy

Aft section of the narrowboat

Narrative

Two elderly couples and an elderly gentleman hired a 20m narrowboat for a 1-week holiday. They were all experienced at canal boating, and although the single gentleman was partially paralysed on his right-hand side, he was still very able to helm a canal boat using his left hand. When he was on the helm, another member of the crew would operate the throttle.

The party loaded their stores on to the hired canal boat and then completed the safety handover with a member of the boat yard staff. The brief did not include any mention of manoverboard action, or the use of the life-ring, which was stored amidships on top of the canal boat, and the party declined lifejackets when offered. The boat had a semi-traditional stern, which had no rail around the transom.

Two days into the holiday, the party were heading downstream in a meandering section of a river, which was flowing relatively quickly due to recent rain. The weather was windy with frequent heavy showers. The partially paralysed gentleman was steering, standing on the right side, helming with his left hand. One of the ladies was sitting down operating the throttle as needed.

The boat entered a particularly sharp right-hand turn, and it became apparent that they were not going to get round in one go. Astern thrust was applied, but at the same time the wind caught the bow and the boat gently bumped into the left-hand bank of the river. The stern, pushed by the current, edged closer to the right-hand bank. At some point, the gentleman on the tiller lost his footing and fell off the right-hand side of the boat, into the river, and drifted downstream. There was a cry of 'man overboard', and the lady who had been down below dived into the river to help. She swam to the casualty and attempted to keep his head above water. Meanwhile, another gentleman climbed on top of the canal boat to deploy the life-ring. The lanyard for the life-ring was wrapped around it like a yo-yo. Unfortunately, the life-ring lanyard didn't unravel as it was thrown, resulting in the life-ring dropping into the water beside the boat. The lanyard was pulled back in, and fully unravelled, before a second attempt at a throw was made. The throw did not reach the pair in the water, the lady having now managed to raise the casualty's head above water.

The gentleman on top of the canal boat then untied the life-ring lanyard from its securing point on the boat, and took the life-ring on to the left-hand riverbank so that he could get into a better position to throw it again. Two farmers, who happened to be in a nearby field, then helped in the rescue, throwing the life-ring and pulling the two people out of the water. The emergency services were called and CPR was administered to the elderly gentleman.

The accident site was quite remote, so paramedics arrived sometime later. The gentleman was flown to hospital by helicopter, where he was pronounced dead. After hospital checks, the other four members were released shortly afterwards, with only the lady who entered the water having suffering mild hypothermia.

Demonstrating use of the life-ring

The Lessons

1 Make sure you have a manoverboard procedure and that you know how to use the safety equipment on your hire boat. Throwing the life-ring correctly might have ensured vital seconds were saved while those in the water were trying to remain afloat. It was very lucky, in this case, that the rescuer who dived in did not also perish.

2 Lifejackets, although often seen as unnecessary on a canal boat, are really essential if there are any non-swimmers or physically impaired members in your party. Diving into a river to assist a weak or non swimmer can put you at great risk.

3 Ensure you hire a canal boat that is suitable for your party.

For example, you may wish to consider:

- a cruiser stern, which includes a rail around the stern
- easier access steps into cabin
- other child-friendly safety features if travelling with children.

Fatal Injuries From Propeller

Narrative

A family were enjoying their first narrow boat holiday together on a hired boat. The hire company had provided buoyancy aids and shown the family how to manoeuvre the boat and operate the locks on the canal before they set off.

Two days into their holiday, the family approached a lock which was obscured from their view by a bend in the canal and a bridge immediately ahead of the lock gates. Their boat came level with another hire boat moored in the lock waiting area, and the family realised that they needed to move astern to moor and wait their turn for the lock. With the wind blowing down the canal, from bow to stern, the helmsman put the propeller into reverse, but was unable to prevent the bow being skewed at an angle across the canal. The boat then made contact with the stern of the moored narrow boat and a family member jumped from the stern to the bank using the stern mooring line to help secure the boat safely.

The boat then made contact with the canal bank, and the helmsman was seen to tip over the guard rail, which was at about knee height and fitted round the cruiser style stern. He managed to hold on briefly, with his legs hooked over the rail, before dropping into the water on the outboard side. The crewman with the stern line jumped back on board and stopped the engine, but could not see the helmsman in the water. Although buoyancy aids were available on the boat, the helmsman was not wearing one. A lifebuoy was thrown into the water, but with no sign of the helmsman, the crewman jumped into the canal to assist. The crewman quickly found the helmsman's leg, but could not pull him free. Another family member and the helmsman of another boat jumped into the waist deep water to assist, but the helmsman was entangled in the propeller.

The crewman climbed back on board and removed the weed hatch in the engine compartment to gain access to the propeller. He could see the helmsman was trapped by torn clothing, with his head and arm caught in the propeller. Using scissors, he managed to free the helmsman, and with the assistance of the emergency services, who had quickly arrived at the scene, the helmsman was recovered to the canal bank. He had suffered severe injuries to the back of his shoulders and head, and his left arm was very nearly severed. He was pronounced dead at the scene.

The Lessons

1 Although serious accidents are rare on the inland waterways, boaters, and particularly those new to boating, should be aware of the potential hazard posed by a rotating propeller.

2 All responsible people on board should be familiar with the actions to take in an emergency, and be able to stop the propeller quickly if needed.

3 Boaters should check canal maps for potential obstacles such as locks and bridges, and slow down if the view ahead is obscured to avoid having to make difficult manoeuvres at short notice.

4 Although hand rails are not required on narrow boats, where they are fitted, they should be of an appropriate height to prevent people from falling overboard near the propeller.

List of leisure craft accident reports published since 2004

SAILING VESSELS

Accident Date	Vessel Name	Accident Details
3 February 2007	***Hooligan V***	Investigation of the keel failure, capsize, and loss of one crew member from a Max Fun 35 yacht, 10m miles south of Prawle point.
20/21 August 2006	***Ouzo***	Investigation of the loss of a sailing yacht and her three crew, south of the Isle of Wight, during the night of 20/21 August 2006.
20 May 2006	***Roaring Meg of Cowes***	Investigation of two serious injuries on board a IMX 38 yacht in Southampton Water, 3.3 cables south-west of Hamble Point Buoy
17 March 2006	***Pastime***	Loss of one man overboard from a sailing yacht in the English Channel.
2 July 2005	***Mollyanna***	Capsize of a sailing dinghy with two fatalities, off Puffin Island, North Wales.
22 August 2004	***Albatros***	Accident on board commercial sailing vessel, in the Thames Estuary resulting in one fatality.

POWER VESSELS

Accident Date	Vessel Name	Accident Details
20 January 2007	***Lindy Lou***	Investigation of a fire on board a canal boat at Lyme View Marina, Adlington, Cheshire, resulting in 1 fatality on 20 January 2007.
26 August 2005	***Big Yellow***	Hull failure of a rigid inflatable boat, Porthmeor Beach, St Ives Bay, Cornwall.
7 August 2005	**Ribeye Open Tender 450 RIB**	Serious injury sustained when falling overboard from a RIB, off Abersoch Beach, Wales.
16 July 2005	***Carrie Kate*** and ***Kets***	Collision between *Carrie Kate* and *Kets* resulting in one fatality near Castle Point, St Mawes, Cornwall.
10 July 2005	***Sea Snake***	Grounding at high speed of a leisure powerboat near the entrance to Tarbert harbour, Loch Fyne with the loss of three lives.
19 June 2005	**2 Sorcerer Powerboats**	Collision between 2 powerboats during a junior racing event at Portland Harbour.
13 March 2005	**High-speed rigid inflatable boat**	Investigation of two people being thrown from a high-speed RIB with the loss of their lives in Milarrochy Bay, Loch Lomond, Scotland.
3 September 2003	**Unnamed cabin cruiser**	Swamping of a cabin cruiser in Lady Bay on Loch Ryan, and associated wave generation issues.
19 July 2003	***Breakaway 5***	Capsize of a hire boat on the River Bure, Norfolk resulting in one fatality.
12 July 2003	**4.6m grp open sports boat**	Swamping and foundering of a 4.6m grp open sports boat with the loss of three lives on Loch Ryan south-west Scotland.

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