LESSONS LEARNT
BY ACCIDENT
OUT!

THIS ISSUE
Aquaculture worker injures arm in machine
Lifejacket, phone and knife save capsized kayaker
Beam sea takes boaties by surprise
Trawler hits rock and sinks at harbour entrance
Skipper distracted as trawler heads for rocks
Man dies in cold water close to shore

Boaties out of their depth with alcohol

Inside page 4
The accident occurred at the end of the day’s second harvest of green-lipped mussels. The man, a highly experienced fisherman and aquaculture worker, was one of five crew on board the 18 metre steel vessel.

The crew began cleaning the harvest equipment while the vessel was still alongside the last mussel line. The man started to clean the debris caught inside the tine area of the declumper – a machine that breaks up clumps of mussels into singles, using a rotating shaft, chains and tines. The machine was normally disabled while it was being cleaned, but on this day it had not been shut down effectively.

The man had removed several clumps of seaweed with his right hand. As he reached in to pull debris from the tines, he used his left arm for leverage and inadvertently pushed down on the control lever, which started the tines rotating clockwise through his arm and up his hand. The rotating machine caught his arm, severely injuring it. He screamed out and other crew stopped the machine and reversed the tine to release his arm.

First aid was administered while the vessel steamed to the nearest wharf, where the injured man was treated by ambulance staff and transferred by helicopter to hospital.

This accident fits the classic “Swiss cheese” model, promoted by UK expert in organisational process James Reason. Under this model, holes that vary in size and position in slices of Swiss cheese represent risks or weaknesses in any system. When slices are stacked side by side, the holes do not usually line up, therefore no hazardous situation exists.
In this case, however, the accident was able to happen because the failure of various systems (barriers) designed to prevent the machine from rotating did align, allowing the hazard to pass through. The Swiss cheese model illustrates why it is vital to have more than one way of preventing an action or event in a safety system.

A combination of factors was found to have caused the accident:

- The main hydraulic isolating valve on the deck was not turned off, as set out in the safe operating plan. Turning off this valve shuts off all oil flow to the equipment and should be done before opening the declumper hatch.
- The automatic cut-out lever on a secondary isolating valve failed as the hatch was lifted. Normally, a short shaft moves this valve to the off position as the declumper hatch is opened, but the shaft had become disconnected and didn’t turn the valve as it was designed to do – although it had been working correctly earlier.
- The man’s left elbow activated the rotation control lever while his right arm was inside the equipment, which caused the machine to start rotating, catching and severely injuring his arm.
- Had the injured man correctly followed the procedure required for that item of machinery, this accident could have been avoided. He had worked on the vessel for six years and was fully trained in all aspects of the operation, with detailed knowledge of its safe operating procedures.

In response to this and other accidents involving machinery, MNZ has been periodically undertaking at-sea inspections of mussel vessels, to ensure appropriate guarding is in place and procedures are being followed to prevent serious harm injuries.
Boaties out of their depth with alcohol

A man who’d been drinking all day on a fishing expedition drowned after the boat ran out of fuel and he tried to swim ashore.

The man was one of a group of four who set out on a fishing trip in a four metre runabout. Two of the party decided the conditions were too rough and were returned to shore, but the man and his brother stayed on, drinking whisky and beer while they fished. They got lost as they headed back to the boat ramp, and their boat ran out of fuel less than a hundred metres from shore.

Although his brother, the skipper, urged him not to, the man entered the water to try to tow the boat ashore. The water was between 3 and 5 metres in depth, which was deeper than he’d expected, and he was wearing a lifejacket that didn’t fit him properly. Being a poor swimmer, he was very quickly in difficulty.

The skipper jumped in to try to rescue his brother, but he was also a weak swimmer. After struggling for about 15 minutes to keep his brother afloat, the skipper was unable to do any more to help and, overcome, he closed his eyes, face down in the water. During this time, their abandoned boat washed up ashore.

The men were spotted by people on shore, who swam out and brought the unconscious men in. The rescuers provided first aid until emergency services arrived and administered professional medical help. Although the skipper regained consciousness, his brother was unable to be revived and was pronounced dead at the scene.
This completely avoidable boating tragedy highlights the real dangers of operating or being in a vessel while under the influence of alcohol. Safe boating and alcohol do not mix. Things can change quickly on the water, and all on board need to stay alert and aware of the risks. Being affected by alcohol could mean you are unable to make the right decisions and keep yourself and others safe from harm.

Evidence collected during the investigation clearly showed that the skipper and the deceased had consumed a large quantity of alcohol. The skipper told the police he had drunk a bottle of whisky on the day. The dead man had a blood alcohol reading of 48 milligrams per 100 millilitres.

The effects of alcohol are well documented and have been widely publicised. Alcohol causes disorientation and gives people a false sense of their situation, prompting them to attempt tasks beyond their capability. The man’s decision to get into the water, despite being a poor swimmer, probably set in train the disastrous events that followed. Had he and his brother stayed with their boat instead, they may have either washed ashore on board without putting themselves at great risk, or been sighted by people on shore and rescued.

With alcohol, your coordination and ability to do a simple task – such as putting on a lifejacket – are reduced. It is harder to stay afloat or hold your breath. Blood flow is reduced, contributing to muscle, heat and fluid loss. Your airway protection reflexes are suppressed, which makes it easier for you to inhale water, and you are more susceptible to cold and less aware of the onset of hypothermia.

Maritime rules require the skipper in charge of a boat to ensure there are enough lifejackets of an appropriate size and type for each person on board. In this case, it is believed there was only one lifejacket on the boat, and it did not fit the person who wore it. Had the man who drowned been wearing a lifejacket that was the right size, he may have been able to keep his head above water and conserve energy. This would have reduced panic and increased his chances of surviving until he could be rescued or make it to shore. His brother, trying to keep him afloat without wearing a lifejacket, was fortunate not to have lost his life as well.

The men drank whisky and beer while they fished, and this bottle was in the boat when it washed up.
A kayaker made headlines for all the right reasons after becoming trapped under his kayak about 300 metres off the coast. His safety precautions and sound judgment meant he was able to contact rescuers and eventually make it home safely.

The man had been out fishing from his kayak for several hours. He had the kayak in a position where he knew he was in 20 metres of water, lined up with a group of rocks off the beach and between outcrops on a nearby island.

Noticing the swell picking up and the wind strengthening, he moved about 50 metres closer to shore. The wind continued to intensify, and he decided to follow the lead of two other kayakers who had told him they were heading back to shore.

The kayaker went to pull in the anchor, but it was stuck fast in the reef. He continued to tug on the line until it was pulled taut in a position directly above the stuck anchor. Reluctant to lose the anchor, he gave it another few sharp tugs, which turned the kayak side-on to the waves. A final tug coincided with a high swell, flipping the kayak over and trapping him directly beneath it.

There was not enough give in the line for the man to right the kayak and get it off himself. Luckily, he was in the habit of keeping his knife attached to his lifejacket, and used it to cut the anchor line so that he could push the kayak off. However, his attempts to right the kayak were not so successful, as it had become waterlogged.

Recognising that he was in trouble, the kayaker knew he needed to call for help. His cellphone was in a sealed plastic bag in the pocket of his lifejacket, and he was able to phone 111 and report his situation. He lost contact but managed to also call his wife, who phoned the police. A rescue helicopter and Coastguard vessel were dispatched to search for him.

The kayaker assessed his situation and realised his safest course of action was to stay with the kayak. He had been in the water for about 45 minutes and had swallowed a considerable amount of seawater when he was located by three divers in a runabout who’d heard reports of his call for help on their VHF radio.

They kept him warm and talking for about 10 minutes until the Coastguard rescue vessel arrived and took him back to shore. He was then taken to hospital and treated for hypothermia.

The key factors that prevented this incident turning into a tragedy were the kayaker wearing a lifejacket and carrying a way to summon help when he got into difficulty.

The lifejacket enabled the man to keep afloat until rescuers arrived and would have kept him from swallowing even more seawater, as it kept his head and face mostly clear of the water. The lifejacket also helped him to conserve energy, reducing fatigue and any tendency he may have had to panic.

All boaties should carry at least two ways to call for help that will work when wet. In this case, the kayaker had only one way to call for help – a cellphone in a sealed plastic bag – but it was enough to enable him to alert rescuers to his situation. Carrying it in the pocket of his lifejacket also meant that he could access it when he was in the water.

A minimum of two ways to call for help is recommended, as one may fail. Cellphones are not always a reliable way to call for help, as they only get reception in some areas and will not work when wet. Having a cellphone in a sealed plastic bag, as this man did, means it can be used by someone who ends up in the water.

A hand-held VHF radio or a distress beacon clipped to his lifejacket would have been a more reliable means of alerting people that help was needed.

The man also made the right decision to stay with his kayak and to wait for help to arrive, rather than striking out in an attempt to swim ashore. Although the kayak was too saturated for him to get into, it served as a flotation device and would have enabled him to be more readily seen than a person in the water would have been, especially from the air.

The good sense of keeping his knife attached to his lifejacket became apparent when the man became trapped under the kayak by the taut anchor line and was able to cut it.

Other lessons the kayaker took from the incident were not to pull tight to anchor, and to never be side-on to the waves. He has also resolved to tie his gear down in future, after suffering the loss of his fishing gear overboard.
 Beam sea takes boaties by surprise

Two men in a small fishing boat had to make their way to shore through chest-deep water after their runabout capsized at the river mouth.

The boat’s owner had just finished getting it ready for the summer season and decided to take it out for a run. The sea looked calm, but as they moved out of the sheltered channel where they had launched and crossed into the river mouth, they found themselves immediately abeam of choppy ocean waves.

The skipper motored close to the shore for shelter, but they were still exposed and the last two of a set of swells broke on the boat and capsized it. The men ended up chest-deep in water and had to force their way back to shore through the surging water. While they made it back to shore unhurt, the boat sustained heavy damage.

Looking along the seawall, the wave action can be seen at the entrance.

LOOKOUT!

Beam sea takes boaties by surprise

There have been several similar capsizes at this location, where a rigid wall divides the river into two parallel channels to protect the western bank from the ocean swells entering the bay. One channel leads past the wharf and out into the bay, and is mainly used by commercial vessels. The other channel is very sheltered and is used by recreational craft. Small vessels launch from a boat ramp approximately 500 metres upstream. As they exit the channel, boaties can find themselves suddenly abeam of the ocean swell and at great risk of swamping and capsizing.

Local knowledge is invaluable when navigating tricky spots, but this can only be gained through experience, and through experienced skippers and crew sharing information and educating others. Recreational boaties launching in unfamiliar waters should make it their responsibility to find out about any identified risks — in this case, the danger of a beam sea on exiting the channel — before they head out.

 Conditions can change over time and at different times of the day. Sediment deposited from the river has lifted the seabed at this point, making the water more shallow and producing higher swells. This effect is more pronounced at low tide. The outgoing river flow opposes the ocean swell, making the swell face steeper at the channel entrance.

This incident demonstrates the importance of wearing a lifejacket on small craft in any conditions, because things can and do go unexpectedly wrong, even in what seem to be sheltered waters. There’s usually not enough time to retrieve lifejackets and put them on in an emergency.

The boat’s occupants, both grown men, were wearing lifejackets and made it to shore without further mishap. However, had there been any children or less able adults on board who were not wearing lifejackets, the story could have ended very differently.
Trawler hits rock and sinks at harbour entrance

A fishing trawler returning to its home port hit a submerged rock and sank while navigating the harbour entrance in darkness.

The 13 metre wooden vessel was steaming home through the night, having cut short its fishing trip after its winch developed a mechanical problem while trawling. It had taken the three crew most of the day to haul in the fish and equipment before they were finally ready to leave the fishing grounds at about 8pm.

Once underway and having safely navigated past a potential trouble spot, the skipper went to bed and slept for two hours before taking the wheel once more. He was stationed at the helm, using the auto-pilot to steer the vessel. The GPS and radar were both operating, but the track plotter was old and not in use.

Early in the morning, the trawler hit rocks as it entered the harbour. The two crew asleep in the fo’c’sle were woken by the crash and rushed up the stairs into the wheelhouse. One of them was drenched by seawater flooding in through a hole in the port-forward side of the hull.

The skipper instructed the crew to launch the liferaft and dinghy, while he issued a mayday call on the VHF radio.

One crew member grabbed the emergency position-indicating radio beacon (EPIRB) and torch, and the men abandoned ship, watching from the liferaft as their vessel sank. They were rescued a short time later by Coastguard and a port company pilot vessel.
This incident directly resulted from the vessel being navigated too close to the harbour entrance. This is due to a failure to line up the vessel’s approach to the entrance channel, which is clearly defined by marker beacons.

Under Maritime Rules Part 22, it is the skipper’s responsibility to maintain an effective lookout by sight, sound and all available means. Navigating at night requires extra precautions and vigilance due to the reduced visibility. Skippers should use every tool available and actively search for possible dangers in the darkness.

The vessel’s GPS was working and would have shown the vessel’s position, but the skipper should have been cross-checking with paper charts and plotting regular positions to keep the vessel clear of known hazards.

Fatigue is likely to have played a part in the skipper’s failure to keep a proper lookout. He had only two hours’ sleep before returning to the watch. Naps like this can provide a good defence for a while, but at least six hours (and preferably seven or eight hours) of uninterrupted sleep is recommended before starting work.

Even though the usual routine and operations had been disrupted by the mechanical breakdown, there should have been a procedure in place to manage fatigue and ensure the person on lookout was adequately rested.

The owner of the vessel was unaware that the trawler was still under the name of the previous owner until the incident was investigated. The new owner, having failed to register the change, could have been charged under the Maritime Transport Act with acting without the necessary maritime document.

The skipper could have been charged with the same offence, as well as being charged with operating a vessel in a way that caused unnecessary danger or risk to other people or property. In this instance, no charges were laid.
MOSS made us proactive about the process of assessing risk. We sat down as a team and discussed our business requirements. It made our skippers aware of every issue in the health and safety plan. Our staff are more aware and more responsible for the plan, which now fits our business to a T."

Darryl O’Keeffe
Owner operator of Mussel Barge Snapper Safaris, Coromandel

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Nō te rere moana Aotearoa
A fishing trawler steered by autopilot struck rocks after the skipper lost track of time while he was tidying up the wheelhouse.

The 15 metre wooden vessel was steaming to fishing grounds in the early hours of the morning, with its radar and track plotter both in use.

The skipper, on watch while the other crewman slept, decided to alter course from the vessel’s usual track because an increasing groundswell and ebb tide were making the passage uncomfortable. He adjusted the autopilot to steer inside an island, through an area that was known to pose hazards (such as rocks and reefs) but well used by local fishers.

After tying down some loose gear on deck and deploying the paravanes – outriggers designed to limit the roll of a vessel – the skipper went into the wheelhouse. He became distracted while clearing up gear that had been thrown around, and lost awareness of how far the vessel had travelled. A flood tide had also begun to run and the vessel steamed further north than the skipper intended.

When the vessel struck rocks, the crewman was woken by the collision and rushed into the wheelhouse. Although the skipper directed him to get lifesaving gear ready, they managed to back the vessel off the rocks. After inspecting the inside of the hull for leaks, they were able to get back to port, using extra pumps and the assistance of another vessel.

The vessel grounded because the skipper lost situational awareness, and did not know the vessel’s position. By attempting to perform other duties at the same time, the skipper was not giving the task of lookout his full attention.

He did not meet his responsibility to keep a proper lookout by sight and hearing, as well as by all available means, while the vessel was underway.

Having made a change to the usual course, the skipper should have been fully alert to any changes in the weather and sea conditions, and actively searching for dangers. He needed to make full use of the technology on board his vessel – without delegating the responsibility for safe navigation to the equipment.

The skipper was very experienced. While fatigue was unlikely to have been a contributing factor – because the vessel was heading out to the fishing grounds rather than returning – complacency may have played a part.

Complacency and over-reliance on established routines can be dangerous when operating a regular run, and there is even less justification for a lookout relaxing their vigilance when navigating unfamiliar or tricky waters in darkness.
Man dies in cold water close to shore

A man died after falling into very cold deep water while attempting to board a larger vessel from an inflatable dinghy.

The man was one of five people staying on board a 14 metre vessel, which was being used as the base for the group’s hunting and fishing activities. The vessel was moored in a sheltered cove, 60 to 70 metres offshore.

Three of the group had already gone ashore in one inflatable dinghy when the man took the remaining member of the party ashore in the other. He dropped the person ashore without incident and was seen setting out in the second dinghy on his own, to return to the main vessel.

As the others were returning to the main vessel in the first dinghy, they saw the second dinghy drifting about 20 metres from the larger vessel and discovered the deceased man floating nearby.

Although the accident was not witnessed, it appeared the man had fallen into the water and was unable to pull himself out onto either the dinghy or the main vessel before he succumbed to the effects of cold-water immersion.

Because there were no witnesses to the accident, it is not known whether the man fell into the water while attempting to climb from the inflatable dinghy into the main vessel, or whether he ended up in the water after suffering a cardiac event (he had known medical conditions). The initial shock of plunging into cold water could also have triggered a cardiac arrest.

Cold water can kill very quickly. The initial shock of entering cold water can cause a large gasp for air, and a massive increase in lung and heart effort. This can result in muscle spasm, drowning or a heart attack. Even without those immediate effects, a person’s extremities quickly become numb and unable to function normally. Fine motor skills disappear, making it difficult to grab or hold on to items. Severe pain interferes with rational thought within minutes, and hypothermia, unconsciousness and death can rapidly follow.

No lifejackets were carried on the inflatables, despite the legal requirement to have enough lifejackets of the right size and type for all those on board a vessel under 6 metres. The group did not know the area also had a regional bylaw requiring lifejackets to be worn in vessels under 6 metres. Recreational boaties need to make sure they are aware of the local bylaws for the area they are operating in, and follow them.

Lifejackets can increase a person’s ability to survive in cold water, although it is considered unlikely that wearing a lifejacket would have changed the outcome in this situation. The very cold water would have quickly taken effect and is likely to have prevented the man from staying alive long enough to be found and rescued, or make his way to the shore, 60 or 70 metres away.

Another factor that could have contributed to this tragedy was the lack of equipment on the main vessel to help climb up from a smaller craft. Steps or a boarding ladder may have enabled the man to pull himself up and out of the water to safety.
Certain techniques can improve your chance of surviving long enough to be rescued:

- **Wear a lifejacket**
  A full lifejacket helps to keep the head and airway clear of the water, even when strength and mental capacity is waning. It will also make adopting heat loss-reducing postures much more stable.

- **The more clothes you have on, the better**
  Do not get undressed to enter the water. If there is time, add more layers. A person wearing two layers of woolen clothing will lose less than a quarter of the heat a person wearing only a swimsuit will lose. Wear as many layers of wool as possible, covered with a waterproof layer. The wool will trap warmer layers of water closer to the body.

- **Try not to panic**
  Panic can impair breathing and hasten the drowning process. Hyperventilation can occur when a person is unexpectedly immersed in the water. A mistimed breath can result in a laryngospasm, which sometimes results in loss of consciousness. A person who does not panic may simply have to cope with hyperventilation, which will eventually subside.

- **Where possible, get out of the water**
  In water the body loses heat 20 to 30 times faster than it does in air. Even if you feel colder out of the water, try to clamber on top of an overturned boat or any floating wreckage.

- **If you are forced to stay in the water, adopt the HELP (heat escape lessening posture)**
  Hold the arms tight against the chest, press the thighs together, and raise up the knees to protect the groin. This posture will increase survival time by nearly 50%. It will be most easy to adopt when wearing a lifejacket.

- **Groups of three or more should adopt the huddle position**
  The sides of the chests and the lower torsos are pressed together, arms hugging each other around the lifejackets. Intertwine legs as much as possible, and talk to one another. Children succumb to cold much more quickly than adults, and should be sandwiched in the middle of the group.

- **Consider options before swimming to shore**
  If you decide to swim for shore, consider that tests show an average person wearing a lifejacket and light clothing could swim about 1.85 kilometres in water of 10°C. In one Canadian case, a 20-year-old strong swimmer drowned within 5 minutes in 10°C waters. When deciding to swim for it, consider your swimming ability, the weakening effects of the cold and anxiety, and the huge overall heat loss that the swim will cause. If in any doubt, stay with the boat.

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**How the body reacts to cold**

The body must maintain the vital organs in its inner core – the heart, lungs, brain and so on – at a constant temperature of about 37.6°C to enable them to function normally. At normal temperatures the heat generated by the body is carried by the blood to all regions of the body. The body automatically regulates its blood flow to control body temperature. Any excess heat is removed by transferring it to the outer layers for dissipation.

As the temperature of the environment falls, the outer layers of the body begin to cool. The body now reduces blood circulation to these outer regions, so that the cooling is not transferred to the important organs in the deeper regions of the body. Hands and feet feel cold because of the reduced blood supply to these areas. Shivering starts, as an involuntary muscular attempt to generate more body heat.

With further cooling, the inner core of the body begins to cool.* This is the beginning of hypothermia. The blood supply to the body’s outer regions is further reduced, as the body takes drastic measures to maintain the temperature of its vital organs. Shivering may decrease or stop. The organs in the core are now being affected.

As the brain cools, there is reduced control and consciousness is affected. Further cooling of the core will cause the organs to stop functioning. Consciousness is lost. Death will follow unless treatment is immediate and correctly given.

*While progressive loss of body heat can result in loss of consciousness and death, many victims perish much sooner when immersed suddenly in cold water. Cold shock can affect some, causing cardiac failure within a few minutes. Increased breathing rates can lead to dizziness, and the muscles cool rapidly. Immersion in cold water can cause such rapid loss of muscular function that a person loses the strength to board a raft or even operate a flare in minutes. A fit person in these circumstances quickly loses the ability to make even basic movements to help keep themselves afloat. There have been many recorded cases of drowning in less than 10 minutes – long before the body core temperature has started to drop or the person is affected by hypothermia.

Adapted from *Safety in Small Craft*, written by Mike Scanlan, Coastguard Boating Education Service.

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The aim of the “HELP” (left) and “huddle” positions is to keep the warm water close to the body from being replaced by colder surrounding water.