

MCIB

Marine Casualty Investigation Board
Bord Imscrúdú Taisní Muirí



**REPORT OF THE INVESTIGATION
INTO FATAL INCIDENT
INVOLVING THE
'FV AISLING PATRICK'
15 NM OFF BROADHAVEN,
CO MAYO
10th APRIL 2018**

**REPORT NO. MCIB/277
(No.3 OF 2019)**

The Marine Casualty Investigation Board (MCIB) examines and investigates all types of marine casualties to, or on board, Irish registered vessels worldwide and other vessels in Irish territorial waters and inland waterways.

The MCIB objective in investigating a marine casualty is to determine its circumstances and its causes with a view to making recommendations for the avoidance of similar marine casualties in the future, thereby improving the safety of life at sea.

The MCIB is a non-prosecutorial body. We do not enforce laws or carry out prosecutions. It is not the purpose of an investigation carried out by the MCIB to apportion blame or fault.

The legislative framework for the operation of the MCIB, the reporting and investigating of marine casualties and the powers of MCIB investigators is set out in The Merchant Shipping (Investigation of Marine Casualties) Act, 2000.

In carrying out its functions the MCIB complies with the provisions of the International Maritime Organisation's Casualty Investigation Code and EU Directive 2009/18/EC governing the investigation of accidents in the maritime transport sector.



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The Marine Casualty Investigation Board was established on the 25th March, 2003 under the Merchant Shipping (Investigation of Marine Casualties) Act, 2000.

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Glossary of Abbreviations and Acronyms

BIM	Bord Iascaigh Mhara
CG	Coast Guard
CoP	Code of Practice for fishing vessels less than 15 m LOA
DoC	Declaration of Compliance stating vessel complies with the Code of Practice
DSC	Digital Select Calling
EPIRB	Emergency Position Indicating Radio Beacon
GPS	Global Positioning System
GRS	Geodetic Reference System
HSA	Health and Safety Authority
IRCG	Irish Coast Guard
LB	Offshore Lifeboat
LOA	Length Overall
MRCC	Marine Rescue Coordination Centre
PFD	Personal Floatation Device
PLB	Personal Locator Beacon
VHF	Very High Frequency (radio)

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1. SUMMARY

On the 10th April, 2018 at approximately 07.00 hrs, the 'FV Aisling Patrick' departed from Ballyglass, Co. Mayo with three persons on board to fish for mackerel between Erris Head and Eagle Island. Around 12.30 hrs the vessel began listing to starboard. The Skipper entered the wheelhouse and the speed was reduced to ascertain the cause of the list. A wave struck the vessel on the port quarter which pushed the starboard bulwark under water and flooded the deck. Almost immediately a second wave struck the port side again and capsized the vessel. The Skipper had commenced a mayday message after the first wave struck but he had not completed it when the second wave struck and capsized the vessel. He swam out from underneath the capsized vessel. The other two crewmembers were thrown into the water. The liferaft surfaced from under the vessel and one crewmember inflated it and climbed aboard. He threw a large fender towards the Skipper. The third crewmember was in the water face down and did not make any attempt to swim or stay afloat. One crewmember was in the liferaft, the other two were in the water drifting away.

Malin Head Radio received a partial distress call at 12.35 hrs. Rescue helicopter R118, an Air Corps CASA aircraft, Ballyglass lifeboat and Killala Coast Guard were tasked to commence a search. The liferaft was located by R118 at 13.19 hrs and two crewmembers were lifted on board from the water and one from the liferaft. They were taken to Sligo Hospital where the Casualty was pronounced dead on arrival at the hospital. The two other crewmembers were treated for hypothermia. Some items of wreckage were recovered on the following day. On the 2nd May, 2018 the upturned hull of the vessel came ashore on the Isle of South Uist, Scotland.

Note all times are local time.

2. FACTUAL INFORMATION

2.1 The Vessel (see Appendix 7.1 Photograph No.1 and Appendix 7.2 Plan of 'FV Aisling Patrick' at deck level)

Name:	'FV AISLING PATRICK'.
Type:	GRP CATAMARAN.
Fishing No:	WT 341.
Call Sign:	EIQR6.
Builder:	Sutton Workboats UK.
LOA:	9.96 metres (m).
Breadth:	4.94 m.
Depth:	1.11 m.
Gross Tonnage:	4.04 t.
Year:	2011.
Construction:	GRP with foam core laminate on deck and hull.
Engine:	Twin Nanni Diesels.
Power:	42.6 kW.

The vessel was a 10 m GRP Catamaran with a wheelhouse, forward and a wide after deck covered with a GRP awning and surrounded by a GRP Bulwark. The vessel was powered by two engines, one in each hull. The hull was subdivided into three watertight compartments on each side (total of six). The engines were in the middle compartments on each side. Each compartment had an electric bilge pump with a float switch and there was a second high level electric bilge pump in each engine compartment.

2.2 Crew of - 'FV AISLING PATRICK'

Skipper:	Male, mid 20's. Fisher for eight years. Bord Iascaigh Mhara (BIM) Safety Certificate and Short Range Radio Certificate.
Crewmember No.1:	Male, early 20's. Fisher for two years. BIM Safety Certificate.

Crewmember No.2: Male, mid 50's. Recently returned to fishing.
(Casualty) No safety training certificates.

2.3 Licence and Survey

The Code of Practice (CoP) on the vessel issued on the 27th June, 2016 and was valid until the 30th June, 2018. It stated a crew of two.

The fishing licence was valid until the 17th April, 2020.

2.4 Safety Equipment

No safety equipment remained on board at the time of the vessel inspection. All had been lost between the time of the incident and the time the vessel was washed ashore in Uist. The list below is equipment on board prior to the incident, as advised by the Skipper. It relates to life saving apparatus and radio equipment as part of the overall equipment requirement under the vessel's CoP.

- ARC Globalfix Pro Emergency Position Indicating Radio Beacon (EPIRB) new in 2016, battery valid to 2021, secured to the wheelhouse top in an ARC hydrostatic release case for EPIRB. Hydrostatic release expiry date April, 2018.
- Two Very High Frequency (VHF) transceivers with Digital Select Calling (DSC) linked to Geodetic Reference System (GRS) Satnav.
- Four man liferaft with hydrostatic release, date issued to vessel 9th March, 2018 secured to the wheelhouse top.
- Three Personal Flotation Devices (PFD).
- Two life rings.

2.5 Voyage Particulars

An offshore fishing voyage from Ballyglass to an area north of Erris Head and Eagle Island (see Appendix 7.5 Chartlets of the area).

2.6 Marine Incident Information

Type: Fatality and loss of vessel. Very serious marine casualty.
Date: 10th April, 2018.
Time: 12.35 hrs.

Position:	Lat 54° 29.6' N - Long 010° 22.5' W.
Weather Details:	See Appendix 7.3 Met Éireann Weather Report.
Small Craft Warning:	NE to E winds will occasionally reach force 6 for a time today on Irish coasts.
Wind Speed:	4/5 occasionally 6 Beaufort - (15-24kn).
Wind Direction:	East North East.
Sea State:	Rough (2.5 m).
Swell:	Heavy (3.5-5.5 m).
Combined Wave Height:	Up to 6 m.
Visibility:	Mist 2-5 NM otherwise good (greater than 5 NM).
Air Temperature:	6° - 7°C.
Sea Temperature:	8° - 9°C.
Tide Information:	High Water 06.11 hrs and 18.37 hrs.
Ballyglass:	Low Water - 12.21 hrs.
www.tidetimes.org.uk:	Range: Spring tides.
Sunrise:	Approximately 06.47 hrs.
Sunset:	Approximately 20.33 hrs.
Ship Operation:	Fishing.
Human Factor:	Lack of training.
Equipment Factor:	Not wearing PFDs. Mechanical failure resulting in flooding and vessel capsize. Lack of maintenance of bilge pumps and alarms.
Consequences:	Fatality and loss of vessel.

2.7 Shore Authority Involvement and Emergency Response

At 12.30 hrs on the 10th April, Malin Head Coast Guard received a partial distress message giving the name of the vessel and a latitude coordinate. The

Coast Guard tasked the Sligo Search and Rescue (SAR) helicopter, an Air Corps CASA aircraft that was on exercise in the area, the Ballyglass lifeboat and the Killala Coast Guard Unit (CGU). The SAR helicopter was instructed to proceed to the latitude given in the distress message and search in a westward direction. The CASA aircraft was instructed to search along the latitude in an eastward direction.

At 13.19 hrs the SAR helicopter sighted the liferaft and a flare and the upturned hull of the *'FV Aisling Patrick'*. Shortly afterwards they sighted a person in the water. They recovered the person in the water first and then the person in the liferaft. They finally recovered a person in the water who was floating face down and proceeded to Sligo Hospital where it landed at 14.29 hrs.

The Ballyglass lifeboat arrived on scene around 14.30 hrs and picked up the liferaft and other items of debris. There were brought ashore and given to the Garda Síochána at Belmullet.

On the 11th April the SAR helicopter was tasked to locate the hull of the upturned vessel. This was sighted at 17.04 hrs. The position was passed to the Coast Guard and a Radio Navigation Warning was issued.

On the 2nd May Stornoway Coast Guard reported that the upturned hull of the *'FV Aisling Patrick'* was sighted off the west coast of the Isle of South Uist in the Outer Hebrides. The upturned hull came ashore on the beach the following day (see Appendix 7.4 Extracts from Sitreps and Appendix 7.5 Chartlets of the area).

3. NARRATIVE

- 3.1 The 'FV Aisling Patrick' was purchased new in February, 2011. The owner fitted a salt water pump forward of the starboard engine which pumped water to a hose on deck for washing fish. This was driven by a belt from the front of the engine.
- 3.2 The vessel was surveyed by the Irish Marine Survey Office in March, 2011 and issued with a passenger boat licence for 12 passengers valid for two years. After the initial survey the inlet hose to the salt water pump was cut and a hydraulic oil cooler was inserted on the suction side of the pump. An elbow of sections of hose with stainless steel inserts was fabricated to join the oil cooler to the pump. Hoses were held by jubilee clips (see Appendix 7.1 Photograph No.3 and diagram alongside).
- 3.3 In 2014 the starboard engine was replaced by the owner. On 27th June, 2016 the vessel was issued with a Declaration of Compliance (DoC) following a survey for the CoP for fishing vessels under 15 m length overall. The survey report stated that the bilge pumps and bilge pumping systems complied with the code. There are no records for the testing of the bilge pumps and alarms having been carried out since the survey.
- 3.4 The crew of the vessel consisted of a Skipper and two crewmembers. The Skipper had been fishing for approximately eight years. He had a current BIM safety certificate and a Short Range Radio Operator's certificate. He had no formal training in boat handling, vessel management or vessel stability. Crewmember No.1 had a BIM safety certificate and had been fishing for two years. Crewmember No.2 had been a fisher but had left for work ashore. He was returning to fishing and had not attended the BIM safety training course.
- 3.5 On 10th April, 2018 the three crewmembers went on board the vessel. Following routine checks of each engine the vessel proceeded to sea at approximately 07.00 hrs. No checks were made on the bilge pumps and neither surviving crew could confirm if any pump operated when the power was switched on. The salt water pump was put in gear to supply cooling water to the oil cooler and to wash fish. When not in use it discharged overboard but some water would flow on deck during fish washing.
- 3.6 The vessel headed towards Erris Head where it stopped and fished for about an hour using a line with hooks. The vessel then travelled further out to sea following the fish. By 12.00 hrs four boxes of fish were caught. During this time none of the crewmembers were wearing a PFD.
- 3.7 Shortly before 12.30 hrs the line was hauled in and the vessel was under way again, following the fish, when a pronounced list to starboard was observed. There was no audible or visual alarm of rising water levels in the bilges. The

Skipper in the wheelhouse reduced the speed of both engines so that he could open the hatches to the starboard compartments and investigate the cause of the list.

- 3.8 The vessel came broadside on to the waves and a large wave pushed the port quarter up and the starboard bulwark went down pouring water onto the deck. The Skipper immediately began to send a distress message on the VHF radio channel 16. He did not use the DSC distress button on the VHF. Very quickly afterwards a second wave on the port side turned the vessel over.
- 3.9 The Skipper had only sent a partial message when the second wave hit and he was still in the wheelhouse when the vessel capsized. He managed to swim out of the wheelhouse to the surface. The other two crewmembers were on the afterdeck when the second wave struck the vessel and they were thrown into the water. None of the crew had donned PFDs.
- 3.10 The hydrostatic release for the liferaft operated allowing it to float to the surface. The vessel's EPIRB was also fitted with a hydrostatic release but it did not surface or activate. Crewmember No.1 found a life ring and noticed the liferaft surface close to him. He pulled the painter to inflate it. When the Skipper surfaced Crewmember No.1 threw a fender to him.
- 3.11 Once the liferaft was inflated Crewmember No.1 was able to climb in. Crewmember No.2, the Casualty, was observed to be floating face down in the water during this time with no movement. The Skipper drifted away from the liferaft and was unable to swim back because of the heavy seas. Two crewmembers were in the water for at least 45 minutes. The liferaft had a safety pack which included flares but not a radio.
- 3.12 The IRCG at Malin Head heard the partial distress call from the '*FV Aisling Patrick*' and timed it at 12.35 hrs. They received the name of the vessel and the latitude coordinate of 54° 29.6' N. They tasked the Sligo SAR Helicopter R118 to fly along the latitude from north of Erris Head in a westerly direction. An Air Corps CASA Aircraft was also in the vicinity and it was instructed to search in an easterly direction along the same latitude.
- 3.13 At 13.19 hrs helicopter R118 sighted the flare which was activated by Crewmember No.1 in the liferaft and then sighted the two other casualties in the water. They lifted the Skipper from the water, then Crewmember No.2 from the liferaft and then the Casualty, who was still face down in the water.
- 3.14 Once the three Crewmembers were on board the helicopter proceeded to Sligo University Hospital, arriving at 14.29 hrs. The Casualty was pronounced dead on arrival at the hospital. The Skipper and Crewmember No.1 were suffering from hypothermia. The Skipper's condition was deemed to be critical.
- 3.15 The Ballyglass lifeboat was directed to the scene and recovered debris, including the liferaft. This material was surrendered to the Garda Síochána at Belmullet and subsequently inspected as part of this investigation. It consisted of a life ring, the

liferaft, its canister and contents of the safety pack, panels from the canopy over the deck and some of the fish boxes. No EPIRB was recovered.

- 3.16 On the 11th April, 2018 R118 helicopter was tasked to fly over the location of the incident. It reported that the upturned hull of the 'FV Aisling Patrick' was still afloat and had drifted about five miles to the NW. A Radio Navigational Warning was issued (see Appendix 7.5 Chartlets of the area).
- 3.17 On the 24th April, 2018 a NATO Naval exercise 50 miles west of Barra in Outer Hebrides, Scotland sighted the upturned hull of the 'FV Aisling Patrick' in position 56°47'N 008°39'W at 09.45 hrs and reported its location to HM Coastguard at Stornoway (see Appendix 7.5 Chartlets of the area).
- 3.18 On the 2nd May, 2018 Stornoway Coast Guard received reports of an upturned hull on a reef off the west coast of Isle of South Uist. On investigation it was confirmed to be the 'FV Aisling Patrick'. The upturned hull of the vessel was washed up on shore the following day.
- 3.19 An inspection of the hull on the 9th May, 2018 on the beach on South Uist found the hull still inverted with the deck buried in the sand. All skin fittings were intact and there was no damage to the underwater hull. The propellers and shaft seals were intact and no damage was observed around the exhaust outlets.
- 3.20 The vessel was dug out of the sand and turned upright and a second inspection was undertaken on the 28th May. The wheelhouse and the port and aft bulwarks had been broken off and no parts of them were found on the beach. The starboard engine hatch cover was missing and the other five hatch covers were in place. Inspection of the seals and securing arrangements found them to be in good condition. The hatch coamings and seals on the two forward and two aft hatches had been modified at the request of the surveyor during the CoP survey. There were accumulations of sand and water in all compartments and much of these had to be removed before inspection. Inspection of the starboard engine compartment found all sea cocks and attached pipework undamaged except for the connection between the oil cooler and salt water pump (see 3.21 below).
- 3.21 The pipework and elbow from the oil cooler to the salt water pump was connected when located but under pressure it came apart (see Appendix 7.1 Photographs No.3 and No.4). It was made up of three sections of different diameter plastic pipe. The two end pieces were 45 mm outside diameter. The centre section (see Appendix 7.1 blue in Photograph No.3) had an inside diameter of 54 mm, a difference of 9 mm. There was one stainless steel pipe inside the centre section curved slightly to make the elbow. The two sections of pipe were flexible plastic and tightening the jubilee clip between the blue section and the clear section attached to the oil cooler. The owner stated that there had been a second section of stainless pipe inside the joint to compress the two sections of pipe together. No such section of pipe was found in the engine compartment.

- 3.22 The water pump appeared to be misaligned and there were marks on the engine casing where the drive pulley had come in contact with it (see Appendix 7.1 Photograph No.6). When the owner and Skipper were shown photographs of the pump and oil cooler they stated that both the water pump and the oil cooler had moved apart from their normal positions. There was rust staining on the forward end of the engine (see Appendix 7.1 Photograph No.5).
- 3.23 Inspection of the starboard aft compartment found signs of water ingress over an extended period of time in way of the point where the bilge pump outlet passed through the deck. There was also a line showing the level of water that frequently accumulated in the compartment (see Appendix 7.1 Photograph No.1). This water would have covered the bilge pump. Inspection on deck found evidence of cracking in way of the joint between the deck and the GRP duct on the bulwark side which permitted water ingress.
- 3.24 All bilge pumps were inspected and all were found to have clear impellers. The bilge pump from the starboard aft compartment was removed and it operated when connected to a battery. The power supply to the second bilge pump in the starboard engine compartment had been connected to the power supply to the lower bilge pump with a block connector and covered with tape. The connection was mid height on the aft bulkhead of the compartment and the tape had torn and the connector was exposed (see Appendix 7.1 Photograph No.8). Inspection of other compartments did not reveal any obvious failures, except in the port aft compartment where the exhaust hose was cracked in two places and there was staining on the sides of the compartment in way of the cracks.
- 3.25 During the incident the EPIRB did not activate. It was not recovered with the debris collected by the lifeboat or amongst the wreckage on the beach on the Isle of South Uist.
- 3.26 The post mortem on the deceased crew member found the cause of death as 'sudden cardiac death secondary to severe coronary artery disease.' The results of the autopsy provided to the Marine Casualty Investigation Board (MCIB) at the time of publication are provisional. The determination of the cause of death is a matter for the Coroner's inquest.

4. ANALYSIS

Water Ingress and Bilge Pump Analysis

- 4.1 From the crew's description of the incident the vessel began listing to starboard and they concluded that there was water ingress into one of the starboard compartments. There was no visible or audible alarm to indicate which compartment was flooding. The vessel should have complied with the CoP section 4.3.4.6 which states that:

'In all vessels, except where the bilge can be readily seen, an audible and visible bilge level alarm must be fitted to indicate leakage of water into the machinery space. Indication should be at the helm control position.'

The bilge pumps and alarms should have been tested regularly as recommended by Marine Notice 35/2016 (see Appendix 7.6). Had the bilge alarm systems been operational it would have given earlier warning of the water ingress into any compartment.

- 4.2 The aft starboard compartment had evidence of water lying in it which covered the bilge pump (see Appendix 7.1 Photograph No.7). It is likely that this was rainwater which seeped through the crack in the duct on deck and built up in the compartment when the boat was not in use. When the power was switched on the pump would operate and pump the water out. On the day of the incident the power had been on for over five hours so the bilge pump should have pumped all of the water out of the compartment.
- 4.3 In the engine compartment (starboard centre) the elbow between the oil cooler and water pump may not have made a good watertight connection because the jubilee clip may not have fully closed the 9 mm difference in the pipe diameters as described in 3.20. The water pump drive pulley was making contact with the engine casing (see Appendix 7.1 Photograph No. 6). This could have caused vibrations which caused water to leak from the joint between the water pump and oil cooler. Evidence that water had been leaking for some time was indicated by the amount of rust staining on the forward end of the engine, which had been replaced in 2014 (see Appendix 7.1 Photograph No.5). The statements of the owner and Skipper that the oil cooler and water pump had moved apart could indicate an increase of water flow on the day of the incident. It is preferable to have the minimum number of joints in pipework and this elbow should have been one piece of stainless steel pipe with plastic pipe joints connected at each end. The joint was situated on or slightly above the waterline, however, with the pump drawing suction, water would siphon in and once the joint was lower than the outside sea level it would flow in faster than the bilge pumps could handle. Water in the compartment would have been surging around and could have shorted the exposed connection to the bilge pumps causing failure and allowing water to build up.

All modifications to the vessel (deck water pump, oil cooler, extra bilge pumps engine compartments and fitting of new engine) were all carried out before the survey in 2016. It is the owner's responsibility to declare all modifications between surveys. Section 2.17, 2.18 and 4.32 of the CoP and Annex 7 of the CoP as in Appendix 7.7 set out the requirements for sea inlets and discharges, associated pipework and seawater systems. These requirements address the requirements for pipework but may benefit from further elaboration.

Radio and Safety Equipment

- 4.4 The vessel was equipped with two VHF DSC radios which were linked to the GRS receiver. When the distress button is pressed the radio automatically transmits a digital distress message with the vessels position included. This would be much faster than a voice message. The reason given for not using the distress button was due to a lack of confidence in its reliability. The operator had done a course of instruction and obtained a Short Range certificate.
- 4.5 The liferaft and the EPIRB were both mounted on the wheelhouse top. The hydrostatic release on the liferaft operated and it floated to the surface. The EPIRB did not surface. There are a number of possible reasons for this:
- (1) The hydrostatic release failed - its renewal date was April, 2018.
 - (2) It operated but the EPIRB was trapped under water and did not float free. The vessel was afloat for 25 days in rough seas which could release it but this had not occurred.
 - (3) Hydrostatic release mechanisms are designed to operate not before the unit is immersed 1.5 m but before it reaches a depth of 4 m. Measurements taken from the vessel indicate that the EPIRB hydrostatic release did not reach the 4 m depth because the vessel remained afloat and the wheelhouse top was only immersed about 3.2 m.
- 4.6 None of the crew were wearing PFDs during the voyage (see paragraphs 3.5 and 3.8 above). Under S.I. No.586/2001 - Fishing Vessel (Personal Flotation Devices) Regulations, 2001 there is an obligation to wear a PFD: 'The personal flotation device shall be worn at all times by the crew of the fishing vessel when on the exposed deck of the vessel'.
- 4.7 The deceased Crewmember was returning to fishing and had not completed the required BIM safety training within the previous five years. Owners and skippers should not permit crew to sail on their vessels without the required valid training.
- 4.8 The DoC indicated the number of crew as two. The owner stated that he did not include the Skipper as crew. The vessel had the required safety equipment for three crewmembers.

None of the crewmembers were wearing the required Personal Locator Beacon (PLB) while on deck as required by the CoP Section 9.5.3.

Weather and Craft Analysis

- 4.9 The Met Éireann Weather Report (see Appendix 7.3) carried a small craft warning of wind force 6 Beaufort.

A boat with a Length Overall (LOA) of 10 m is considered a small craft and putting to sea with a small craft warning in place is not recommended. In addition, the vessel was navigating in waters where large waves would be encountered due to wind effects over the tidal streams around the entrance to Donegal Bay.

- 4.10 Catamarans are as suitable as mono-hulls for fishing and as workboats. They provide a stable platform and are able to operate effectively even in high sea states. They are relatively simple to handle and operate but there are essential differences from a mono-hull that operators should be aware of:

- (1) Catamarans have two engines and the propellers are placed further outboard than a mono-hull with twin engines. The vessels can be easily steered by use of engines alone and when underway it is important to balance the power of each engine to maintain the correct course without large use of the rudders.
- (2) Weight distribution is important as excess weight on one side will immerse that hull deeper causing more drag. This can be compensated for to some extent by supplying more power to the engine on that side.
- (3) The hulls are divided into watertight compartments and each must have its own bilge pump. It is very important that the compartments are kept dry as even small amounts of water can upset the vessel's stability due to free surface effects. The bilge pumps should be fitted with float switches and tested regularly.
- (4) The stability of a catamaran is derived from its beam, unlike a mono-hull which relies on weight low down in the vessel. There is buoyancy in each hull and in the bridge between the hulls. When one hull floods the vessel takes on the characteristics of a mono-hull but does not have the weight to maintain stability.
- (5) Due to the watertight compartments a catamaran is unlikely to sink when capsized until all the compartments are breached. This vessel survived in an upturned state for 25 days.

- 4.11 When the vessel listed due to water in the starboard compartments the stability of the vessel was severely compromised. The vessel became particularly vulnerable to waves from the beam. The initial action should have been to adopt a course with the waves ahead or astern. By reducing power on both engines, the deeper starboard side caused drag and turned the vessel beam on to the sea.
- 4.12 By reducing the power to the port engine and maintaining enough power on the starboard engine to compensate for the drag from the partially submerged hull the vessel could be put bow on to the waves. Heading into the waves has some risk with weight astern that the vessel could flip over, however, it would prevent water coming on deck when the hatches were opened.
- Running down away from the waves has the advantage that the frequency of encounter with waves is reduced.
- 4.13 Either strategy would require constant adjusting of helm and engines to prevent the vessel broaching and coming beam on to the waves. They both expose the central bridge to the waves and its buoyancy will help compensate for the loss in the breached compartment. Once the vessel was made as comfortable as possible then the source of water ingress could have been investigated. The cause of the capsize was the weight of extra water on the deck which compromised the stability to the extent that it could not survive the second wave.
- 4.14 The upturned vessel was sighted on the 11th April and observed drifting northwards. A navigation warning was issued but no attempts were made to track the upturned vessel or recover it to shore. It remained a hazard to navigation until it came ashore on the 3rd May 2018, some 24 days later.

5. CONCLUSIONS

- 5.1 The investigation was unable to determine conclusively the cause of the capsizing but it would appear that the vessel's stability was reduced due to the ingress of water and as a consequence capsized in the prevailing sea conditions.
- 5.2 There were at least two possible sources of water ingress identified on the starboard side of the vessel. One source identified was the multiple pipe connections between the oil cooler and deck water pump. Another source of water ingress was through a crack in the deck leading to the aft starboard compartment.
- 5.3 The bilge alarm systems did not give an early warning of water ingress into either compartment. This indicates that the vessel had not been maintained to the requirements of the CoP as required in the CoP Section 1.5.4.2.
- 5.4 The requirements set out in Sections 2.17, 2.18 and 4.3.2 and Annex 7 of the CoP could benefit from elaboration to assist owners in ensuring the installation and maintenance of effective bilge pump arrangements.
- 5.5 The most probable reason the EPIRB did not deploy is that its hydrostatic release did not immerse to four metres.
- 5.6 The distress message would have been complete had it been sent digitally by activating the DSC button on the VHF.
- 5.7 The absence of any formal operational training for the crew of this vessel resulted in poor operational procedures and incorrect actions during an emergency situation.
- 5.8 Of the top ten factors in the Marine Safety Strategy contributing to loss of life at sea in Ireland identified by the Department of Transport, Tourism and Sport the following three are present in this incident:
 - The need for an enhanced maritime safety culture.
 - Lack of crew training.
 - Non-wearing of PFD (lifejacket/buoyancy aid).
- 5.9 The upturned vessel remained a risk to navigation for 24 days without any action by the owners to track or recover it.
- 5.10 The vessel was carrying three crewmembers but the DoC indicated two crewmembers.

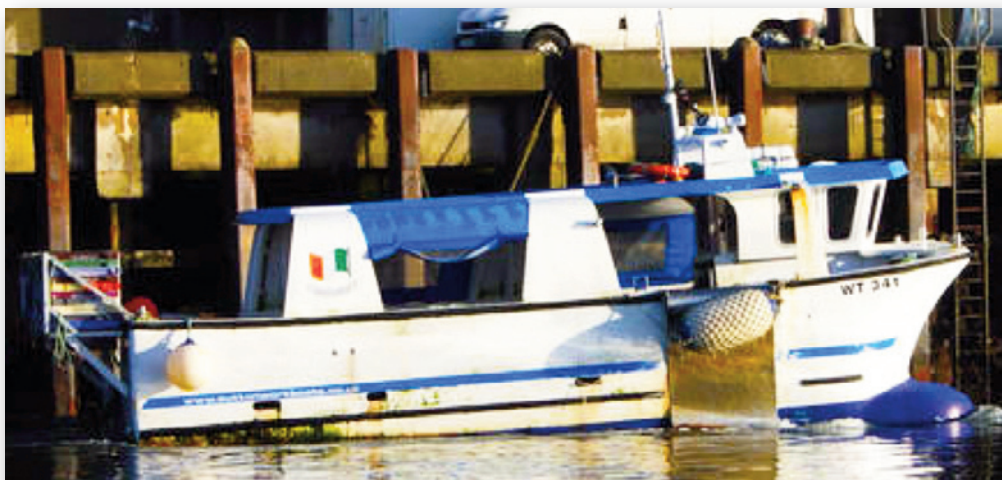
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- 5.11 The Casualty had not undergone the required refresher training as set out in the CoP Section 8.6.
 - 5.12 None of the crewmembers were wearing the PFDs as required by S.I. No.586 of 2001.
 - 5.13 None of the crewmembers were wearing the required PLB while on deck as required by the CoP Section 9.5.3.

6. SAFETY RECOMMENDATIONS

- 6.1 The Minister for Transport, Tourism and Sport should issue a Marine Notice reminding owners and skippers that they are required under the CoP to ensure that:
- All of their crew undergo the required safety training.
 - All crew members must wear a PFD while on deck.
 - All crew members must wear a PLB while on deck.
 - They must maintain their vessel in accordance with the requirements of the CoP including informing of any modifications.
 - They must ensure that bilge pumps and alarms are regularly tested as recommended in Marine Notice 35/2016 and maintained in an operational condition.
 - All defects in the vessel including cracks should be repaired and the CoP complied with.
 - All watertight hatches should be secured when vessels are at sea.
- 6.2 The Minister for Transport, Tourism and Sport should bring forward Action 14 of the Maritime Safety Strategy and introduce training and Certificates of Competency for skippers of fishing vessels under 15 m LOA. Such training should be relevant to the types of vessel in the fleet.
- 6.3 The Minister for Transport, Tourism and Sport should review the requirements in respect of piping systems set out in the CoP.

7.	APPENDICES	PAGE
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Appendix 7.1 Photographs.



Photograph No.1 - 'FV Aisling Patrick'.



Photograph No.2 - Hull of the vessel on the 28th May.

APPENDIX 7.1

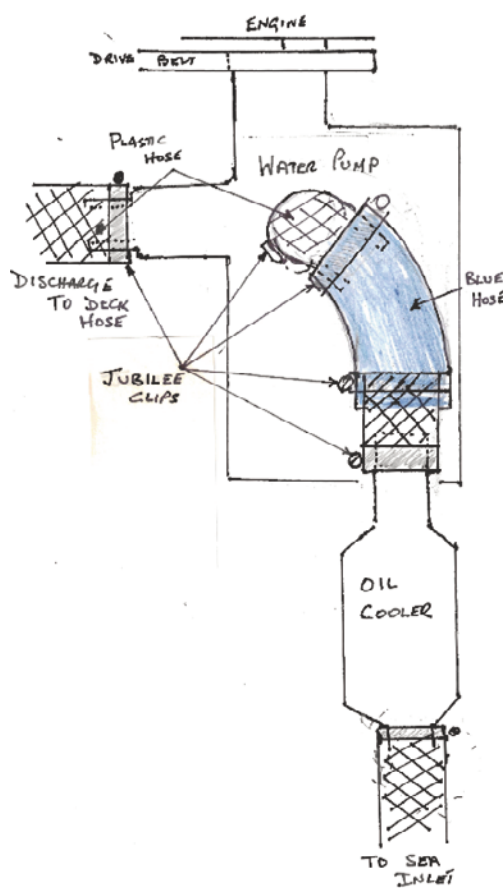
Appendix 7.1 Photographs.



Photograph No.3 - Elbow between oil cooler and water pump.



Photograph No.4 - Joints came apart with light pressure.



Appendix 7.1 Photographs.



Photograph No.5 - Rust on forward end of starboard engine.



Photograph No.6 - Marks where the water pump drive pulley was in contact with the engine.

Appendix 7.1 Photographs.

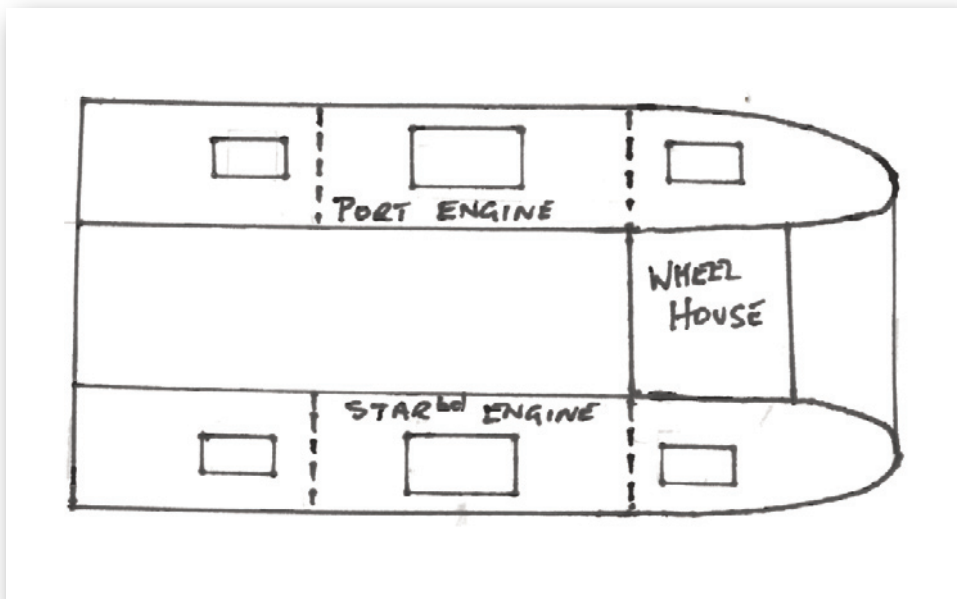


Photograph No.7 - Water ingress in aft starboard compartment.



Photograph No.8 - Electrical connections to the bilge pumps in starboard engine compartment.

Appendix 7.2 Plan of 'FV Aisling Patrick' at deck level.



Appendix 7.3 Met Éireann Weather Report.



Met Éireann

The Irish Meteorological Service

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Our Ref. WS1730/1806_25

Your Ref. MCIB/12/277

Estimate of weather & sea state conditions for the area 15 nautical miles off Broadhaven, Co Mayo (54°29.60N 010°22.50W) on Tuesday 10th April 2018 between 00:00 hours and 12:00 hours.

Synopsis: A large area of low pressure of 991 hPa with its centre approximately 150 nautical miles southwest of Mizen Head was slowly moving south-eastwards into the Bay of Biscay. A fresh to strong and stabilizing north-easterly airflow covered Ireland. Weak weather fronts embedded in the flow brought cloud, mist patches and only occasional outbreaks of light rain. However, a westerly swell combined with wind-waves developed by the increasing north-easterly winds would have caused a rough or very rough sea state in the offshore area under investigation.

From 00:00 to 06:00 hours:

Wind: Winds were moderate to fresh occasionally strong force 4 or 5 occasionally force 6 (mean speed of 15 – 25 knots) with gusts up to 32 knots from an east-northeasterly direction.

Weather: Dry, cloudy with occasional mist patches.

Temperature: Air temperature 6 or 7 degrees Celsius. Sea temperature 8 or 9 degrees Celsius.

Visibility: Moderate in mist (2 to 5 nautical miles) otherwise good (more than 5 nautical miles)

Sea State: Rough to very rough sea state caused by a combination of a westerly swell (significant wave height 3.5 – 5.5 metres) and wind-waves from a north-easterly direction of significant wave height of up to 2.5 metres. The maximum total wave height could have reached 6 metres or possibly more.

From 06:00 to 12:00 hours:

Wind: Moderate to fresh Force 4 or 5 (mean speed 15 – 20 knots) with gusts up to 25 knots from a north-easterly direction.

Weather: Dry, cloudy with occasional mist patches.

Temperature: Air temperature 6 or 7 degrees Celsius. Sea temperature 8 or 9 degrees Celsius.

Visibility: Moderate in mist (2 to 5 nautical miles) otherwise good (more than 5 nautical miles)

Sea State: Rough to very rough sea state caused by a combination of a westerly swell (significant wave height 3.5 – 5.5 metres) and wind-waves from a north-easterly direction of significant wave height of up to 2.5 metres. The maximum total wave height could have reached 6 metres or possibly more.

01 July 2018

Appendix 7.3 Met Éireann Weather Report.



Met Éireann
The Irish Meteorological Service

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Our Ref. WS1730/1806_25
Your Ref. MCIB/12/277

APPENDIX 1. Sea Area Map & Beaufort Scale of Wind



Beaufort Scale of Wind					
Force	Description	Speed ¹ knots km/hr	Specification - seas	Wave height ² (metres)	
0	Calm	<1	<1	Sea like mirror	
1	Light air	1-3	1-5	Ripples	0.1 (0.1)
2	Light breeze	4-6	6-11	Small wavelets	0.2 (0.3)
3	Gentle breeze	7-10	12-19	Large wavelets, crests begin to break	0.6 (1)
4	Moderate breeze	11-16	20-28	Small waves becoming longer, frequent white horses	1 (1.5)
5	Fresh breeze	17-21	29-38	Moderate waves, many white horses, chance of spray	2 (2.5)
6	Strong breeze	22-27	39-49	Large waves, white foam crests, probably some spray	3 (4)
7	Near gale	28-33	50-61	Sea heaps up, streaks of white foam	4 (5.5)
8	Gale	34-40	62-74	Moderately high waves of greater length	5.5 (7.5)
9	Strong gale	41-47	75-88	High waves, dense streaks of foam, spray may reduce visibility	7 (10)
10	Storm	48-55	89-102	Very high waves, long overhanging crests, visibility affected	9 (12.5)
11	Violent storm	56-63	103-117	Exceptionally high waves, long white foam patches cover sea	11.8 (16)
12	Hurricane	64+	117 & over	Air filled with foam and spray, sea completely white	14 (-)

¹Speed = mean speed at a standard height of 10 metres.
²Wave height is only indicated as a guide to what may be expected in the open sea. Bracketed figures indicate the probable maximum wave height.

[Redacted]

01 July 2016



Appendix 7.3 Met Éireann Weather Report.



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The Irish Meteorological Service

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APPENDIX 2. Sea States & Visibility

Wave Heights / State of Sea
The wave height is the vertical distance between the crest and the preceding or following trough. The table below gives a description of the wave system associated with a range of significant wave heights. The Significant wave height is defined as the average height of the highest one-third of the waves. (It is very close to the value of wave height given when making visual observations of wave height.)

Sea State (Descriptive)	Significant Wave height in meters
Calm	0 – 0.1
Smooth (Wavelets)	0.1 – 0.5
Slight	0.5 – 1.25
Moderate	1.25 – 2.5
Rough	2.5 – 4
Very rough	4 – 6
High	6 – 9
Very high	9 – 14
Phenomenal	Over 14

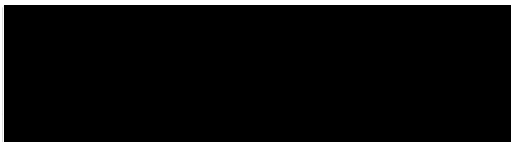
Individual waves in the wave train will have heights in excess of the significant height. The highest wave of all will have a height about twice the significant height

Visibility Descriptions of visibility mean the following:

Visibility (Descriptive)	Visibility in nautical miles (kilometres)
Good	More than 5 nm (> 9 km)
Moderate	2 – 5 nm (4 – 9 km)
Poor	0.5 – 2 nm (1 – 4 km)
Fog	Less than 0.5 nm (< 1km)

Note:


If there are no measurements or observations available for an exact location, these estimated conditions are based on all available meteorological measurements and observations which have been correlated on the routine charts prepared by Met Éireann.



01 July 2018



Appendix 7.3 Met Éireann Weather Report.



Weather Forecast From Met Éireann

24-hour Sea Area Forecast

Updated at 0000 / 0600 / 1200 / 1800

Sea Area Forecast until 0600 Wednesday, 11 April 2018
Issued at 0600 Tuesday, 10 April 2018

1. **Gale warning:** Nil
Small craft warning: In operation

2. **Meteorological situation at 0300:** A fresh to strong northeast airflow covers the area, as a frontal trough along the southwest coast continues to drift away southeastwards. A warm front in the Irish Sea will track westwards over Ireland today and weaken .

3. **Forecast for all Irish coastal waters and the Irish Sea**

Wind: East to northeast force 5 or 6 and gusty, locally force 7 in the north Irish Sea. Decreasing northeast to north force 4 or 5 later today and force 3 to 5 tonight

Weather: Rain in southwest mostly dying away. Rain and drizzle in eastern areas spreading westwards but becoming well scattered.

Visibility: Poor in rain otherwise moderate, occasionally good.

Warning of Heavy Swell: on Atlantic coasts for a time today.

4. **Outlook for a further 24 hours until 0600 Thursday 12 April 2018:** Mostly moderate northeast winds, increasing fresh to strong at times in northern and eastern areas. Occasional rain or showers with mist at times also.

Forecasts provided by Met Éireann. Customer Services (Tel) 01-8064244. (Email) customer.liason@met.ie. Met Éireann Copyright.

Appendix 7.3 Met Éireann Weather Report.


Weather Forecast From Met Éireann
Text of Gale Warning

Nil

Text of Small Craft Warning
Northeast to east winds will occasionally reach force 6 for a time today on all Irish coasts.

Coastal Reports	5 AM Tuesday, 10 April 2018
Malin Head Automatic	East-Northeast, 23 Knots, Cloudy, 7 Miles, 1004, Rising slowly
Dublin Airport	East-Northeast, 14 Knots, Mist, 7 Miles, 1000, Rising slowly
Buoy M5 51° 41'N 6° 42'W	East-Northeast, 11 Knots, Wave ht: 1.3 m, The visibility at Tuskar is greater than 10 Miles, 995, Steady
Roches Point Automatic	Northeast, 10 Knots, Cloudy, 5 Miles, 996, Rising slowly
Sherkin Island Automatic	Northeast, 12 Knots, Light rain, 8 Miles, 995, Rising slowly
Valentia Automatic	East-Northeast, 5 Knots, Recent rain, 26 Miles, 996, Rising slowly
Mace Head Automatic	East-Northeast, 15 Knots, Cloudy, 5 Miles, 1000, Rising slowly
Belmullet Automatic	East-Northeast, 9 Knots, Mist, 4 Miles, 1002, Rising slowly
Buoy M1 53° 8'N, 11° 12'W	Report not available
Buoy M2 53° 29'N, 5° 26'W	Fast-Northeast, 20 Knots, Wave ht: 1.4 m, 999, Steady
Buoy M3 51° 13'N, 10° 33'W	Report not available
Buoy M4 55° 0'N 10° 0'W	East-Northeast, 16 Knots, Wave height not available, 1003, Rising slowly
Buoy M6 53° 4'N 15° 56'W	Northeast, 18 Knots, Gust 28 Knots, Wave ht: 5.3 m, 1002, ?

Disclaimer: buoy locations are approximate and are not for navigational purposes

Sea Crossings	State of sea until 0600 Thursday 12 April 2018
Dublin - Holyhead	Mostly slight, but increasing moderate for a time today.
Rosslare - South Wales	Slight increasing moderate today, decreasing slight later.
Cork - South Wales	Moderate, increasing rough for a time today, but decreasing moderate on Wednesday, later slight.
Rosslare - France	Moderate to rough, increasing rough to very rough Today. Decreasing moderate on Wednesday afternoon.
Cork - France	Moderate to rough, increasing rough to very rough Today. Decreasing moderate on Wednesday afternoon.

Next update before 1300 Tuesday, 10 April 2018

 A detailed forecast may be obtained by dialing *Weatherdial* on 1550 123 855.

Appendix 7.4 Extracts from Sitreps.

10th April 2018

1135: MAYDAY CALL WITH ONLY LATITUDE IN THE POSITION. TASKED CASA (FROM EXERCISE), R118 (SLIGO HELI), BALLYGLASS LB AND KILLALA CG.

COORDINATING INSTRUCTIONS

LOCATE AND RESCUE

REQUESTED R118 TO PROCEED ALONG THE 54N29W LATITUDE WESTBOUND

CASA TO SEARCH IN EAST BOUND DIRECTION, BALLYGLASS LB TO PROCEED TO DOWNPATRICK HEAD AND KILLALA CG BOAT TO PROCEED TO DOWNPATRICK HEAD.

1219 R118 SIGHTED FLARES/ONSCENE SIGHTED 3 CASUALTIES, LIFERAFT AND CASUALTY VESSEL.

RECOVERED CASUALTIES AND PROCEEDING TO SLIGO HOSPITAL ON CASUALTY IN SERIOUS CONDITION

1329: LANDED SLIGO HOSPITAL TO AWAITING AMBULANCES.

2nd May 2018

1653 STORNOWAY CG ADVISE OF VSL MATCHING THAT OF AISLING PATRICK SIGHTED 150 YDS OFF THE WEST SIDE OF ISLE OF SOUTH UIST.

MALIN HEAD PASSED VESSELS PARTICULARS FOR IDENTIFICATION

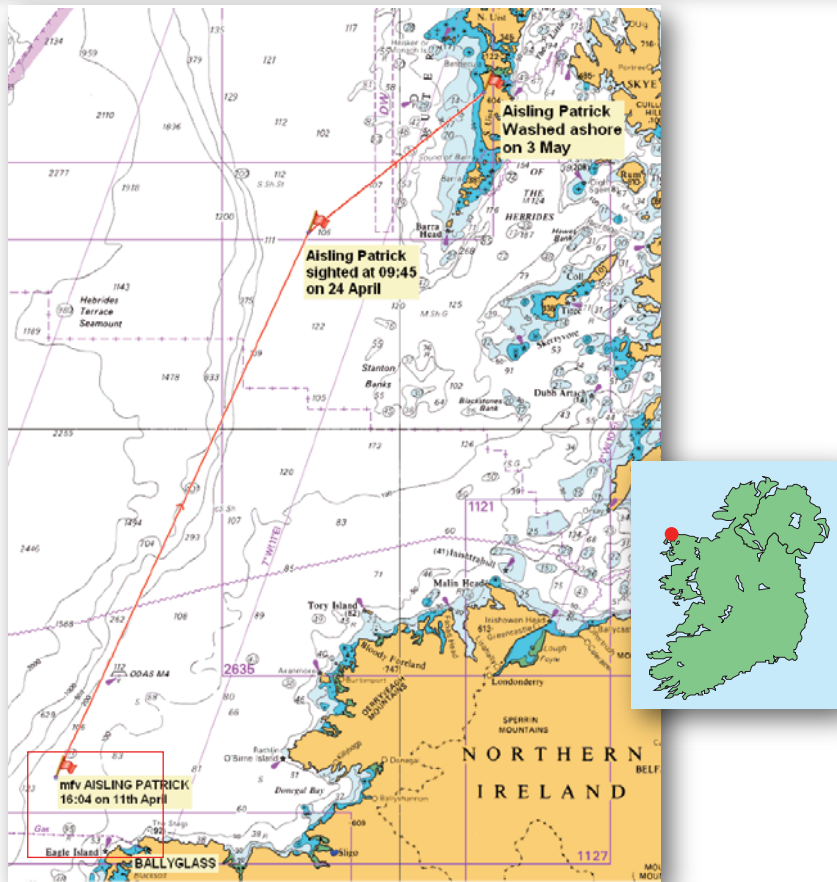
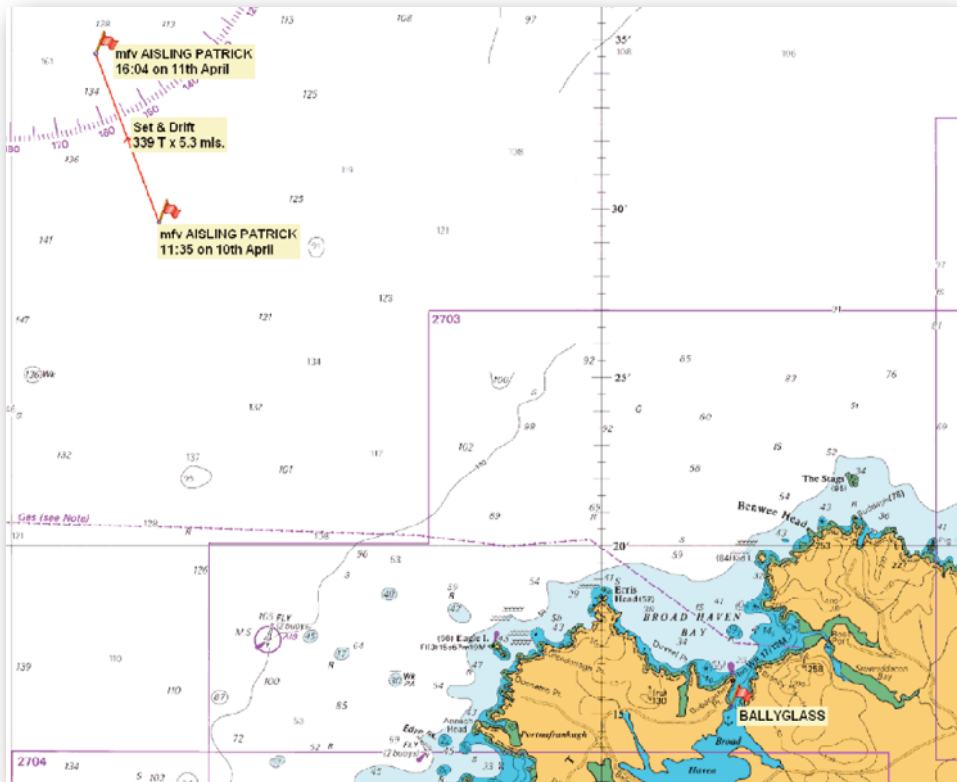
1830 ADVISE THAT VESSEL HAS BEEN IDENTIFIED AS THAT OF THE AISLING PATRICK. VESSEL IS ON A REEF AND LIFEBOAT UNABLE TO ATTACH LINE.

STORNOWAY ENQUIRING IF THERE IS ANY FUTHER INTEREST IN THE VESSEL FROM THE IRISH AUTHORITIES.

WILL REVERT

APPENDIX 7.5

Appendix 7.5 Chartlets of the area.



Appendix 7.6 Marine Notice 35/2016.

Recommends to: Masters, Skippers, Vessel Operators and Crews of Fishing Vessels

'That bilge spaces are monitored prior, during and after voyages. It is essential that bilge alarms are tested regularly. The test should prove that both the audible and visible alarms are working. It is also good practice to regularly inspect bilge suction strainers to ensure that they are clean and ready for use.'

Appendix 7.7 Extracts from CoP.

2.17 Sea Inlets and Discharges

- 2.17.1 Sea inlets and discharges should be fitted with an efficient means of closure.
- 2.17.2 Where sea inlet piping systems comprise flexible hose, the connection of the hose to the sea inlet must be of sound and efficient construction.
- 2.17.3 Inlet or discharge openings should be fitted with a valve or seacock at the hull connection, which is readily accessible for operation in an emergency. If such valves are inaccessible in an emergency, they should be fitted with a remote means of operation, i.e. by extended spindle or wire pull device.
- 2.17.4 Openings serving as discharges from engine cooling water, bilge and general service pumps, galley and toilet drains, etc., should be also fitted with an automatic non-return valve adjacent to the closing valve. Alternatively, a screw down non-return type valve may be fitted.

2.18 Materials for Valves and Associated Piping -Sea Water Systems

- 2.18.1 Valves, pipes and fittings serving as sea inlets and discharges attached directly to the hull of the vessel below the load waterline should be of steel, bronze, or other equivalent and compatible material.
- 2.18.2 Where the sea inlet valve or fitting is connected to the hull by means of a tube or distance piece, the tube or distance piece should be of a material that is compatible with the hull and valve.
- 2.18.3 Valves, piping and flexible hoses must be of sound and efficient construction and installation. All piping systems must be well supported with pipe clips or mounts and protected against vibration and chafing.

4.3.2 Cooling Water Systems

Provided that the piping and fittings are of sound construction and efficient in operation, the cooling water system fitted in pre-2004 fishing vessels will be accepted until such time as the system is renewed or the vessel is re-engined, when the following requirements are to be met:

- i) Cooling water inlets for main and auxiliary machinery must be kept to a minimum and comply with the requirements of 2.17 and 2.18 (see page 11).
- ii) Sea inlet trunks or boxes built into the hull structure must be of such a design that they remain below the waterline at all normal conditions of trim and heel, and must be fitted with arrangements for purging of trapped air.
- iii) The sea inlet pipe to the propulsion engine must be fitted with an accessible strainer.
- iv) Where a common sea main supplying a number of services is installed, each branch pipe must be fitted with an easily accessible isolating valve, with open/closed indication.

Appendix 7.7 Extracts from CoP.

- v) Vessels of 7 m LOA and over with a single sea water cooling supply to the propulsion engine must be fitted with an additional hose connection with a valve, whereby an emergency supply of cooling water from a bilge or general service pump may be introduced in the event of blockage of the main sea inlet valve.

Annexe 7 New Construction vessels section 6

Piping Systems

Fuel oil and cooling water systems and valves are to be fitted in accordance with acceptable construction rules. Vessels of LOA ≥ 7 m are to be fitted with a means of providing an alternative engine cooling water supply in the event of blockage of the engine sea inlet.

NATURAL JUSTICE - CORRESPONDENCE RECEIVED

Section 36 of the Merchant Shipping (Investigation of Marine Casualties) Act, 2000 requires that:

- '36 (1) Before publishing a report, the Board shall send a draft of the report or sections of the draft report to any person who, in its opinion, is likely to be adversely affected by the publishing of the report or sections or, if that person be deceased, then such person as appears to the Board best to represent that person's interest.
- (2) A person to whom the Board sends a draft in accordance with subsection (1) may, within a period of 28 days commencing on the date on which the draft is sent to the person, or such further period not exceeding 28 days, as the Board in its absolute discretion thinks fit, submit to the Board in writing his or her observations on the draft.
- (3) A person to whom a draft has been sent in accordance with subsection (1) may apply to the Board for an extension, in accordance with subsection (2), of the period in which to submit his or her observations on the draft.
- (4) Observations submitted to the Board in accordance with subsection (2) shall be included in an appendix to the published report, unless the person submitting the observations requests in writing that the observations be not published.
- (5) Where observations are submitted to the Board in accordance with subsection (2), the Board may, at its discretion -
- (a) alter the draft before publication or decide not to do so, or
 - (b) include in the published report such comments on the observations as it thinks fit.'

The Board reviews and considers all observations received whether published or not published in the final report. When the Board considers an observation requires amendments to the report that is stated beside the relevant observation. When the Board is satisfied that the report has adequately addressed the issue in the observation, then the observation is 'Noted' without comment or amendment. The Board may make further amendments or observations in light of the responses from the Natural Justice process.

'Noted' does not mean that the Board either agrees or disagrees with the observation.

8. NATURAL JUSTICE - CORRESPONDENCE RECEIVED

There was no correspondence received in the Natural Justice process for this investigation.



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