

Report on the investigation of
the capsizing of the fishing vessel

Aquila

with the loss of three lives
Bo Faskadale Reef, Ardnamurchan
on 20 July 2009

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

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

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ARCC	-	Aeronautical Rescue Co-ordination Centre, RAF Kinloss
CRT	-	Coastguard Rescue Team
DCPSO	-	Duty Counter Pollution and Salvage Officer
EPIRB	-	Emergency Position Indicating Radio Beacon
ETA	-	Estimated Time of Arrival
HRU	-	Hydrostatic Release Unit
kg	-	kilogram
kW	-	kilowatt
m	-	metre
MCA	-	Maritime and Coastguard Agency
MDI	-	Marine Data International
MGN	-	Marine Guidance Note
MRCC	-	Maritime Rescue Co-ordination Centre
nm	-	nautical mile
OSC	-	On Scene Co-ordinator
RNAS	-	Royal Naval Air Station
SAR	-	Search and Rescue
SARIS	-	Search and Rescue Information System
Seafish	-	Sea Fish Industry Authority
SOSREP	-	Secretary of State's Representative
UKHO	-	United Kingdom Hydrographic Office
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency (Radio)

Times: All times used in this report are UTC unless otherwise stated



f.v. Aquila

SYNOPSIS



At about 1540 UTC on 20 July 2009 the fishing vessel *Aquila*, with a crew of four, capsized while dredging for scallops to the east of the Isle of Muck, off the west coast of Scotland. Three of her crew lost their lives in the accident; their bodies were recovered from the sea after the sole survivor was rescued by a passing yacht.

Aquila was trawling on the Bo Faskadale reef when her starboard trawl warp became snagged on the seabed. She yawed and heeled to starboard in following seas. The skipper put the engine out of gear, but had no time to take further action before the vessel capsized as large waves broke over her starboard side. The speed of the capsize resulted in the vessel's liferaft and emergency position indicating radio beacon (EPIRB) becoming trapped in the superstructure. Therefore, although they had released from their stowage cradles, neither of these important safety items were able to operate as intended.

The accident was witnessed from the shoreline by a holidaymaker, who cycled to a nearby house and telephoned the emergency services. He was connected with the coastguard at Maritime Rescue Co-ordination Centre (MRCC) Clyde, who immediately tasked a Search and Rescue helicopter. However, when it was realised that the accident had occurred outside MRCC Clyde's area of operation, they transferred control to MRCC Stornoway, in whose area the accident had occurred, and stood the helicopter down.

The decision to transfer control of the incident and stand the helicopter down caused a delay of 23 minutes in a rescue helicopter reaching the accident site. However, while regrettable, it is considered unlikely that this delay affected the tragic outcome of the accident.

At the time of her build, *Aquila* met the stability standard for larger fishing vessels, there being no standard for vessels with a registered length of less than 12m. However, analysis undertaken by the MAIB found that, due to an increase in her displacement tonnage, at the time of the accident she no longer met this standard.

As a consequence of this accident, the following actions have been taken:

- The Maritime and Coastguard Agency (MCA) has commenced a review of:
 - procedures for the handover of live incidents between MRCCs
 - the selection of Search and Rescue assets during an incident
 - its use of VHF radio procedures and the VHF radio coverage in the area of the accident.

- The UK Hydrographic Office has placed a warning on the chart and in the Sailing Directions regarding the possibility of dangerous waves being present in the area of the accident.
- The Sea Fish Industry Authority has agreed to highlight the safety issues identified in this report in the relevant fishing industry training courses.
- The MAIB has published a Safety Flyer for circulation to the fishing industry, which details the lessons learned from the accident.

In view of the actions already taken, no recommendations have been made.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *AQUILA* AND ACCIDENT

Vessel details

Registered owner	:	Private
Port of registry	:	Ballantrae
Registration Number	:	BA 379
Flag	:	UK
Type	:	Fishing vessel
Built	:	1988, Hepworths Yard, Hull
Construction	:	Steel
Length overall	:	13.40 metres
Length registered	:	11.92 metres
Gross tonnage	:	28.79
Engine power and type	:	186kW, Caterpillar 3406

Accident details

Time and date	:	1540, 20 July 2009
Location of incident	:	56° 47.80'N 006° 05.00'W 305° x 2.9nm from Ockle Point, Ardnamurchan
Persons on board	:	4
Fatalities	:	3
Damage	:	Vessel capsized and was a constructive total loss

1.2 BACKGROUND

Aquila had dredged for scallops in the area between Skye, Cardigan Bay and the Ulster coast since 2006. The vessel moved her base between a number of ports throughout the year, convenient to the area in which she was fishing at the time.

She had relocated to Mallaig in early June 2009, to fish the waters around the inner isles. New wire warps were fitted to her trawl winch at this time. The normal length of a fishing trip on *Aquila* was 4 to 5 days, after which she would return to port to land her catch, refuel and take on ice and stores. The crew would normally work two successive trips before returning to their homes in Cumbria for a short break.

1.3 NARRATIVE

Aquila had arrived back in Mallaig, after a 4 day fishing trip, on the afternoon of 16 July. The crew landed the catch, took on 2086 litres of fuel, topped up the fresh water tank, and loaded 2 tonnes of ice into the fish hold. She departed on the morning of 17 July and began to dredge for scallops in the waters to the east of the isle of Eigg (**Figure 2**).

The crew of four worked a routine of towing the dredges across the seabed for about an hour at a time during the day before hauling them in; this was extended to about 90 minutes at night to facilitate crew rest periods. The dredge bags were then emptied out before being lowered back to the seabed to begin another tow.

The vessel continued fishing in the area between Skye and the Ardnamurchan peninsula until the morning of 20 July when, while east of the Isle of Muck, the crew renewed the tooth bars fitted to the 14 dredge bags (**Figure 3**).

Aquila then headed towards the Bo Faskadale reef where she dredged across the top of the reef for about 40 minutes, and caught over 100kg of scallops.

She then headed towards the Ardnamurchan peninsula and dredged for about an hour off the north shore of the peninsula. This catch produced only about 30kgs, which the crew sorted, bagged and stowed on ice in the fish hold. There were then about 110 bags of scallops, each weighing approximately 37kg in the fish hold.

The wind had been steadily strengthening throughout the day and was west-south-west force 5 to 6 when the skipper informed the crew that they were going back to fish on the Bo Faskadale reef. He also advised them that if the weather continued to deteriorate, they would afterwards head towards more sheltered waters.

At about 1530 *Aquila* arrived on the north-west side of Bo Faskadale reef, and started to dredge in a south easterly direction across the reef. The wire warps were payed out from the trawl winch until there was approximately 120m of wire on the starboard warp and 100m on the port warp. The winch was then placed out of gear, and the brakes applied and tightened with a bar on both warps.

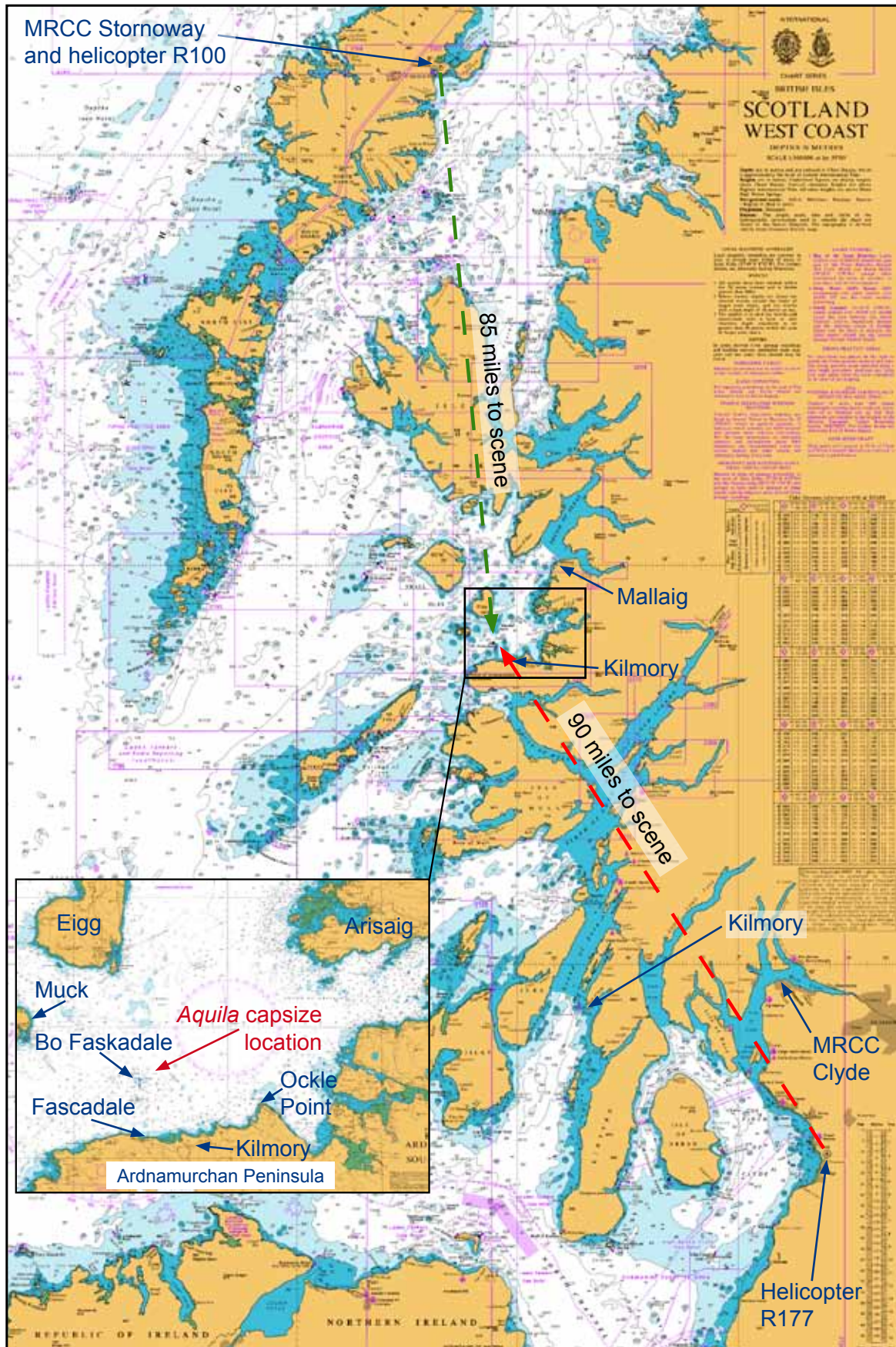


Chart extract showing accident area



Dredge bag from *Aquila*, showing toothed bars

The skipper was in the wheelhouse, at the controls, and the three crewmen had returned from the main deck to the galley, leaving the accommodation access door and the engine room door open, as was their normal practice. A short time later the trawl snagged on the seabed and the skipper was heard to adjust the engine controls and successfully clear the snag.

A few minutes later the trawl snagged again; the skipper was again heard to put the engine out of gear when the vessel suddenly, and violently, yawed to starboard. She simultaneously heeled over to starboard and water entered the galley, through the open door, as a succession of large waves broke over and into the vessel. Soon afterwards, at approximately 1540, she capsized.

The crew were inside the upturned hull as the water level very quickly rose. In the darkness, one of the crew in the galley saw the patch of light of the open accommodation doorway under the intruding water. He called out to his crew mates that he was going to attempt to escape. He then dived down and out through the doorway, pushed himself clear of the vessel and surfaced a short distance away from the capsized hull.

Once on the surface he grabbed two wooden planks, which had floated free from the wreck, to help him float. He looked around and, in waves of about 2m in height, saw the skipper in the distance, whom he assumed had escaped through an open wheelhouse window. He called out to the skipper, who appeared to be in some pain, but could not make out what the skipper said in response. He then saw the two crewmen who had been with him in the galley, and swam towards them.

He reached one of the men, who was complaining of back pain, and placed one of the planks under this man's back to help support him. He then swam to the other crewman, who was nearby but face down and showing no signs of life. He grabbed this man's clothing and pulled him towards the other man. He also found a long length of green coloured twine, which was floating on the surface, and used this to tie the men together.

After some time the crewman who had complained of back pains became motionless, and he realised that both his colleagues had succumbed. He then looked around for the skipper, but could not see him and so began to swim towards the land in an attempt to save himself.

1.4 ENVIRONMENTAL CONDITIONS

Wind: west-south-west force 5 to 6 (Beaufort scale)

Sea state: moderate to rough with a heavy westerly swell

Tidal Stream: north-east, 1 knot

Water temperature: 12°C

1.5 THE CREW

There were four persons on board *Aquila* at the time of the accident:

1.5.1 The skipper

Tony Hayton was the owner and skipper of *Aquila* and was an experienced fisherman. He had owned and skippered the vessel for 12 years and had been a fisherman for 26 years. He had attended the following statutory training courses:

First-Aid, 10 May 2001

Fire-Fighting, 24 March 1983

Sea Survival, 25 March 1983

Safety Awareness, 10 May 2007

He lived in Maryport, Cumbria, as did the other members of the crew.

1.5.2 The crew

The crew were all experienced fishermen who had also all attended the requisite statutory safety training courses.

The two crewmen who lost their lives in this accident were Peter Hilton and Thomas Sanderson.

The four men had sailed together on *Aquila* for about 3 years.

1.6 EYEWITNESS AND EMERGENCY CALL

Aquila's capsize was witnessed from the north shore of the Ardnamurchan peninsula by a holidaymaker, who had been cycling with his family along a remote coastal road near the hamlet of Faskadale (**Figure 2**). The eyewitness was looking out to sea when he saw a fishing vessel, about 2 miles offshore, struck by a large wave, after which she appeared to rapidly capsize.

The eyewitness then cycled as quickly as he could to a house in the nearby hamlet of Kilmory, where he and his family were staying. He used binoculars to verify what he had seen and made a 999 emergency telephone call to the coastguard to report the accident.

1.7 SEARCH AND RESCUE

At 1603 the emergency call was answered by a coastguard officer at the Maritime Rescue Co-ordination Centre (MRCC) Clyde. While the officer was on the telephone, taking details from the eyewitness, the coastguard watch manager alerted the Aeronautical Rescue Co-ordination Centre (ARCC) at RAF Kinloss, in accordance with rescue procedures, that a helicopter was required for a search and rescue operation for an accident off the village of Kilmory on the Sound of Jura.

During the emergency call, the owner of the house in which the eyewitness was holidaying, came on the telephone to provide detailed local knowledge and confirmed that the accident had occurred on the Bo Faskadale reef. She informed the coastguard that *Aquila's* upturned hull was visible on a transit bearing with the west side of the isle of Eigg, from her home in Kilmory, on the Ardnamurchan peninsula.

At 1608, MRCC Clyde telephoned ARCC to advise them that the helicopter could be stood down. ARCC were advised that the accident had occurred to the north of Ardnamurchan Point, in the operational area of MRCC Stornoway, and not in the Sound of Jura as MRCC Clyde had initially thought (**Figure 2**).

The duty officer at ARCC, who had tasked the closest available Search and Rescue helicopter, enquired as to the nature of the accident. When informed that a fishing vessel had capsized, he sought confirmation that a helicopter was

definitely not required. He advised MRCC Clyde that the helicopter based at the Royal Naval Air Station (RNAS) Prestwick, call sign R177, was almost ready to lift off. MRCC Clyde confirmed that there was no requirement for a helicopter “as yet”.

MRCC Clyde telephoned MRCC Stornoway at 16:09, briefed them on the detail of the emergency telephone call and transferred control of the incident to them. Shortly after this the crew of R177 contacted MRCC Clyde direct, on VHF radio, to advise them that, if required, they would be able to lift off “*in two minutes*”, at 1612. MRCC Clyde then instructed R177 to stand down.

At about the same time a coastguard officer from MRCC Clyde telephoned MRCC Stornoway to advise them that R177 was just getting airborne. The officer at MRCC Stornoway acknowledged the message and hung up before the Clyde officer had time to correct this information, when he realised the helicopter had, in fact, been stood down by one of his colleagues.

At 1615, MRCC Stornoway telephoned the house at Kilmory to clarify the information the first informants had passed to MRCC Clyde. This call lasted more than 4 minutes, during which the house owner gave another excellent description of the accident scenario, location and vessel involved.

At 1617 ARCC contacted MRCC Clyde to obtain the exact position of the accident for their log and to confirm that the crew of R177 could return to their operations room. They also sought confirmation that MRCC Stornoway had tasked the Stornoway based coastguard helicopter, call sign R100, to the accident. MRCC Clyde confirmed that the crew of R177 could leave the helicopter and that they believed MRCC Stornoway had tasked R100.

MRCC Stornoway contacted ARCC at 1621 to request a helicopter. The ARCC duty officer advised them that he understood R100 had already been tasked. He confirmed that R100 was the closest by about 7 minutes flying time, and should be scrambled. At 1622 MRCC Stornoway contacted R100, advised them of the accident location and tasked them to attend.

The Mallaig lifeboat was tasked at 1628, and at 1632 MRCC Stornoway made a Mayday Relay VHF broadcast which informed vessels in the location that a fishing vessel had overturned. It gave the approximate position and requested vessels in the vicinity to provide immediate assistance.

The Mayday Relay broadcast was partially heard by a yachtsman on the yacht *Arran Comrade*, which was to the south of Bo Faskadale reef on passage from Coll to Arisaig (**Figure 2**). However, VHF reception in the area was poor and intermittent, and he did not hear the position of the Mayday.

He called MRCC Stornoway on VHF to obtain the position, but received no reply. As he heard no other distress-related VHF transmissions and could not see other vessels in his area, he concluded that the distress was not close to his position, and continued on passage.

R100 was airborne at 1635, and vessels in the area began to respond to the Mayday Relay broadcast, offering to assist, from 1637. The three officers at MRCC Stornoway were kept fully occupied with a large number of telephone and VHF radio calls relating to the accident. They were also handling routine, non distress, VHF and telephone calls.

At about 1700 the yachtsman on board *Arran Comrade* was in the cockpit when he heard a shout and saw a man in the water waving his arms and calling for help, about 50m from the yacht. The yachtsman, who was sailing single-handed, threw the man a lifebuoy and then a rescue line. As the yacht was manoeuvred closer, the man was able to pull himself along the line to the port side of the yacht. The yachtsman was able to lower the port guardrails and help the man on board despite the yacht rolling heavily in 2-metre high waves.

Once on board *Arran Comrade*, the yachtsman helped the man to the cabin and covered him with sleeping bags to warm him up. The man told him that he was a crewman from the fishing vessel *Aquila* and that he and three other men on board had escaped from the vessel after she had capsized; he also said that he did not think the others had survived.

At 1707, the yachtsman called MRCC Stornoway on VHF, without reply. He kept calling until, at 1711, he made contact and advised them that he had picked up a casualty from *Aquila* and that the other three crewmen, who had also escaped from the vessel after the capsize, were unaccounted for. He gave his position and was advised that a helicopter and a lifeboat were on their way.

R100 and the Mallaig lifeboat arrived on scene at 1720, and once it was known that the survivor was recovering, began searching the area around the yacht for the missing men. The MRCC requested a second helicopter, and R177 took off from RNAS Prestwick at 1724 to proceed to the area.

At 1750, R100 saw and recovered a body from the sea which was taken to Broadford hospital on the isle of Skye. R177 arrived on scene at 1805 and the Tobermory lifeboat, which had been tasked by MRCC Clyde, arrived on scene at 1815. At 1824 the yacht *Stormwind*, which had been the first vessel to respond to the *Mayday Relay*, sighted a third casualty in the water. R177 recovered this body which was also taken to Broadford hospital.

At 1851, MRCC Stornoway appointed Mallaig lifeboat as the "On Scene Co-ordinator" (OSC) of the surface search for the one remaining casualty. The final casualty was located by the Mallaig lifeboat at 1920, which reported that they had initially spotted a line of green coloured twine, attached to the casualty's clothing, which then led them to him. At 1935 R100 recovered this body and took it back to Broadford hospital.

The survivor, who had been transferred to the Mallaig lifeboat, was lifted into R177 and taken to Fort William hospital. At 1952 MRCC Stornoway broadcast a Mayday *silence fini* message, which informed vessels that the casualties from *Aquila* were all accounted for, and that the search and rescue operation had finished.

1.8 HM COASTGUARD OPERATIONAL PROCEDURES AND MRCC STAFFING LEVELS

The operational procedure for handing over co-ordination of an incident is detailed in HM Coastguard operational procedures, CG3, Volume 1.4 (**Annex A**). The introduction to this procedure states: *“It is not normally desirable to change responsibility for the overall co-ordination of an incident that is in progress”*.

When co-ordination of the Search and Rescue (SAR) response was transferred to MRCC Stornoway, there were two coastguard officers in the control room, as the third member of the duty team was taking a meal break. In MRCC Clyde there were four coastguard officers in the control room when the emergency call was received, the fifth member of the watch team returned from a meal break a short time later.

1.9 SALVAGE

The coastguard’s Duty Counter Pollution and Salvage Officer (DCPSO) in liaison with the Secretary of State’s Representative (SOSREP) arranged for the capsized hull of *Aquila* to be guarded overnight by the coastguard vessel *Anglian Sovereign*, to prevent collision with other vessels and to preserve the scene for investigation purposes.

The next day the vessel’s insurers chartered a fishing vessel to undertake guard ship duties of the capsized hull, and contracted a company to salvage the vessel.

On 22 July divers from the salvage company arrived on scene and dived to inspect the capsized hull (**Figure 4**) and the wire trawl warps. This revealed that the starboard warp had become snagged around a rock on the seabed (**Figure 5**), which the diver was able to free.

During this inspection it was observed that the Hydrostatic Release Units (HRUs) of the vessel’s liferaft and EPIRB had both activated correctly. However, both the liferaft and the EPIRB had become fouled on parts of the vessel’s superstructure (**Figures 6 & 7**), and had not floated free.

On 25 July the trawl warps were cut and *Aquila* was towed, inverted, into sheltered waters close to Ockle Point (**Figure 2**). She remained there until 14 September 2009, when she was lifted from the seabed (**Figure 8**) and taken to a safe and secure berth.

Figure 4



Upturned hull of *Aquila* in the capsized location

Image taken from diver's video

Figure 5



Position of
snagged warp

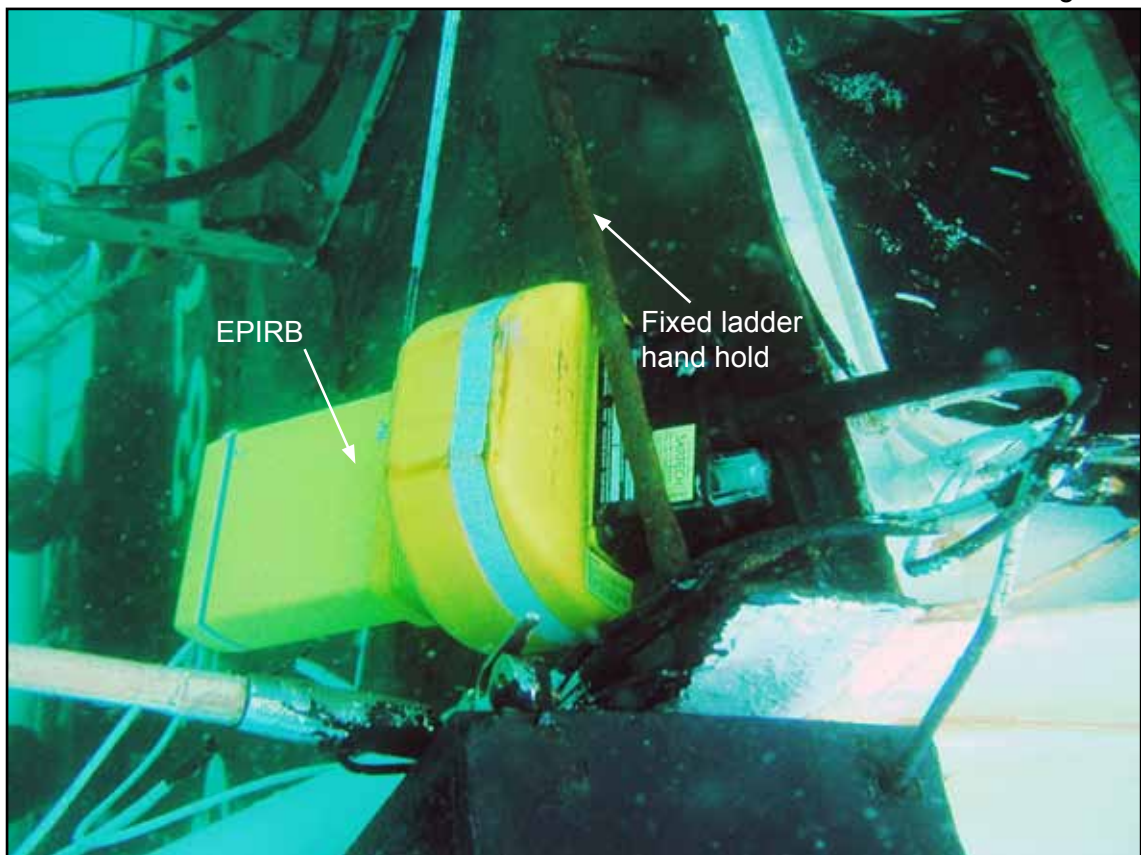
Starboard warp snagged on rock

Figure 6



Liferaft fouled in *Aquila's* superstructure

Figure 7



EPIRB fouled in hand hold of fixed wheelhouse external ladder



Aquila after salvage

1.10 STABILITY INVESTIGATION

The MAIB commissioned Marine Data International (MDI) to determine the stability condition of *Aquila* at the time of the accident. MDI's report is attached at **Annex B**.

To facilitate an objective assessment against accepted standards, the vessel's stability was compared with the statutory stability requirements for larger fishing vessels. The investigation used the Fishing Vessel (Safety Provisions) Rules 1975, which applied to fishing vessels with a registered length greater than 12 metres, as the reference for the analysis.

These rules were in force, for larger vessels, when *Aquila* was built in 1988 and although not statutorily required, a stability booklet was prepared for *Aquila*, which showed the vessel to comply with the provisions of the 1975 rules.

To facilitate accurate comparison, the original 1988 stability calculations were reworked to provide a reference datum. The 1988 calculations were found, in the main, to have been accurate. However, the post accident inclining trial, conducted during the stability assessment, found that a significant amount of ballast and additional fishing gear had been added to the vessel between 1988 and 2009. The lightship displacement was found to have increased significantly to over 70 tonnes since the 1988 trial.

As a result of these additional weights the vessel would no longer have met the requirements of the 1975 Rules, nor the Fishing Vessels (Safety of 15-24 Metre Vessels) Regulations 2002, had she been required to do so.

The report also concludes that in a following sea, given the reduced levels of stability, the vessel was particularly vulnerable when her gear snagged on the seabed.

1.11 SCALLOP DREDGING

Aquila dredged for scallops by towing two wire warps, one from each side, attached to which were steel spreader bars which each held seven dredges (**Figure 9**). The dredges consisted of a frame with a toothed bar at the front, to dig the scallops out of the seabed, with a collecting bag behind it. The bag was made of chain links forming a chain mesh on the bottom with netting on the top (**Figure 3**).

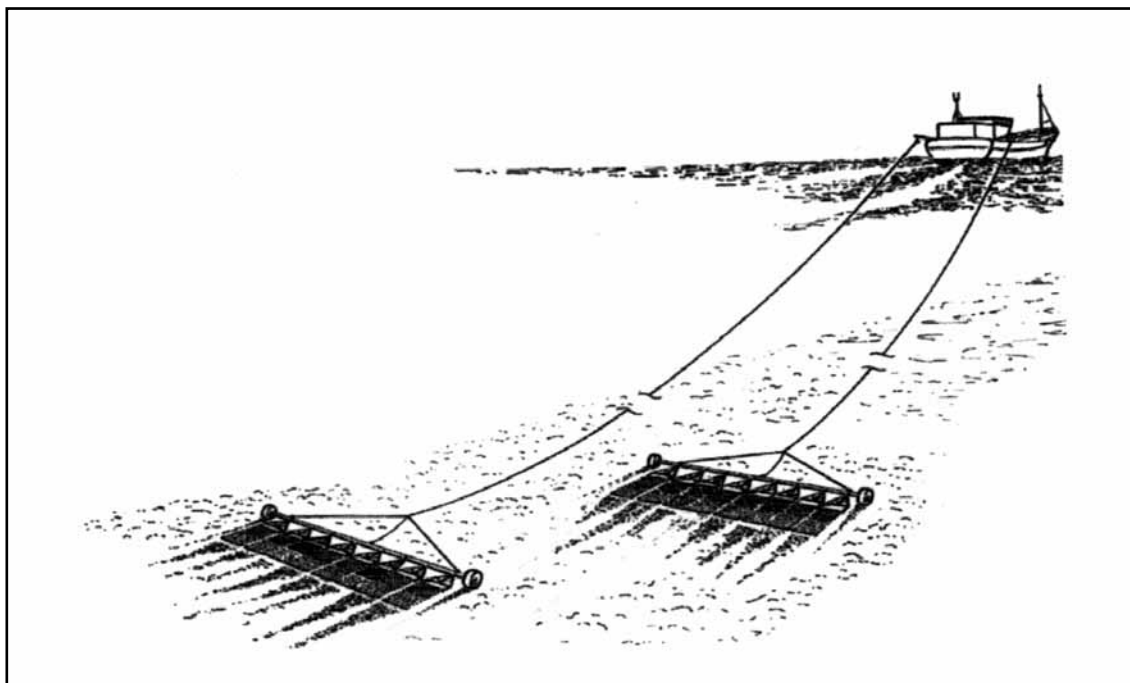
Image courtesy of Sean McIlwraith

Figure 9



Aquila's seven dredges

The dredges were towed astern of the vessel by two warps, which were set at differing lengths to avoid the steel bars fouling each other as they were dredged across the seabed (**Figure 10**). On *Aquila*, at the time of the accident, the starboard warp was set to be 20m longer than the port warp.



Drawing of scallop dredges

1.12 BO FASKADALE REEF

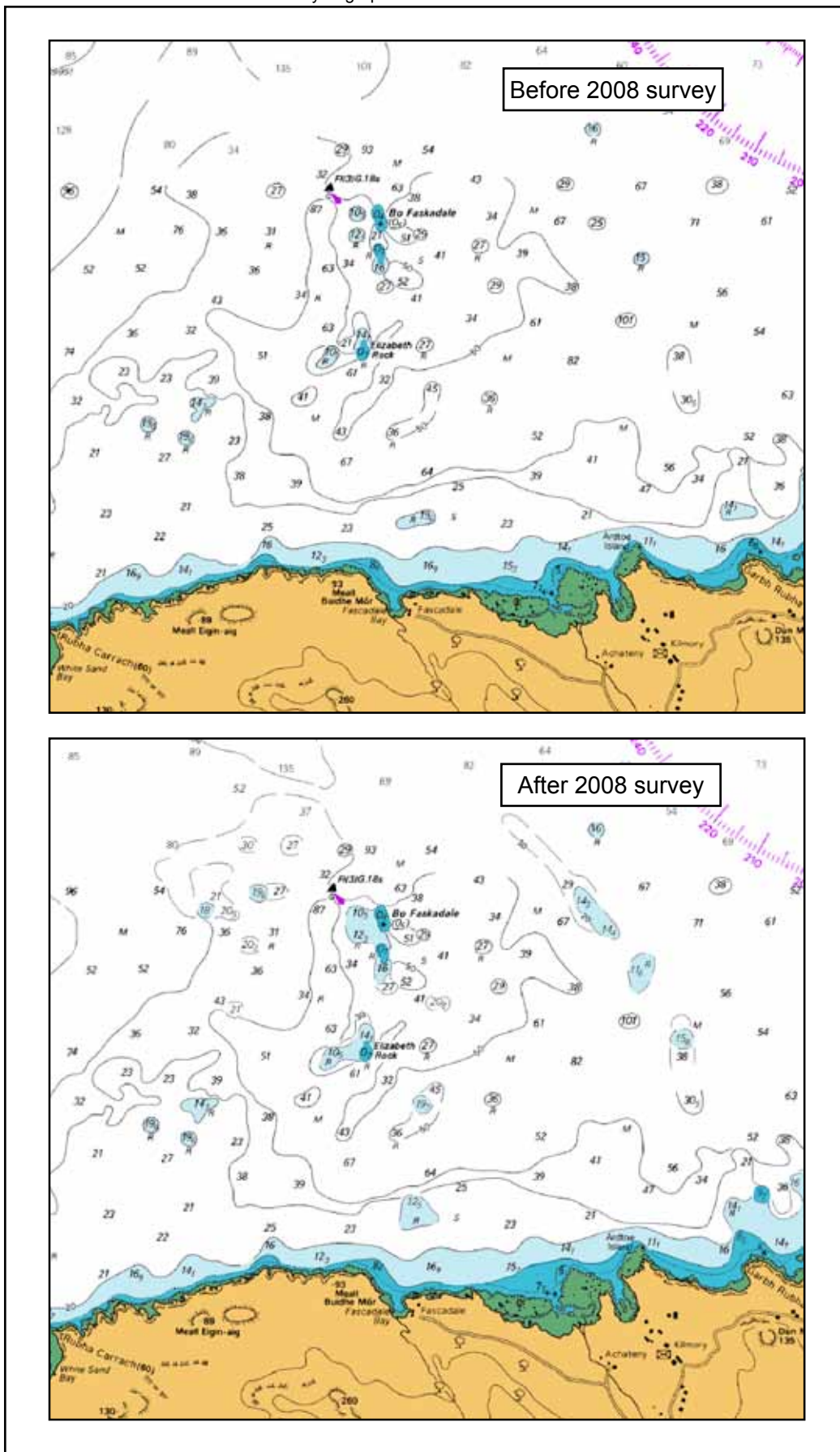
At the time of the accident, *Aquila* was dredging across the top of Bo Faskadale reef (**Figure 2**).

The reef is formed from the hard volcanic rock common to the region and lies 1.5 miles north of the Ardnamurchan peninsula, which is the most westerly point of mainland Britain. It is essentially a plateau with an area of approximately 1.75 square miles. Depths on top of the reef vary between 0.2m on its west side to 30m on the east, with undulating rocky ridges and sand-filled gullies prominent across the top of the reef.

The reef rises steeply on its west side forming a steep underwater cliff 60m in height. The area is popular with sport divers, and reviews of the area on diving websites refer to the danger of “*huge standing waves appearing suddenly due to the ground swell*”.

A hydrographic survey of the reef and surrounding area, using modern technology, was undertaken by the MCA in December 2008. The previous survey of this area had been undertaken in 1862 using a hand leadline only. As a result of the significant differences discovered in depths between the two surveys, a new edition of the chart of the area was published, as a matter of urgency, by the UK Hydrographic Office (UKHO) in January 2009 (**Figure 11**).

The electronic chart system in use on *Aquila* at the time of the accident had not been updated with the latest chart edition.



BA chart 2207 (showing depths before and after the MCA's survey, December 2008)

1.13 SIMILAR ACCIDENTS

Since 2002 the MAIB has been advised of 36 incidents involving fishing vessels which have snagged their gear on the seabed.

In 2003, *Chelaris J* capsized and sank off the Channel Islands, with the loss of four lives after her trawl gear became snagged. Five lives were lost in 2007 when a french trawler, *Bugaled Breizh*, capsized and sank in international waters off Lizard Point when her gear fouled on the seabed.

In several of the other accidents, fishing vessels capsized following snagging, and their crews were fortunate to have survived.

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 FATIGUE

Although the crew worked long hours, they organised their duties such that each man had a total of about 8 hours sleep in every 24 hours. There is no evidence to suggest that fatigue was a contributory factor to this accident.

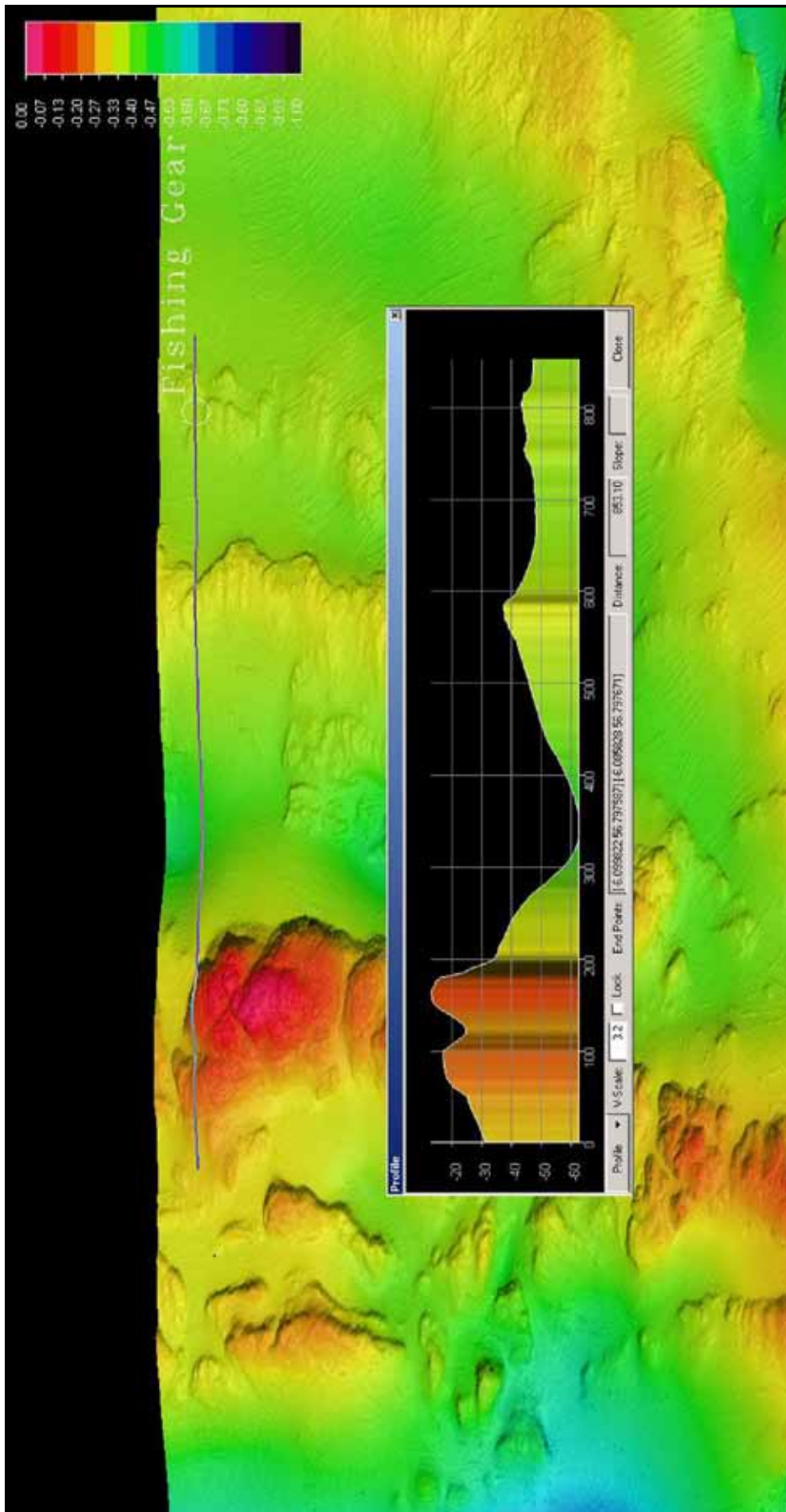
2.3 THE CIRCUMSTANCES OF THE LOSS

At the time of the accident, *Aquila* was dredging across the Bo Faskadale reef where the vessel had fished earlier on the day of the accident, and her gear had also snagged on the seabed on a number of occasions. The reef was well known among the local fishing community as an area in which there was a risk of fishing gear snagging. Some local fishermen referred to the area as the “*Fastadale*” reef, such was the risk of gear becoming snagged or “*fast*” in the area.

The skipper took the decision to return to the reef as *Aquila* had made an excellent catch there just a few hours earlier. The increased risk that the gear might snag on the seabed in this area, particularly as new tooth bars had been fitted earlier in the day, was probably appreciated by this experienced crew. However, no additional measures were put in place to control the increased risk on this occasion. Marine Guidance Note MGN 20 (M&F) informs owners, skippers and crew of the requirement to ensure the health and safety of workers on board vessels. To meet this obligation, fishermen must recognise the importance of undertaking risk assessments and of ensuring that these assessments are amended, as required, to meet changing circumstances.

The weather conditions at the time of the accident were such that, in a moderate to strong south-westerly wind, there were frequent breaking waves. There was also a moderate to heavy westerly ground swell running across the reef. *Aquila* was known to have good sea keeping qualities and, although the conditions were not good, they were considered to be well within the vessel’s operational capabilities.

The position of the accident, and *Aquila*’s probable course at the time of the accident, were superimposed onto the latest seabed survey information obtained from the MCA (**Figure 12**). Analysis of this information showed that, while dredging, several metres of the trawl warp would have been in contact with the seabed before it became snagged.



Seabed profile showing track of fishing gear

When her starboard warp snagged, the vessel yawed rapidly to starboard and lay beam onto the sea. The fact that the skipper was heard to immediately put the engine into the neutral position, where it was found after the salvage, demonstrates that he was alert to the vessel's plight. However, the nature of the snag was such that the skipper could not prevent the yaw, which exposed her starboard side and the open wheelhouse door to the full force of the wind and waves.

2.4 STABILITY REPORT

Aquila's stability at the time of the accident was calculated by modelling the vessel using information obtained during the investigation and from an inclining trial conducted following her salvage, in September 2009. The report (**Annex B**) showed that, while there was no stability standard for small fishing vessels (<12m), *Aquila* would have met the stability requirements for vessels with a registered length greater than 12 metres at the time she was built.

However, between 1988 and 2009 the vessel's displacement was found to have increased significantly to over 70 tonnes. The increase was found to be due to the addition of ballast placed under the crew cabin and in the stern area around the steering flat. The amount of gear carried (spare dredges etc) had also increased significantly.

The ballast was probably added by previous owners to increase the vessel's stern trim and deepen the propeller, which would have improved her towing capability. However, in this case, the addition of the ballast had a detrimental effect on the vessel's stability as it was positioned within the vessel at an average height of 1.5m above the keel.

With the addition of the ballast, the vessel's draught was increased, and her freeboard reduced correspondingly. Stability is generally reduced by a reduction in freeboard, and it is important that fishermen are made aware of the dangers when modifications or additions are made to a vessel without a thorough assessment by a competent person.

When her gear snagged, the vessel would have rotated about the starboard outrigger (**Figure 13**) and the large waves would have lifted her hull causing a further reduction in her stability. Fishermen should be reminded of the adverse impact on stability when trawling downwind in heavy seas.



Aquila, and another vessel, showing position of the outrigger

2.5 LIFERAFT AND EPIRB RELEASE

Although not a statutory carriage requirement, *Aquila* had been fitted with an EPIRB as well as a requisite liferaft. HRUs were fitted to both, and it was found that these had activated as designed and allowed both the liferaft and EPIRB to be released from their housings. However, after release, they had both become trapped in the vessel's superstructure.

In 2004, the MCA published MGN 267 (**Annex C**) summarising the results of a project undertaken in 2001 entitled *Liferaft on the Bow*. This provides guidance on suitable stowage positions and other measures that “*will significantly reduce the possibility of a liferaft or an EPIRB becoming trapped or snagged when being deployed automatically from a sinking fishing vessel.*”

The EPIRB was examined after the accident, and it was found that it had last been serviced in 2002 and that its battery had been due for replacement in 2005. Once the prudent decision to carry an EPIRB had been made, it should have been serviced annually in accordance with the manufacturer's recommendations. Notwithstanding this, no evidence was found to suggest that the unit would not have operated had it floated free of the vessel.

In this case, due to the speed of capsize it is difficult to identify an alternative location from which float free and activation of either of these important items of safety equipment would have been guaranteed (**Figure 14**).

Image courtesy of Norman Pascoe

Figure 14



EPIRB and liferaft stowage positions
on *Aquila*

2.6 SCALLOP DREDGING

Dredging for scallops is undertaken by pulling a number of steel meshed bags, with a toothed bar at the front of each one, along the seabed, digging the scallops out of the sand. The toothed bars on *Aquila* were renewed on the morning of the accident, and the likelihood that one or more of her dredges would become snagged on the seabed increased accordingly.

On *Aquila*, when dredging, the trawl winch was taken out of gear and the brake was applied and tightened up hard, with a bar. The practice of tightening up winch brakes is common as crews seek to avoid the warps paying out and possibly being lost while dredging.

New wire warps had been fitted to *Aquila* in June and, with the winch brakes hardened down, the likelihood of the winch veering or the gear parting in the event of a serious snag was reduced. The crew took pride in keeping their trawl gear in excellent condition; tragically this meant that when the gear snagged, the weight on the warps could not be quickly eased before she yawed and capsized even though the skipper promptly put the engine in neutral.

On larger fishing vessels, auto trawl systems and emergency trawl release systems can be fitted which will release the winch brakes if the load exceeds a predetermined level, or if an emergency release button is activated. However, the installation of such systems requires the winch to be fitted with a hydraulic brake release system, which would be impractical on smaller fishing vessels.

2.7 NEW CHART EDITION BA 2207

Comparison of the data provided on the old and new editions of the chart for the accident area, shows significant depth changes. This can be explained as the older edition was compiled using data based on leadline soundings, taken between 1857 and 1863.

Depths on the new chart edition are, in places, as much as 20m less than those on the old edition, which demonstrates the importance of the MCA's hydrographic survey programme for this area. This also serves as a good reminder why mariners should ensure that they always use the most recent chart editions.

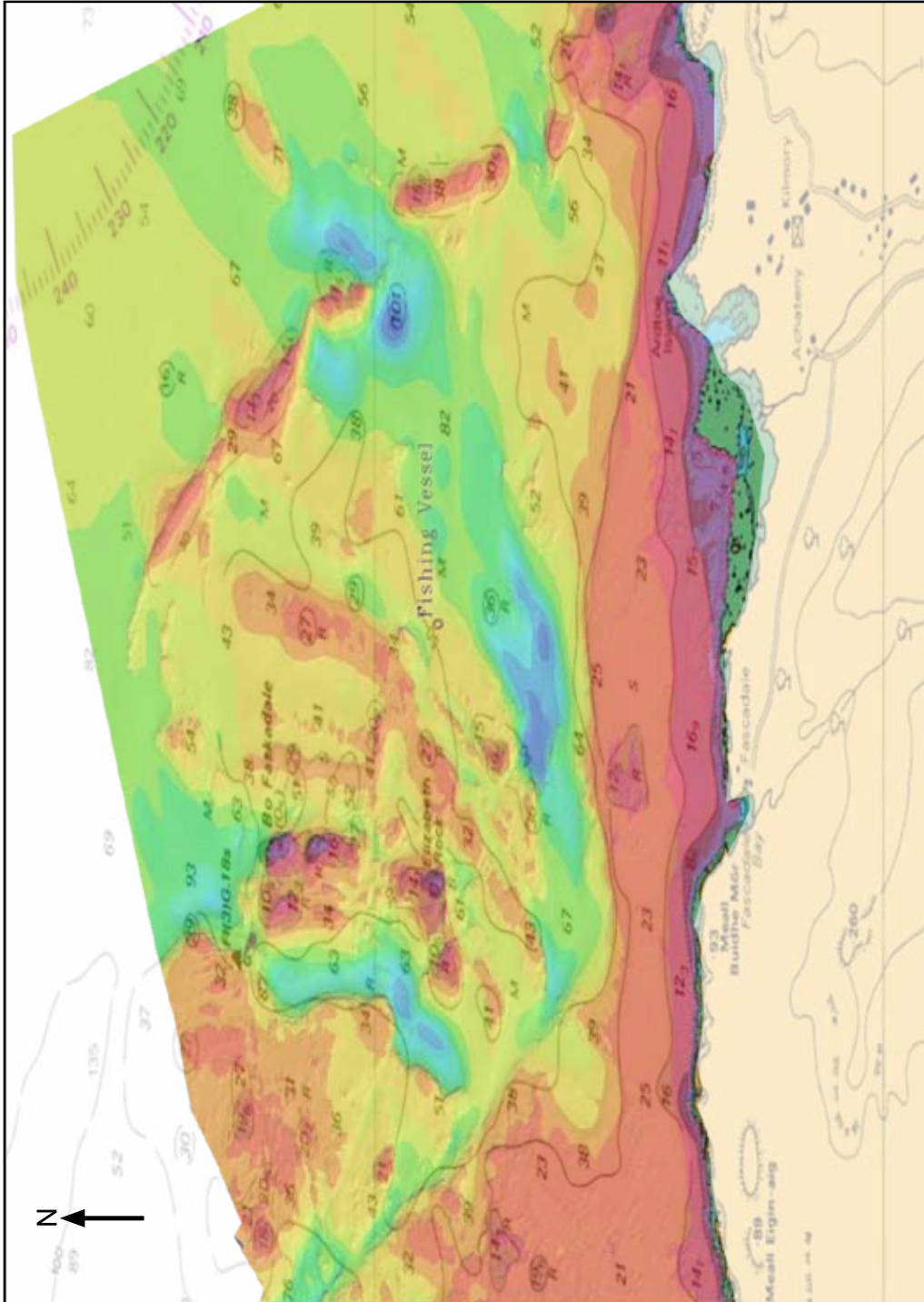
However, the vessel's fishing gear snagged in an area where the depths shown on the old and new chart editions were similar, and it is not considered that failure to carry the latest edition of the chart contributed to this particular accident.

2.8 BO FASKADALE REEF

The geology of the accident area is volcanic in origin, and the Bo Faskadale reef is effectively a steep sided underwater plateau, as illustrated by the detailed survey of the area conducted by the MCA (**Figure 15**). On its west side, which is open to the Atlantic ocean, local fishermen and diving websites report that large standing waves frequently appear, particularly on a flood tide.

Reproduced from Admiralty Chart BA 2207 by permission of the Controller of HMSO and the UK Hydrographic Office
Seabed survey data courtesy of MCA

Figure 15



Seabed survey of west side of Bo Faskadale reef

At the time of the accident the tide was flooding, and in a strong south-westerly wind there was a 2m ground swell with wind waves in the area. In these conditions it is probable that standing waves were generated on the west side of the reef. The vessel probably encountered these larger than average waves when she yawed after her gear had snagged.

No warning of this standing wave phenomenon exists on the chart or in the Admiralty Sailing Directions. This information has now been added to both publications by the UKHO, to inform mariners navigating in the area, of the hazard.

2.9 THE SEARCH AND RESCUE OPERATION

2.9.1 Emergency call and tasking of search and rescue (SAR) units

In the initial emergency telephone call the eyewitness, together with the local resident, provided an excellent description of the incident, including the type of vessel, colour of hull, accident scenario and location of the upturned hull. They gave a clear reference to a transit bearing of the isle of Eigg, from the house at Kilmory, although there is a village with the same name, on the Sound of Jura, in MRCC Clyde's area of operation (**Figure 2**). When provided with such clear initial information there should have been no doubt as to the location of the accident. Lessons should be learned from this case to prevent a recurrence of such confusion in the future.

MRCC Clyde initially responded efficiently and promptly when they advised ARCC of the requirement for helicopter assistance. However, once they realised that the accident had occurred in MRCC Stornoway's area of operation, they instructed ARCC to stand down the helicopter. Had the Prestwick-based helicopter been authorised to take off at this time, based on actual flight times, it would have arrived on scene 23 minutes earlier than the eventual arrival time of the first helicopter. The decision to stand down the helicopter was regrettable and premature, and was made even though the ARCC duty officer and, subsequently, the crew of R177 questioned the instruction. The decision process and the exchange of information between MRCCs and the ARCC should be reviewed to prevent a recurrence of the problems encountered during this accident.

At the time control was transferred, four coastguard officers were in the watch room at MRCC Clyde, while only two were at Stornoway. Under the circumstances it would have been prudent for MRCC Clyde, with more personnel on duty, to have retained control of the search and rescue response, regardless of coastguard operational boundaries.

MRCC Clyde initially advised MRCC Stornoway that R177 had been launched, and later they advised ARCC that they believed R100 had been tasked to the accident. While this information was given in good faith, it was not correct, and was based on overheard conversations within the operations room. This information should have been confirmed before it was relayed. There was no systematic recording of the key information relating to the accident in a format and location where everyone in the operations room could easily view it and keep pace with developments. Measures should be taken to prevent a recurrence of this confusion in the future.

While it is unlikely that the delays in tasking SAR resources affected the outcome of this tragic accident, in differing circumstances they might have had very serious consequences. The response to initial emergency calls and transfer of control between MRCCs should be reviewed accordingly.

2.9.2 Search and rescue

At 1632 MRCC Stornoway broadcast a Mayday Relay message alerting all vessels in the area to the distress. Part of this message was heard by the yacht *Arran Comrade* but, because of poor VHF reception, the yachtsman who found the survivor was unable to confirm the position of the distress and, because he could not see any signs of the distress, he assumed it was not in his locality. Repetition of the Mayday Relay broadcast might have enabled the full message to be heard; nevertheless VHF radio coverage in the accident area should be checked to ensure that all vessels can reliably use VHF when navigating there.

The actions of the lone yachtsman on *Arran Comrade*, on hearing the casualty calling for help, were commendable. Not only was he keeping a good lookout and, hence, heard the man's cries for help, but he also displayed excellent seamanship in manoeuvring his vessel close enough to the survivor to throw him a line. He then assisted him onto the yacht, which was rolling heavily. The survivor also showed great fortitude in his assistance to his crew mates in the water and subsequently, as he had been in the water for about 1 hour 20 minutes when he was rescued.

Throughout the SAR operation MRCC Stornoway was regularly contacted on VHF by vessels with routine radio traffic. The MRCC could have broadcast a Silence Mayday signal to impose radio silence for non distress-related radio traffic. Additional Mayday Relay messages could also have been transmitted to reinforce this requirement.

Once the casualty had been recovered from the water, MRCC Stornoway realised that additional assets would be required for SAR duties. They requested additional helicopter and lifeboat assistance. At 1730, R177 took off from RNAS Prestwick and the Tobermory lifeboat was tasked. These additional resources played an active role in the search for the remaining casualties.

MRCC Stornoway appointed Mallaig lifeboat as the On Scene Co-ordinator for the surface search at 1851. This was a sensible decision, as the surface vessels had not been properly organised into an effective search pattern up to that point. However, the lifeboat had only just started to organise the surface search when the final casualty was located.

With the resources available to them, MRCC Stornoway did an effective job in SAR co-ordination, and were proactive in summoning additional SAR resources when they realised they were needed. However, the masters/skippers of some of the surface vessels involved in the search considered they were not used effectively during the search.

The casualties were located at intervals over a 2-hour period, and their individual recovery had to be specifically organised by MRCC Stornoway and the helicopters on scene. This demonstrates that MRCC Stornoway was fully stretched during this incident, and could not dedicate the time required for detailed plotting of the surface assets to organise them into an effective search pattern.

Although MRCC Clyde provided Stornoway with a plan of the search area, it could have been more involved in organising the surface assets for the SAR operation. This should be considered in a review of the response to this accident.

2.10 SIMILAR ACCIDENTS

Including this accident, at least 12 UK fishermen have lost their lives as a result of accidents involving the snagging of fishing gear on the seabed since 2000.

Fishermen must be made aware of the detrimental effects on a vessel's stability when its fishing gear becomes snagged on the seabed

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION WHICH HAVE BEEN ADDRESSED

- The risk of trawl gear becoming snagged on the Bo Faskadale reef should have been assessed to ensure appropriate control measures were developed. [2.3, 2.6]
- Fishermen should understand the effect on a vessel's stability, of making modifications or additions, and these should be assessed by a competent person. [2.4]
- The adverse effects on stability when trawling down wind in heavy seas should be emphasised to fishermen. [2.4]
- No warning of a standing wave phenomenon exists on Admiralty charts or in Admiralty Sailing Directions covering the Bo Faskadale reef area. [2.8]
- The transfer of control between MRCCs, and the exchange of information between MRCCs and ARCC should be reviewed to prevent a recurrence of the delays encountered in tasking SAR resources in this accident. [2.9.1]
- The MCA should review the VHF radio coverage in the accident area to ensure that vessels can reliably use VHF when navigating in this area. They should also ensure that a Silence Mayday broadcast by MRCCs is made, when appropriate, to reduce non distress-related radio traffic. [2.9.2]
- Fishermen must be made aware of the detrimental effects on a vessel's stability when its fishing gear becomes snagged on the seabed. [2.10]

SECTION 4 - ACTIONS TAKEN / TO BE TAKEN

4.1 THE MARINE ACCIDENT INVESTIGATION BRANCH

The MAIB has issued a flyer to the fishing industry highlighting the lessons learned from this tragic accident (**Annex D**).

4.2 THE UNITED KINGDOM HYDROGRAPHIC OFFICE

The UKHO has reviewed information from a recently received survey report of the area along with a report published by a local diving club and have added the following text to the Sailing Directions published in Admiralty Notice to Mariners Week 8 on 25 February 2010:

DANGEROUS WAVES

In areas of shallow water, wind combined with strong tidal streams can cause very heavy seas. It has been reported that exceptionally large waves can sometimes form in relatively calm seas in the vicinity of Maxwell Bank (56°51' N 6°06' W) and Bo Faskadale (56°48' N 6°06' W).

The same caution has also been included on edition 5 of Admiralty chart BA 2207 published on 4 March 2010 which also contains new depths from the recently received bathymetric survey.

4.3 THE MARITIME AND COASTGUARD AGENCY

The MCA has:

- made arrangements to make ARCC the single tasking authority for SAR helicopters with effect from 1 April 2010

and has commenced a review of:

- the exchange of information between MRCCs and ARCC when aircraft are tasked to an incident
- the handover of live incidents between MRCCs
- the selection of appropriate SAR assets regardless of MRCC boundaries
- VHF radio procedures for managing SAR assets
- the VHF radio coverage in the area of the accident.

4.4 THE SEA FISH INDUSTRY AUTHORITY

Seafish has agreed to:

- Stress the importance of undertaking appropriate risk assessments of trawl gear becoming snagged to fishermen attending its safety awareness training courses.
- Include in its stability awareness course the importance of ensuring that a vessel's stability is assessed by a competent person when modifications or additions are made.
- Highlight to fishermen attending its stability awareness course, the adverse effects on a vessel's stability when trawling downwind in heavy seas.

SECTION 5 - RECOMMENDATIONS

In view of the actions already taken, no recommendations have been made.

**Marine Accident Investigation Branch
April 2010**