ACCIDENT REPORT

Report on the investigation of

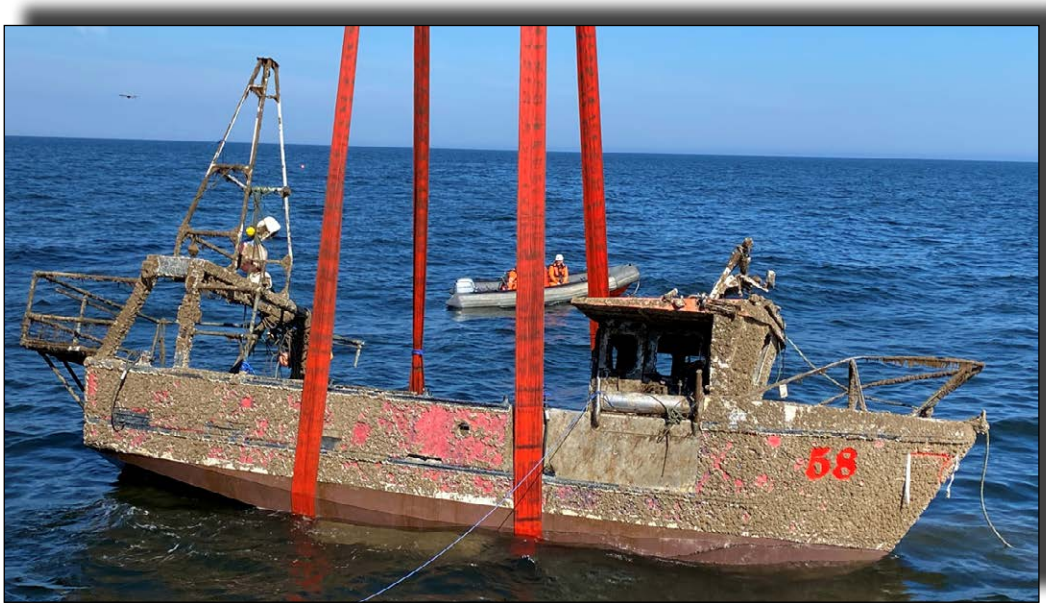
the foundering of the whelk potter

Nicola Faith (BS58)

resulting in three fatalities

in Colwyn Bay, North Wales

on 27 January 2021



MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

VERY SERIOUS MARINE CASUALTY REPORT NO 8/2022 JUNE 2022

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2012 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 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 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, 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

°C	-	degrees Celsius
DSC	-	digital selective calling
EPIRB	-	Emergency Position Indicating Radio Beacon
GPS	-	global positioning system
HRU	-	Hydrostatic Release Unit
ILO	-	International Labour Organization
ILO 188	-	The International Labour Organization Work in Fishing Convention (2007) C188
iVMS	-	inshore vessel monitoring system
kg	-	kilogram
LOA	-	length overall
m	-	metre
mm	-	millimetre
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MSN	-	Merchant Shipping Notice
PFD	-	personal flotation device
PLB	-	personal locator beacon
RNLI	-	Royal National Lifeboat Institution
SAR	-	search and rescue
SI	-	Statutory Instrument
UTC	-	universal time coordinated
VHF	-	very high frequency

TIMES: all times used in this report are UTC unless otherwise stated.

SYNOPSIS

Shortly after 1003 on 27 January 2021, the whelk potter *Nicola Faith* left its home port of Conwy, North Wales and headed out to its fishing grounds with three crew members on board. Their intention was to relocate eight strings of pots to fresh fishing grounds and to haul, empty and reshoot strings of pots that had already been laid in that area. The crew fished and relocated pots throughout the day. *Nicola Faith* was reported overdue the following morning and an extensive search began, but no sign of the missing vessel was found. A wide-ranging underwater search then started.

The bodies of the three crew members were washed ashore in different locations on the north-west coast of the UK over a 3-day period, the first of which was discovered 44 days after the accident.

Once the wreck of *Nicola Faith* had been found, it was salvaged ashore for further examination and investigation into the causes and circumstances of the accident.

The MAIB investigation found that the vessel had been significantly modified since 2017, and that these modifications had eroded its margin of stability. It concluded the vessel probably capsized and sank due to it being loaded with catch and fishing gear to the point of instability.

Recommendations have been made to the Maritime and Coastguard Agency to amend the Code of Practice for the Safety of Small Fishing Vessels of less than 15m Length Overall, to revise the wording and refer to a load limit rather than a catch limit, and to review and enhance the guidance to surveyors to clarify what level of modification should trigger further investigation into a vessel's stability.

A recommendation has also been made to *Nicola Faith*'s registered owner, The Big Ship Limited, to ensure that a written agreement is in place to clearly identify the organisation or person responsible for the operation of any vessels it may own.

Nicola Faith

SECTION 1 – FACTUAL INFORMATION

1.1 PARTICULARS OF *NICOLA FAITH* AND ACCIDENT

VESSEL PARTICULARS	
Vessel's name	*Nicola Faith*
Flag	UK
Classification society	Not applicable
IMO number/fishing numbers	BS58
Type	Potter
Registered owner	The Big Ship Limited
Construction	Steel
Year of build	1987
Length overall	10.69m
Registered length	9.81m
Gross tonnage	8.89
Minimum safe manning	Not applicable

VOYAGE PARTICULARS	
Port of departure	Conwy
Port of arrival	Conwy (intended)
Type of voyage	Fishing
Manning	3

MARINE CASUALTY INFORMATION	
Date and time	27 January 2021 at about 1800
Type of marine casualty or incident	Very Serious Marine Casualty
Location of incident	Colwyn Bay
Injuries/fatalities	3 fatalities
Damage/environmental impact	Vessel total constructive loss
External & internal environment	Not applicable
Persons on board	3

1.2 NARRATIVE

At 1003 on 27 January 2021, *Nicola Faith* departed from Conwy Harbour **(Figure 1)**. On board were its skipper, Carl McGrath, and two crew, Ross Ballantine and Alan Minard.

During the day, the vessel was operating 2-3 miles offshore in the vicinity of Great Ormes Head and eastwards to Colwyn Bay, fishing and relocating strings of pots **(Figure 2)**. At about 1400, the skipper sent a text message to his whelk buyer, informing him that they had 20 bags of whelks on board and that he would update him later in the day with the total number of bags he intended to land. At 1759, when

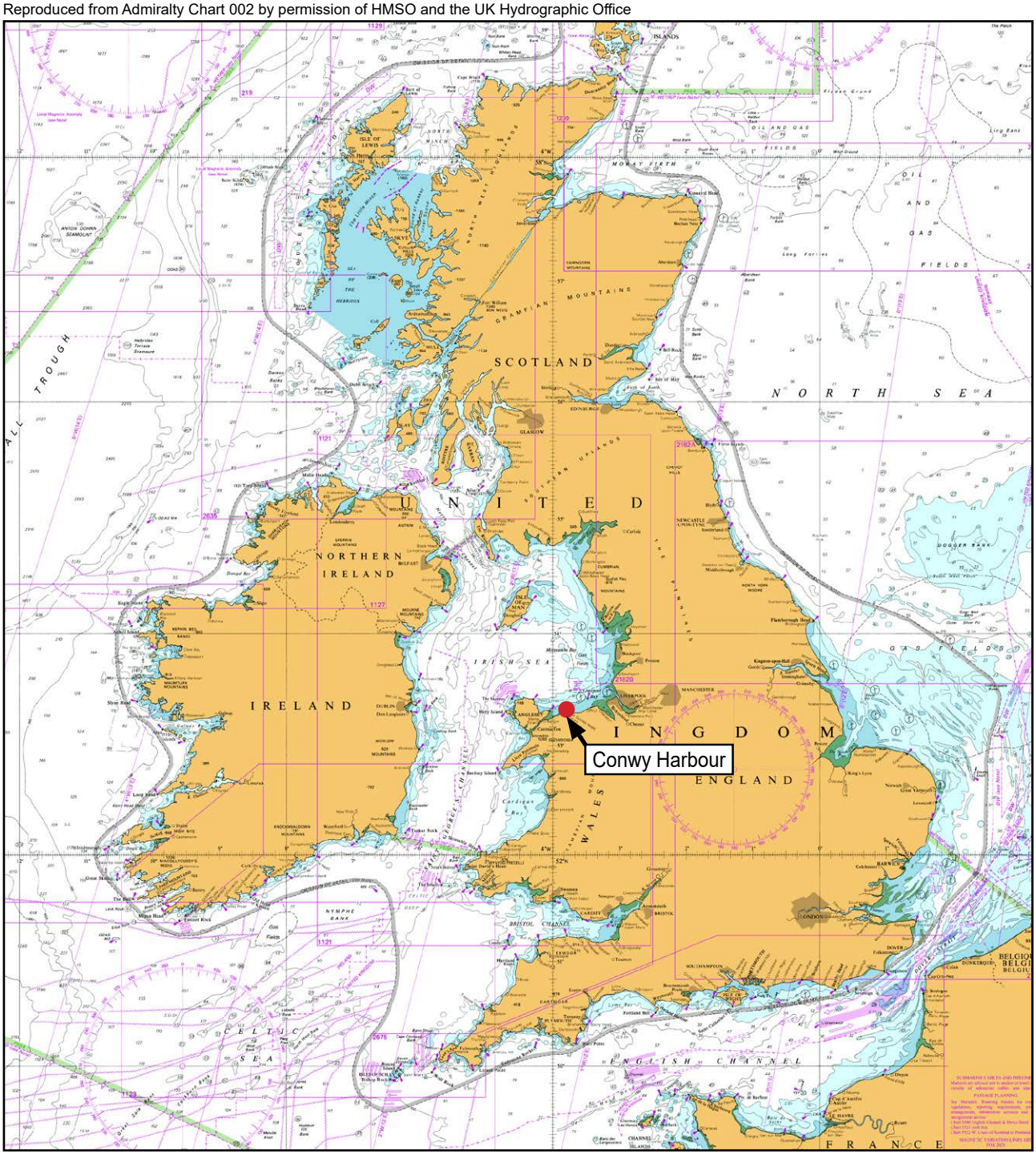

Figure 1: Conwy – port of departure

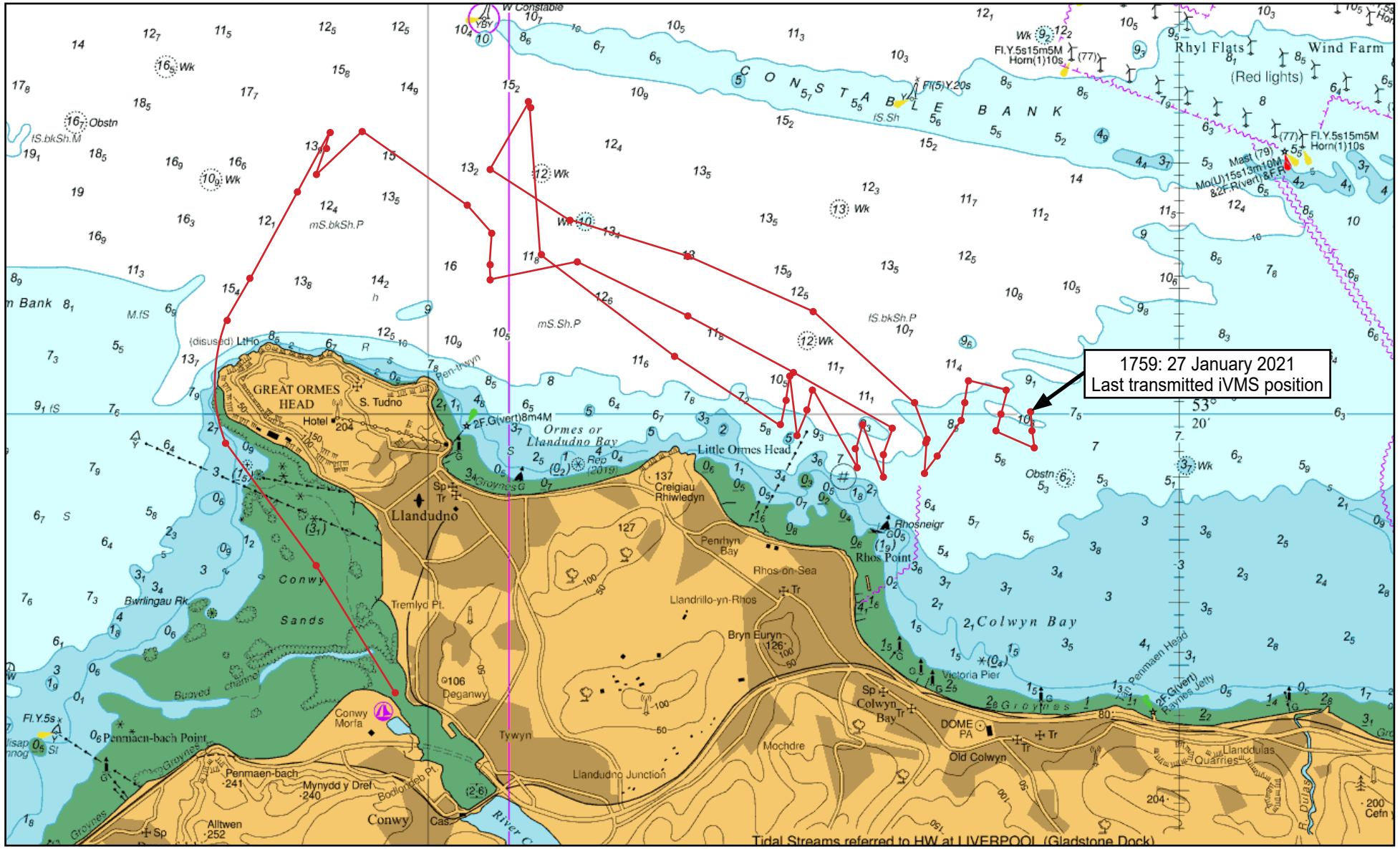

Figure 2: *Nicola Faith*'s iVMS track on 27 January 2021

positioned 1.8 miles off Rhos-on-Sea, the inshore vessel monitoring system (iVMS) fitted to *Nicola Faith* stopped automatically transmitting its position and the vessel did not return to port that evening as expected.

At 2130, the whelk buyer sent a text message to *Nicola Faith*'s skipper requesting an update on the number of bags of catch that he expected to land, but received no reply. At 2330, he sent a second text message, again without reply. The whelk buyer then drove to Conwy harbour where he waited until 0130 the next morning for *Nicola Faith* to arrive. He left once the tide became too low for the boat to enter the harbour.

At 1008 on 28 January, the coastguard received a telephone call that reported *Nicola Faith* as overdue. The coastguard made local enquiries and initiated a shoreline search. At 1101, it tasked several Royal National Lifeboat Institution (RNLI) assets to conduct a search at sea for *Nicola Faith*. These were joined a short while later by search and rescue (SAR) fixed-wing aircraft and helicopters. The search continued until 1800 on 29 January, and covered a combined sea and coastline area of over 500 square miles, but found no sign of the vessel, debris, or pollution **(Figure 3)**.

On 19 February, a passenger ferry travelling between Liverpool and Belfast sighted an inflated liferaft in a position 24 miles north of Rhos-on-Sea. An extensive air and sea search was conducted but the liferaft could not be located. On 4 March, a liferaft was found on the shore of Kirkcudbright, Scotland, approximately 90 miles north of Rhos-on-Sea. It was later confirmed to have come from *Nicola Faith* **(Figure 4)**.

All three crew members were recovered on the north-west coast of England. On 12 March, Ross Ballantine's body was found near West Kirby. On 13 March, Carl McGrath's body was recovered near Blackpool. On 14 March, Alan Minard's body was found near Egremont **(Figure 4)**.

The postmortem examination results confirmed that the cause of death for all three crew members was consistent with immersion in water/drowning.

1.3 ENVIRONMENTAL CONDITIONS

In the late afternoon of 27 January, a wind farm weather station locally recorded a 5 miles per hour wind blowing from the east, with an air temperature of 7 degrees Celsius (°C), sea temperature of 6.4°C, and a low 0.2m sea swell from a north-north-westerly direction. A series of storms swept through the area over the next 6 weeks, with a particularly violent storm occurring from the 9-12 March.

1.4 *NICOLA FAITH*

1.4.1 Description

Nicola Faith was a 9.81m steel-hulled potter built in 1987 **(Figure 5a)**. During its life it was modified to operate as a stern trawler, but later converted back for use as a potter **(Figure 5b)**. It had a forward wheelhouse that was enclosed from the centreline to the port side of the vessel only. Forward of the wheelhouse, below the main deck, was a cabin that extended across the full width of the bow and was accessed from inside the enclosed wheelhouse. This cabin was used for storing equipment and tools.

Image courtesy of HMCG

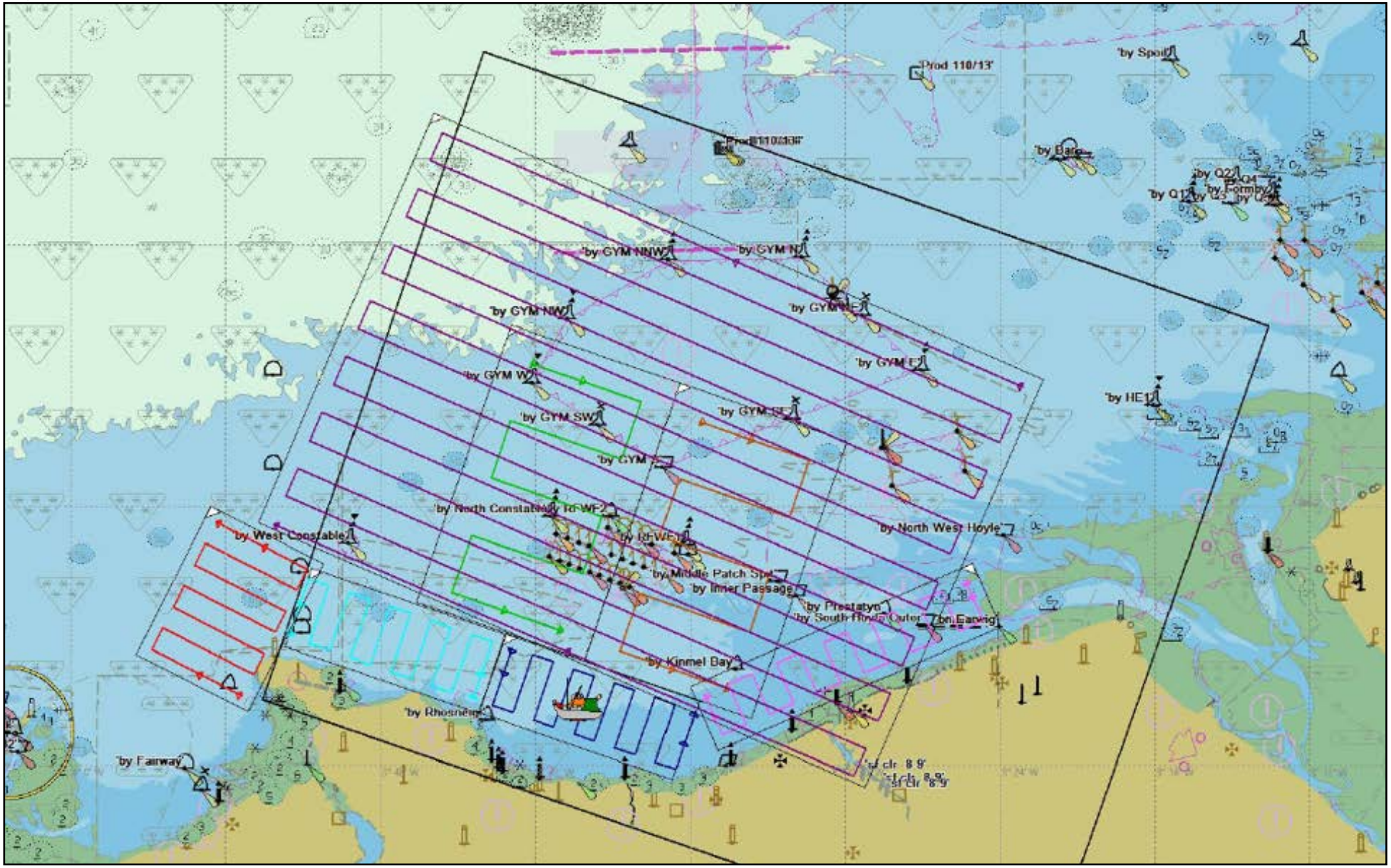

Figure 3: Search and rescue search area, with each coloured line representing a single search and rescue asset

Image courtesy of Google Earth

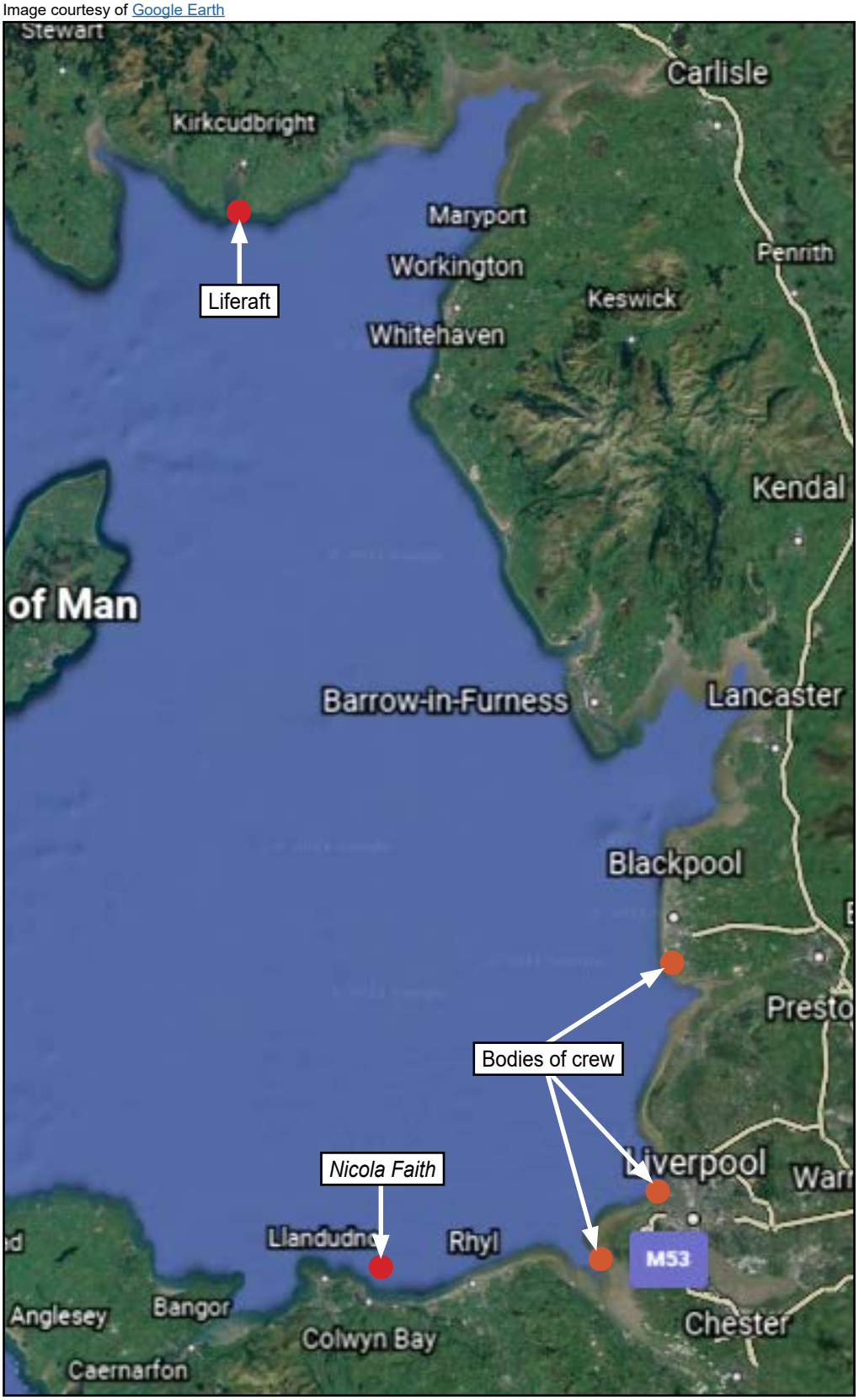

Figure 4: Locations where *Nicola Faith*'s liferaft and the bodies of the three crew of were found

Image courtesy of Google Images

Figure 5: *Nicola Faith* as it was built, before any significant modifications (a) and *Nicola Faith*'s recovered wreck, showing modifications (b)

The enclosed wheelhouse contained the engine and steering controls along with a digital selective calling (DSC) enabled very high frequency (VHF) radio, two chart plotters, each with integral global positioning system (GPS), and an Echomaster Marine OLEX[1]. Outside, on the starboard side of the wheelhouse, secondary steering and engine controls were located next to the hydraulic pot hauler and its controls.

When the vessel was converted back to a potter, the towing frame that had been added to allow it to operate as a stern trawler was retained and a shooting door was cut into the transom.

The working deck extended from the aft bulkhead of the wheelhouse to the stern of the vessel. A whelk riddle[2] was located on the starboard side of the working deck, aft of the pot hauling position. Below the working deck were two full width spaces, each of which was accessed via its own hatch in the deck **(Figure 6)**. The forward space was designed as a fish hold but was used by the skipper as a storeroom for spare gear. Behind this, and stretching to the stern, was an engine space that contained a 6-cylinder 120 horsepower diesel propulsion engine, a diesel generator, fuel tank and hydraulic oil tank. A power take-off unit coupled to the propulsion engine supplied hydraulic power to the pot hauling winch and the steering system. There was also a propulsion engine-driven deck wash pump.

1.4.2 Inshore vessel monitoring system

On 22 December 2020, *Nicola Faith* was fitted with an iVMS, funded by the Welsh Government as part of its sustainable fisheries monitoring strategy. The iVMS used the mobile phone network to transmit time-stamped GPS data to a shore station. The system was designed to transmit the data at a maximum interval of 6 minutes when connected to the mobile phone network. When out of mobile network range the system stored the information, ready to be transmitted once it was back in range again.

The iVMS had several internal alarms, all of which were stored in the internal memory. The system was programmed to transmit certain alarms when they were activated. The last GPS position transmitted from *Nicola Faith*'s iVMS was received by the shore station and timed at 1759 on 27 January 2021.

The MAIB retrieved the iVMS equipment from the wreck of *Nicola Faith* following its recovery ashore. The equipment was significantly water damaged, fouled and corroded after its lengthy immersion on the seabed. With support from the Air Accidents Investigation Branch's data recorder laboratory, the MAIB successfully removed the microchip from the iVMS and recovered data from its internal memory for analysis. This data showed that the unit lost its GPS signal at 1809, and its external power supply at 1819. Further power-related alarms were recorded until 1834, after which the unit stopped recording data.

[1] Three-dimensional seabed mapping chart plotter system.

[2] A slotted table used for the sorting and sizing of whelks.

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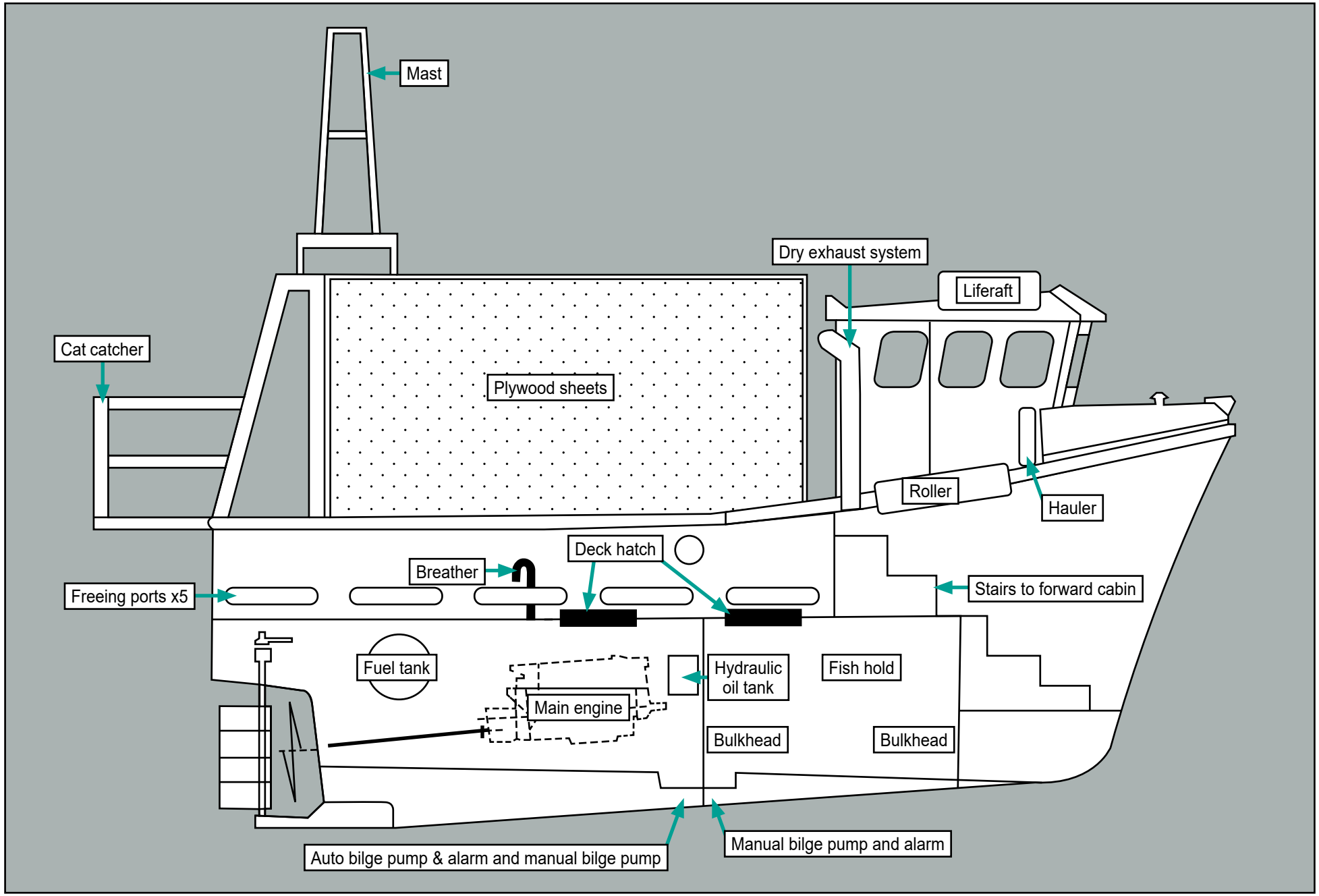

Figure 6: General arrangement of *Nicola Faith*

1.4.3 The crew

Carl McGrath was 34 years old and had been *Nicola Faith*'s skipper for about 3 years. He previously worked as a builder and steel fabricator and had no fishing experience before skippering *Nicola Faith*. He had completed all the mandatory fishing industry safety training courses. He had also undertaken additional non-mandatory training, including the Seafish Intermediate Stability Awareness course.

Ross Ballantine was 39 years old and had been working on board *Nicola Faith* for about 8 months. He had no prior experience as a fisherman and had not completed any of the mandatory fishing industry safety training courses.

Alan Minard was 20 years old and had been crewing on *Nicola Faith* for about 2 weeks. He had not completed any of the mandatory fishing industry safety training courses. Before joining *Nicola Faith* he had been working as an engineering apprentice at a boatyard in Devon, but was laid off because of the COVID-19 pandemic.

Nicola Faith experienced a high crew turnover in the 2 years before the accident and many crew members left after only a few days due to the harsh working conditions on board. The pace of work demanded by the skipper of *Nicola Faith* left one former crew member with permanent nerve damage in his shoulder. All crew were paid a fixed rate for each day's work and none were issued with a contract of employment.

1.4.4 Ownership

At the time of the accident the skipper was in the process of purchasing *Nicola Faith* and its fishing licence over a period of 3 years from The Big Ship Limited, a company owned by a local businessman who had inherited the vessel. It was mutually understood that the ownership of the vessel and fishing license would not pass to the skipper until payment of the last instalment had been made, which was due in April 2021. Although there was a loan agreement in place, there was no formal written operational agreement between The Big Ship Limited, as the registered owner of *Nicola Faith*, and the skipper.

The definition of a vessel owner was outlined in the UK Statutory Instrument (SI) 2018 No.1106 Merchant Shipping (Work in Fishing Convention) Regulations 2018, which stated that:

> *"fishing vessel owner" means the owner of a fishing vessel or any other person such as the manager, agent or bareboat charterer, who has assumed the responsibility for the operation of the vessel from the owner and who, on assuming such responsibility, has agreed to take over the duties and responsibilities imposed on fishing vessel owners in accordance with the Convention, regardless of whether any other organisation or person fulfils certain of the duties or responsibilities on behalf of the fishing vessel owner.* [sic]

The MCA's Marine Guidance Note (MGN) 587 Amendment 1 International Labour Organization Work In Fishing Convention (No.188) (ILO 188) section 3 affirmed that:

> *The fishing vessel owner…has overall responsibility to ensure that the skipper is provided with the necessary resources and facilities to comply with the Regulations.*

Section 3.3 also stated that:

> *While the fishing vessel owner always has overall responsibility, it is recognised that if they are not on board their fishing vessel, they may have limited control of day to day activities. The Regulations provide that responsibility for health and safety also rests with any person who is in control of any particular matter. This will most likely be the skipper in respect of day to day running of the vessel.*

1.4.5 Vessel modifications

Once the loan agreement to purchase *Nicola Faith* was in place, the skipper took full operational control of the vessel. In 2017 and 2018, he carried out extensive work that included:

- replacing steel plating on the hull
- fitting new navigation equipment and general repairs

Further modifications were made in 2019, when the vessel was operational, which included:

- Replacing the existing cat catcher[3] on the stern with a larger cat catcher, constructed from galvanised steel tube with a Glass Reinforced Plastic grating base **(Figure 7)**.
- The addition of concrete ballast to the fish hold and engine room,
- Installing heavy rubber flaps to the outside of seven of the nine deck freeing ports[4] **(Figure 5b)**.
- Rerouting the engine exhaust from the transom so that it went forward and ran up the port aft corner of the wheelhouse.
- Enclosing most of the working deck with plywood sheets, clad over a metal framework, to provide shelter for the crew.
- Fitting a glazed plastic sliding door to the aft bulkhead of the wheelhouse, which reduced the down-flooding angle from 90° to 29° on the port side. The original door, on the starboard side of the wheelhouse on the centreline of the vessel, was permanently secured in the closed position.

1.4.6 Safety equipment

1.4.6.1. Liferaft

A 4-person liferaft was secured in a stainless steel tubular cradle mounted on the wheelhouse roof and fitted with a Hydrostatic Release Unit (HRU). In March 2020, the liferaft had been serviced and a new HRU was installed.

[3] A platform at a fishing vessel's stern, usually used for stowing pots.

[4] An opening in the lower part of a bulwark that allows deck water to run freely overboard.

Image courtesy of Paul Turner

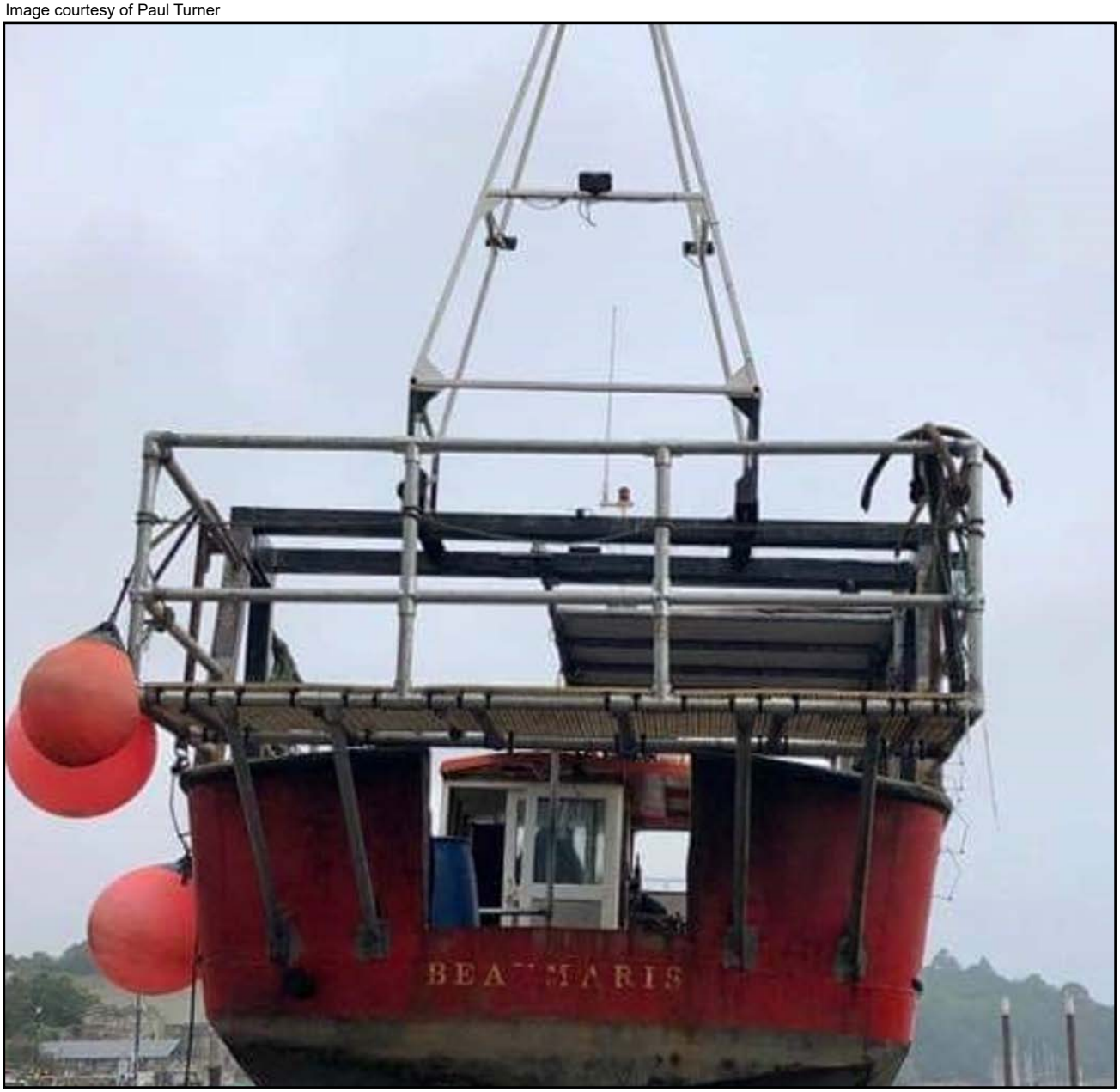

Figure 7: Large cat catcher fitted to *Nicola Faith*'s stern

The liferaft recovered in Kirkcudbright, Scotland, after the accident was examined by a liferaft service agent on behalf of the MAIB. It was confirmed to have come from *Nicola Faith* and the HRU to have released automatically. There were no signs that the liferaft had been occupied during its time at sea.

1.4.6.2. Flares

Nicola Faith was equipped with an offshore pyrotechnic flare pack. It comprised of four red parachute rocket flares, four red handheld flares, four white handheld flares and two orange smoke float canisters, all of which had a December 2020 expiry date. Several other flares were found on board, all with an April 2014 expiry date.

1.4.6.3. Personal flotation devices

Four inflated lifejackets were found in the cabin area of *Nicola Faith* after its recovery, none of which were in date for service.

MGN 588 (F) *Compulsory Provision and Wearing of Personal Flotation Devices on Fishing Vessels*[5], published in November 2018, noted that the failure to ensure the provision and wearing of personal flotation devices (PFD) and/or fall restraint harnesses by all fishermen working where there is a risk of falling overboard will be considered by the MCA to be a breach of health and safety legislation.

1.4.6.4. Emergency Position Indicating Radio Beacon

In October 2019, it became mandatory for all UK registered fishing vessels under 10m registered length to be fitted with a GPS enabled Emergency Position Indicating Radio Beacon (EPIRB), or for each crew member to be provided with a GPS enabled personal locator beacon (PLB).

Merchant Shipping Notice (MSN) 1871 Amendment 1[6]: *The Code of Practice for the Safety of Small Fishing Vessels of less than 15m Length Overall* was in force at the time of the accident and stated:

> *If a 406 MHz EPIRB with GPS is carried, then Personal Locator Beacons (PLBs) can either be 406 MHz and comply with EN 302 152 or be AIS. If no EPIRB is carried, then PLBs must be 406MHz and comply with EN 302 152. This is because the EPIRB is considered to be the mandatory equipment and the PLB is a voluntary addition.* [sic]

No EPIRB had been fitted to *Nicola Faith* nor was one listed for *Nicola Faith* on the MCA's national beacon registry. No PLBs were registered to the vessel, and none were found on board.

Between October 2017 and October 2019, grant funding was available for all fishing vessels, especially those under 15m in length. The funding allowed non-mandatory lifesaving equipment, including EPIRBs, PLBs and PFDs, and other equipment to be provided at no cost. The fishing community was made aware of this opportunity through industry media.

1.4.7 Fishing operation

1.4.7.1. Fishing method

Nicola Faith's skipper owned 25 strings of pots, all of which were in use on the day of the accident. Each string was about 180m in length, made from 14mm leaded back line and had 60 pots attached to it at regular intervals by 14mm leg lines **(Figure 8)**. His pots were handmade from recycled 25 litre plastic chemical drums, and weighed 5kg each. Commercially available alternatives were significantly heavier, weighing approximately 15kg each. The skipper's pots had an opening cut in the top to allow the catch to enter. Holes were drilled into the sides to allow water in, and the pots contained a metal bar to weigh them down.

The hydraulic pot hauler was used by the skipper to haul the back line and each pot in turn. The pots were passed to a second crew member who emptied their contents onto the riddle; undersized whelks and any detritus dropped through the riddle grate and were discharged overboard. The remaining whelks were washed

[5] This MGN was withdrawn on 28 October 2021 and replaced with MGN 588 Amendment No.1 (F) Compulsory Provision and Wearing Of Personal Flotation Devices on Fishing Vessels.

[6] This amendment was withdrawn on 6 September 2021 and replaced with Amendment 2.

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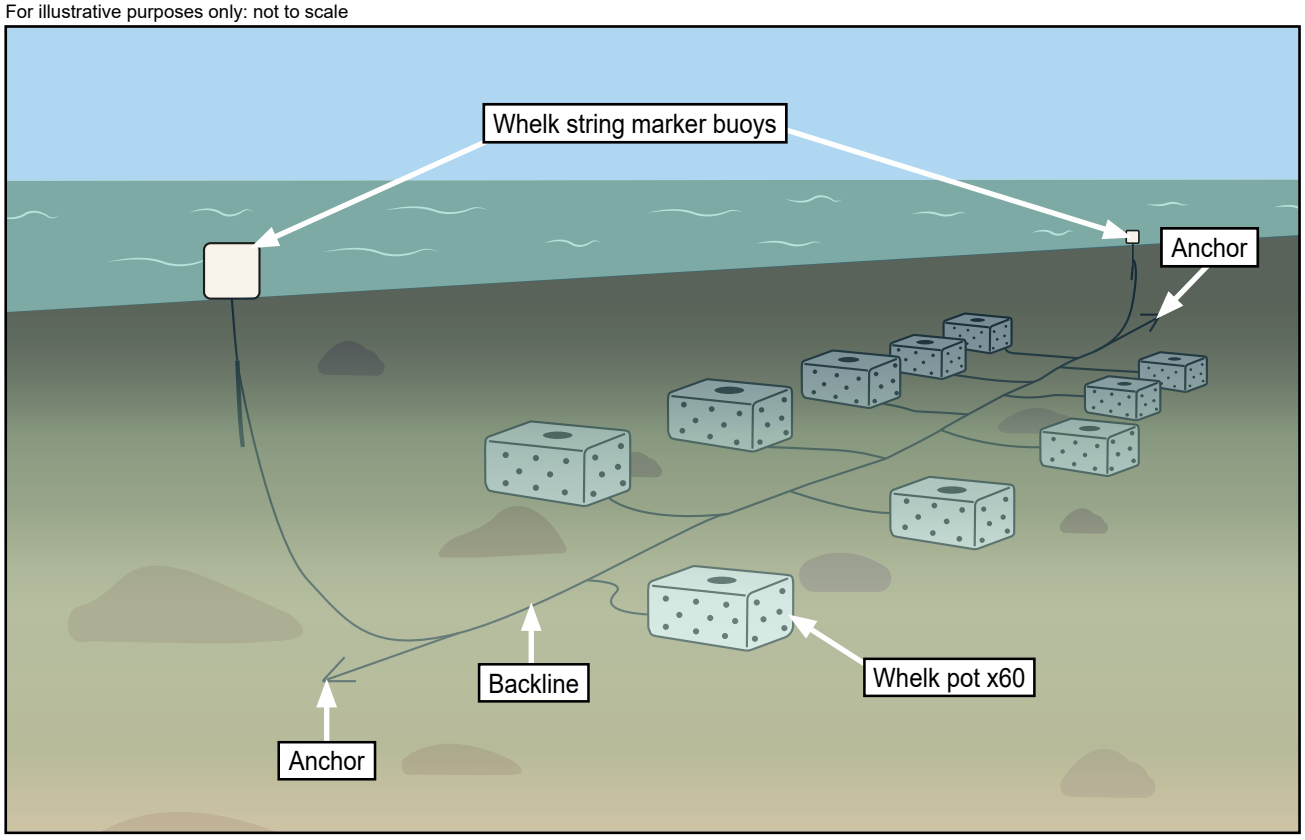

Figure 8: Diagram showing a string of whelk pots as they would be fished

and loaded into net bags, which were tied at the top and stacked on deck. Typically, each full bag weighed about 38kg. The average yield from a string of pots was five bags of whelks, rising to seven bags when the fishing was good. A deck wash hose was used to clean the pot, which was then passed to the third crew member who rebaited each pot with dogfish and crab and then stacked them on deck ready for shooting. The crew of three could haul, process, rebait and shoot eight strings a day when the fishing was good, and up to 12 strings a day when the yield from each string was lower.

Nicola Faith had two distinct areas of operation. The main fishing grounds were off Rhos-on-Sea and extended eastwards into Colwyn Bay. From January to May the skipper would relocate his pots to winter grounds, approximately 3 miles north of Great Ormes Head **(Figure 9)**.

1.4.8 Landing of the catch

All whelks caught by *Nicola Faith* were landed ashore in Conwy and sold to a local shellfish buyer who also supplied bait to the skipper for his pots. As there was no locally set quota limit for whelks, the shellfish buyer informed the skipper that he would take as many bags of whelks as he could land. Examples of the catch loaded during 2020 voyages can be seen in **Figure 10**. The buyer needed information on the number of bags the skipper intended to land so that he could allocate a suitable vehicle to collect them.

Figure 9: *Nicola Faith*'s fishing ground locations

Figure 10: *Nicola Faith* loaded on voyages in 2020

The following landings to the shellfish buyer were recorded in the 8 weeks leading up to the accident:

Date of landing	Number of bags landed	Weight of landing (kg)
24/11/2020	26	976
25/11/2020	40	1471
26/11/2020	54	2018
28/11/2020	33	1193
02/12/2020	55	2114
04/12/2020	52	1950
05/12/2020	60	2019
16/12/2020	134[7]	5052
17/12/2020	86	3436
19/12/2020	76	2863
05/01/2021	14	544
14/01/2021	76	2804
16/01/2021	58	2274
19/01/2021	68	2615
20/01/2021	62	2398
Average catch landing over the period	**55.8 bags**	**2108kg**

Table 1: *Nicola Faith*'s catch landing record 24/11/2020 to 20/01/2021

1.4.9 Local concerns

The safety of *Nicola Faith*'s operation, including the landed catch volumes, had raised local concern, which was expressed directly to the skipper but these were firmly rebuffed. No formal representations about the vessel's operation had been made to the MCA.

1.5 *NICOLA FAITH* SEARCH AND RECOVERY

1.5.1 Underwater search

On 1 February 2021, a Trinity House[8] vessel conducted a side scan sonar search of a 1 square nautical mile area centred around *Nicola Faith*'s last transmitted position. The purpose of the search was to locate the wreck and determine if it posed a

[7] Two days' catch landed together.

[8] Trinity House is the general lighthouse authority for England and Wales.

hazard to the navigation of ships in that area, but the search was unable to locate *Nicola Faith*. In collaboration with the MAIB, the Trinity House vessel conducted further searches over the next few days and covered the approach route to and from Raynes Jetty **(Figure 11)**, but the wreck was not found.

On 8 February, the MAIB commissioned a survey vessel to carry out an underwater search for the wreck of *Nicola Faith*. This search covered the vessel's usual area of operation.

The MAIB had received information of a sighting of *Nicola Faith* and a telephone call with the skipper, both reportedly at about 2000 on the day of the accident, approximately 2 hours after the time of the last iVMS recorded position. This information, coupled with the confidence that the Trinity House vessel had covered the areas it had searched, led the MAIB to widen the search area to around 37 square nautical miles of seabed, covering *Nicola Faith*'s full area of operation on the day of the accident.

The MAIB commissioned several survey vessels, using side scan sonar, to cover the widened search area and re-survey the areas previously searched. These survey operations were severely hampered by storms that swept across the area and searches could only be conducted when conditions allowed. As these searches were ongoing it was established that the information about both the sighting of *Nicola Faith* and the telephone call on the evening of the accident was spurious.

On 27 February, a vessel with hull-mounted side scan sonar equipment again searched the area surrounding *Nicola Faith*'s last known position that had previously been searched, but the wreck was not located using this equipment. On 3 April, this area was searched for a third time using towed side scan equipment. On this occasion, the wreck of *Nicola Faith* was located 319m east of its last transmitted position at a depth of 15m. On 13 April, police divers confirmed the identity of the wreck. Trinity House temporarily marked the wreck with two marker buoys as it was considered a hazard to ships navigating in the area.

1.5.2 Wreck recovery

From 20-31 May, a specialist salvage contractor conducted a thorough underwater survey of the wreck and its attached fishing gear, before recovering *Nicola Faith* from the seabed. A dive survey noted that the vessel was intact, the superstructure was undamaged, and that it was lying on its port side. Recovery divers observed hundreds of pots tangled together and trailing over the port quarter of the vessel. The divers further identified more pots on and below the seabed around the wreck site.

On 31 May, *Nicola Faith* was recovered from the seabed **(Figure 12)** and on the following day it was landed ashore into a local boatyard **(Figure 13)**.

The wreck of *Nicola Faith* was recovered with 223 whelk pots **(Figure 14)**. The associated gear found with the pots included hundreds of metres of leaded polypropylene rope, 11 anchors, and several pot marker buoys.

A calibrated load cell was used to weigh the equipment: the pots, rope and anchors weighed 2436kg; a large quantity of tools and spare gear found in the forward cabin area weighed 1100kg.

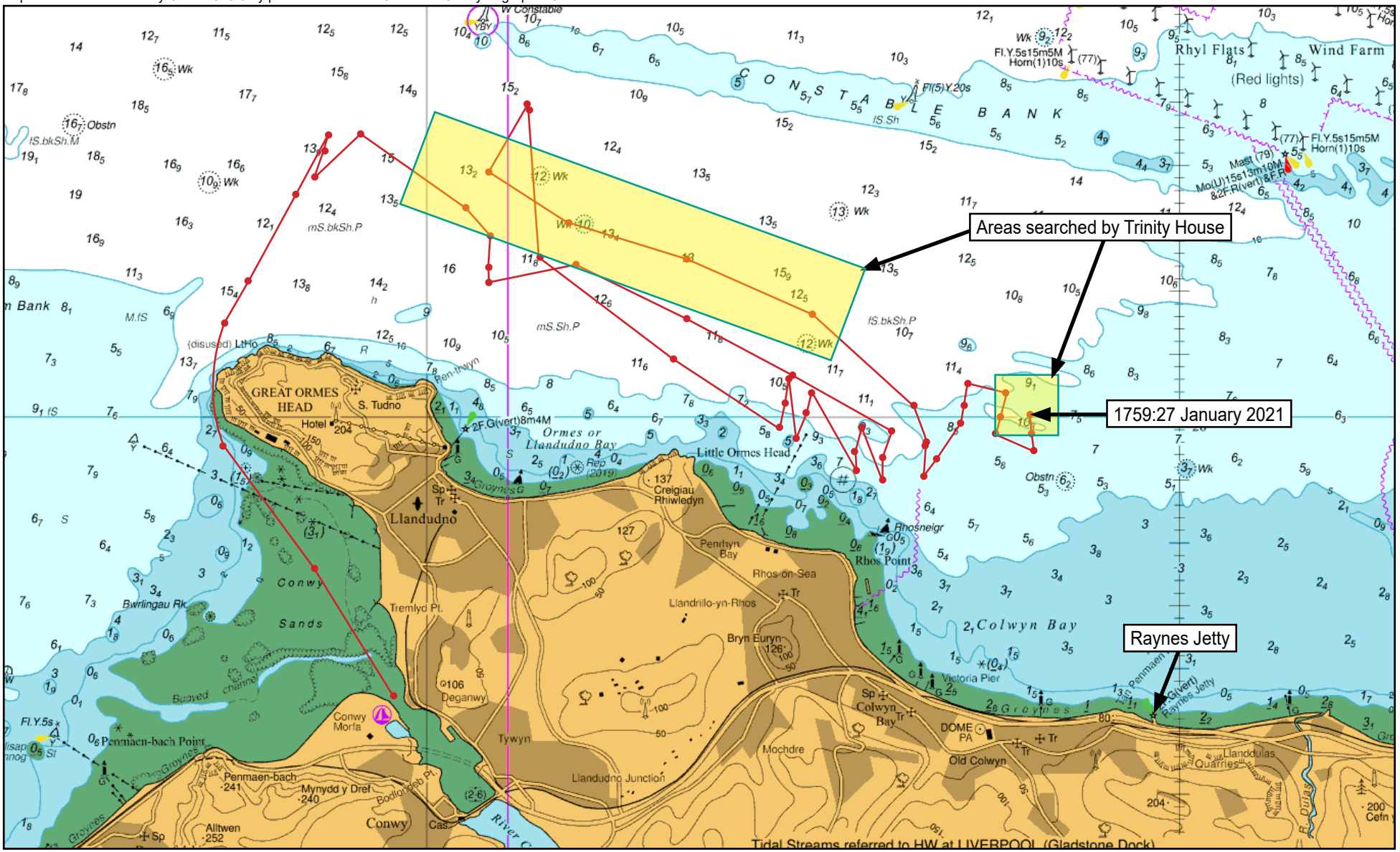

Figure 11: Areas searched by Trinity House, using side scan sonar

Figure 12: *Nicola Faith* being recovered from the seabed

Figure 13: *Nicola Faith* being landed ashore

Figure 14: Whelk pots and associated gear being recovered from the seabed

1.5.3 Wreck examination

Once *Nicola Faith* was ashore a thorough examination of the hull, internal spaces and machinery was conducted to verify that the hull fittings and pipework were intact and eliminate them as a potential source of flooding.

Nicola Faith's engine and deck wash seawater systems were inspected for integrity. The seacock for each system was found open and intact, with all flexible hoses and securing arrangements in good condition and still in place. The original exhaust pipe exiting the stern was found to be blanked off and watertight.

During the dive survey, *Nicola Faith*'s whelk riddle was found on the seabed to the port side of the wreck. The engine room vent pipe, which was located under the whelk riddle on the starboard side of the main deck, was found to have been ripped off, leaving a hole with a diameter of approximately 50mm in the deck.

An escape hatch on the foredeck was noted by the divers to be open. On examination, the hatch hinges were found to be intact and the latches to secure it were undamaged.

The engine room hatch cover in the main deck was found to be in position and secured closed. The fish hold hatch just forward of the engine room hatch was observed as open during the diver survey and its cover was resting on the port bulwark. On inspection, the hatch cover securing mechanism was found to be broken.

An external examination of *Nicola Faith*'s hull confirmed that there was no damage to the vessel's starboard side. A large area of paint was missing from the port side of the hull, plating in way of the bilge radius was pushed in and several cracks were noted where the plating had stretched over framing. Some areas of point loading and subsequent cracking of plating were also noted. The rudder and propeller were intact, but the lower rudder support bracket was found to have been deformed and was in contact with the propeller.

1.6 INSPECTIONS AND SURVEYS

On 29 September 2017, an MCA surveyor carried out a change of ownership inspection in the presence of the skipper during which *Nicola Faith*'s stability was assessed using the Wolfson Stability Guidance Method (see 1.7.3). The proposed addition of a larger cat catcher was discussed and the MCA surveyor requested that once it had been fitted, photographs were taken of the modification and forwarded on to the MCA's Liverpool marine office. The surveyor did not receive the photographs requested.

On 5 May 2019, an unannounced inspection of *Nicola Faith* was carried out by an MCA surveyor following several engine breakdowns that had required the RNLI to tow the vessel into port. The MCA surveyor noted that the larger cat catcher had been fitted and reminded the skipper that significant modifications should be discussed and approved by the MCA before being made.

The MCA's *Instructions for the Guidance of Surveyors on Tonnage Measurement MSIS27 Chapter 1 Annex 3* outlined when a cat catcher should be considered part of a vessel's structure and included in the length overall (LOA) measurement.

Section 3.3, Fixed Permanent Structure, stated:

> *Structure that is integral to the hull and deck structure, i.e. not bolted on shall be considered within the Length measurement.*
>
> *A good test of this is to determine if the structure in question is removed, is there a hole in the hull or deck that would render the vessel un-useable or unseaworthy. If the answer is yes, the structure is counted in the measurements (fixed permanent structure). For example:*
>
> - *Stern Pulpits i.e. cat catcher, where the structure is being integral with the bulwarks (i.e. deck structure), could not readily be removed intact and readily refitted intact from one day to another without altering the physical integrity of the vessel and in addition can contribute to the fishing effort in that it is sized to carry pots/creels (i.e. considered essential for the operation).* [sic]

The guidance specified that if a cat catcher can be easily removed from a vessel it should not be considered part of the vessel's structure and therefore not included in the LOA; the maximum acceptable depth of a cat catcher that would not be included in the LOA was 600mm.

Nicola Faith's cat catcher was 800mm deep and welded to the hull and bulwarks. However, it was not included in the vessel's LOA measurement.

On 11 December 2020, an MCA surveyor carried out a further unannounced inspection following another engine breakdown. During the inspection the new wheelhouse door, modified engine exhaust, freeing port flaps and deck canopy were observed and photographed by the surveyor **(Figure 15)**.

1.7 REGULATIONS AND GUIDANCE

As an existing vessel of less than 12m registered length, *Nicola Faith* was not required to comply with any regulations for a minimum standard of stability.

1.7.1 Codes of practice and guidance relating to small fishing vessel stability

On 30 June 2020, the MCA published MGN 628 (M+F) *Construction and Outfit Standards for Fishing Vessels of less than 15m Length Overall*. Section 1.9.3 of Part 1 – General Requirements – stated:

> *…stability should be properly assessed by a person having appropriate professional experience. Alterations of more than a minor nature should not be made to fishing gear, structure or ballast without first checking to confirm that the vessel's stability characteristics and freeboard are not reduced below acceptable standards.*

Although the standards set out in MGN 628 were for new vessels, section 3.6 of the note stipulated:

> *These standards shall also be used when modifying, repairing or altering a vessel.*

Section 3.8.11 of the MCA's *Instructions for the Guidance of Surveyors, Annex 1 – under 15m LOA FV Inspection Regime MSIS27.1* – required that:

> *The Owners/Skipper's attention should be drawn to the notes on the Certificate that state that:*
>
> - *Any unauthorised modification to the vessel or it's equipment may invalidate this certificate or endanger the crew. If you intend to modify the vessel seek professional advice.* [sic]

MSN 1871 Amendment 1 also stated that:

> *Significant repairs, substantial modifications or alterations affecting the vessel's dimensions, structure or stability, the removal or repositioning of machinery or engines, changes in the vessel's mode of fishing and/or its gear or the fitting of additional equipment shall only be undertaken after consultation and with the MCA's approval to ensure it complies with the requirements of the Code, as applicable to a new vessel, to the satisfaction of the MCA.*

Images courtesy of the MCA

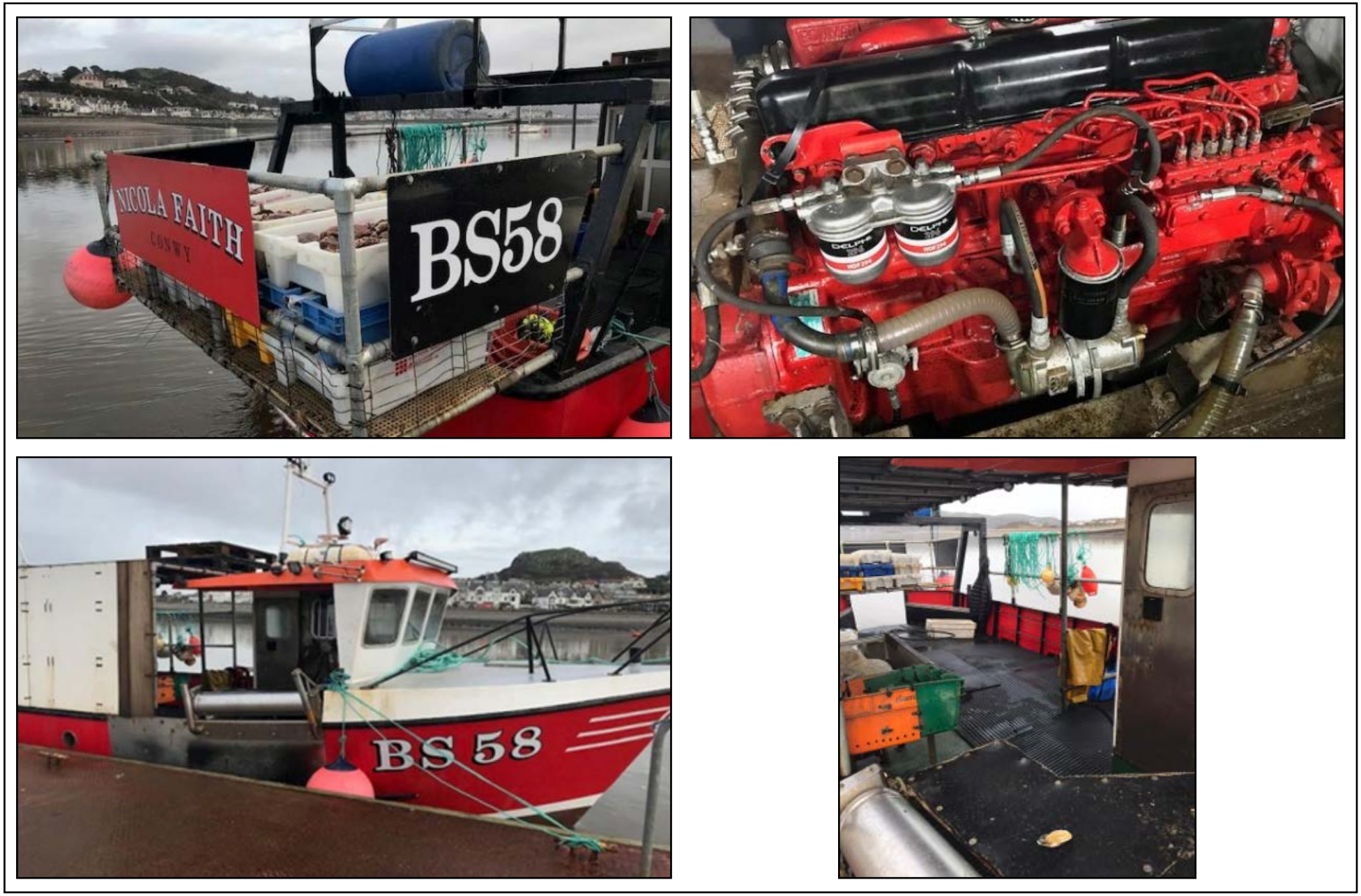

Figure 15: Photographs of *Nicola Faith* taken by an MCA surveyor on 11 December 2020

Section 5.1 of the Code provided guidance to small fishing vessel owners and skippers on the stability of their vessels:

> *It should be noted that a hull designer/builder may well have ensured stability is adequate for the design but the equipment, layout of down-flooding points etc. may differ significantly once an owner has fitted out the vessel, invalidating the designer's assumptions…*

Sections 5.2 and 5.3 went on to state that:

> *While no specific statutory requirements exist for the stability of small fishing vessels, the owner, skipper and others do have legal responsibilities as detailed under the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997.*
>
> *For example their duties include ensuring, as far as is reasonably practicable:*
>
> - *Systems of work that are, so far as reasonably practicable, safe and without risk to health;*
> - *Safe arrangements for the use, handling, and stowage and transportation of articles and substances;*
> - *There is provision of information, instruction, training and supervision necessary to ensure health and safety of fishermen and other persons.*

1.7.2 Wolfson Stability Guidance Method

At its change of ownership in 2017, *Nicola Faith*'s stability was assessed using the Wolfson Stability Guidance Method, contained within Annex 2 of MGN 526 (F) *Stability Guidance for Fishing Vessels – Using the Wolfson Method*.

The MGN detailed a method for owners and skippers of under 15m vessels to calculate the freeboard required to maintain a safety margin regarding stability. The calculation established three safety zones that were defined as:

> *Green: "Safe" in all but extreme sea states – waterline below the mark.*
>
> *Amber: "Low level of safety" and should be restricted to low sea states – waterline within mark.*
>
> *Red: "Unsafe, and danger of capsize" unless restricted to calm conditions and with extreme caution – waterline above the mark.*

The guide recommended that a freeboard guidance mark[9] showing the three safety zones was displayed on the hull.

1.7.3 Code of practice amendment introduced post-accident

On 6 September 2021, MSN 1871 Amendment No. 2 (F) *The Code of Practice for the Safety of Small Fishing Vessels of less than 15m Length Overall* came into force. This amendment improved the stability requirements of small fishing vessels and

[9] Known as a Wolfson mark.

made the Wolfson Stability Guidance Method mandatory. Additionally, it contained a requirement that new vessels intending to carry over 1000kg of catch were subject to a stability assessment. The 1000kg limit did not include any collected fishing gear such as pots, which could add significant weight to the deck of the vessel. Additionally, this amendment applied to new vessels only and not to existing vessels.

The amended code introduced a requirement for the freeboard of a vessel to be measured at every certificate renewal. New decked vessels with a minimum freeboard of at least 300mm had no operational limitations, but vessels with a minimum freeboard of at least 200mm were limited in their area of operation to 20 miles from a safe haven and in favourable weather conditions only.

1.7.4 International Labour Organization compliance

On 16 November 2017, The International Labour Organization *Work in Fishing Convention (2007) C188* (ILO 188) came into force. In November 2018, the UK government made legislation to implement ILO 188 and its ratification was registered in January 2019. ILO 188 applied to all fishermen working on fishing vessels of any size. The convention entitled all fishermen to written terms and conditions of employment, decent accommodation and food, medical care, regulated working time, repatriation, social protection and health and safety on board.

The convention also provided minimum standards relating to recruitment of crew and included a mandatory requirement for crew to hold a certificate of medical fitness. Responsibility for ILO 188 compliance is held jointly between the vessel's owner and its skipper.

In March 2018, the MCA published MGN 587 (F) *Amendment 1 International Labour Organization Work in Fishing Convention (No.188) Health and safety: responsibilities of fishing vessel owners, managers, skippers and fishermen*, which gave guidance on how to comply with ILO 188.

No evidence was found to show that the two crew members had either a written agreement for working on board *Nicola Faith* or valid medical certificates.

1.7.5 Crew training

Fishermen serving on board all UK registered fishing vessels must complete the mandatory safety training courses as detailed in MGN 411 (M+F) – *Training and Certification Requirements for the Crew of Fishing Vessels and their Applicability to Small Commercial Vessels and Large Yachts*.

Before starting work as a fisherman, all new entrants must have completed a 1-day Basic Sea Survival course.

Within 3 months of starting work, all new entrant fishermen must complete the following courses:

- 1-day Basic Fire Fighting and Prevention course;
- 1-day Basic First Aid; and
- 1-day Basic Health and Safety.

Neither of the crew had completed the Basic Sea Survival course. Because Ross Ballantine had been working on board *Nicola Faith* for more than 3 months, he should have completed the three additional mandatory training courses.

During the COVID-19 pandemic, the MCA still required new entrants to the fishing industry to complete a 1-day Basic Sea Survival course before starting work on a fishing boat, if the manning level on the fishing boat the entrant was planning to work on was less than four crew.

On 22 March 2020, the local training provider in Rhos-on-Sea closed due to the COVID-19 pandemic. Training was available in other areas of the country throughout the pandemic. The MCA gave a 3-month extension to the requirement to complete the subsequent training courses within the first 3 months of employment as required by MGN 411, and a further 6-month extension to the requirement if crew were unable to complete their training due to lockdown restrictions.

1.8 STABILITY ASSESSMENT

1.8.1 Overview

The MAIB commissioned naval architects to carry out a roll test, inclining test[10] and full stability assessment of *Nicola Faith* as part of its post-accident investigation. The roll test followed the guidance contained within the MCA's MGN 503 (F) *Procedure for Carrying out a Roll or Heel Test to Assess Stability for Fishing Vessel Owners and Skippers*. The inclining test was carried out as part of the full stability assessment.

Assessments were conducted to calculate *Nicola Faith*'s likely stability:

1. when it was built;

2. in its condition after the most recent modifications; and

3. in its likely condition immediately before the accident.

The objectives were to:

- Assess the vessel's general stability against the requirements of MGN 281 (F) – *Fishing Vessels Freeboard and Stability Information Booklet – Recommended Format*.

- Compare its freeboard in the accident condition with that obtained in September 2017 by the Wolfson method as described in MGN 526 (F).

- Establish its likely stability immediately before the accident.

- Compare roll test and inclining experiment results with calculated stability.

[10] An inclining test involves the vessel being afloat and moving weights to measure their effects and this information then forms an essential part of the stability assessment.

Once *Nicola Faith* had been recovered ashore, the hull shape was accurately measured by a naval architect; the decks, interior spaces, and tanks were also measured. The collected data was used to create a digital model of the vessel **(Figures 16** and **17)**.

The measurements and digital model were then used to assess the vessel's stability using each of the three criteria for the following eight conditions:

1. lightship (non-seagoing)[11]
2. depart port with 100% consumables on board
3. arrival at fishing grounds
4. depart grounds with catch of 1000kg – 100% stowed in the fish hold
5. depart grounds with catch of 1000kg – 50% stowed in fish hold, 50% stowed on the cat catcher
6. depart grounds with catch of 1000kg stowed on deck
7. arrival in port with catch of 1000kg stowed in the fish hold
8. arrival in port with catch of 1000kg stowed on deck.

The number of pots and bags of catch used for the calculation of *Nicola Faith*'s stability immediately before the accident were estimated from the number of strings of pots attached to the vessel when it was recovered (240 pots and associated gear = 2521kg) and the average yield of catch based on historical landings (55 bags = 2090kg) (See 1.4.8).

The results of the calculated stability assessment indicated *Nicola Faith* had a good margin of stability in all assessed conditions when it was built.

The calculations further revealed that after its modifications *Nicola Faith* failed to meet minimum stability requirements in all tested conditions, except for lightship (non-seagoing), and that immediately before the accident *Nicola Faith*'s transverse stability was at a critically low level. The calculations performed by the naval architect indicated that the vessel was almost certainly heeling slightly to port because the centre of gravity was not on the centreline, the maximum righting lever[12] was negligible, and the range of stability was very low at about 15° **(Figure 18)**.

Before the modifications, when the original wheelhouse door on the centreline of *Nicola Faith* was in use, down-flooding into *Nicola Faith*'s forward spaces would occur at a 90° angle of heel or list. The minimum down-flooding angle when heeled to port reduced to 29° when the new plastic sliding door was fitted in the aft bulkhead of the wheelhouse **(Figure 17)**.

[11] Lightship is defined as the weight of the vessel but without stores, fuel, water, cargo or crew on board.

[12] A righting lever, known as GZ, creates a restoring moment to bring a vessel back to the upright position if it is heeled over by an external force such as wave action.

For illustrative purposes only: not to scale

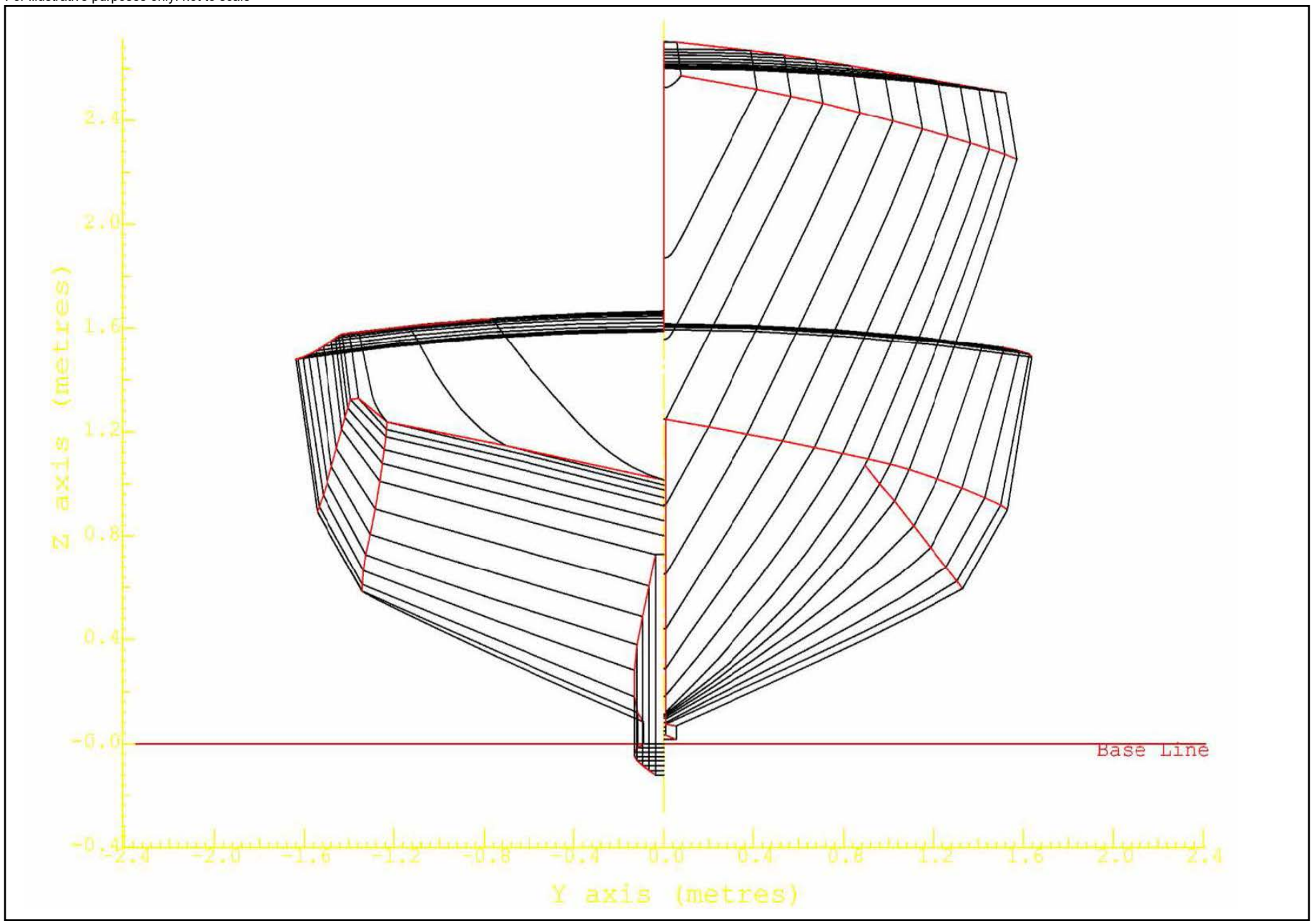

Figure 16: Naval architect's lines plan of *Nicola Faith*

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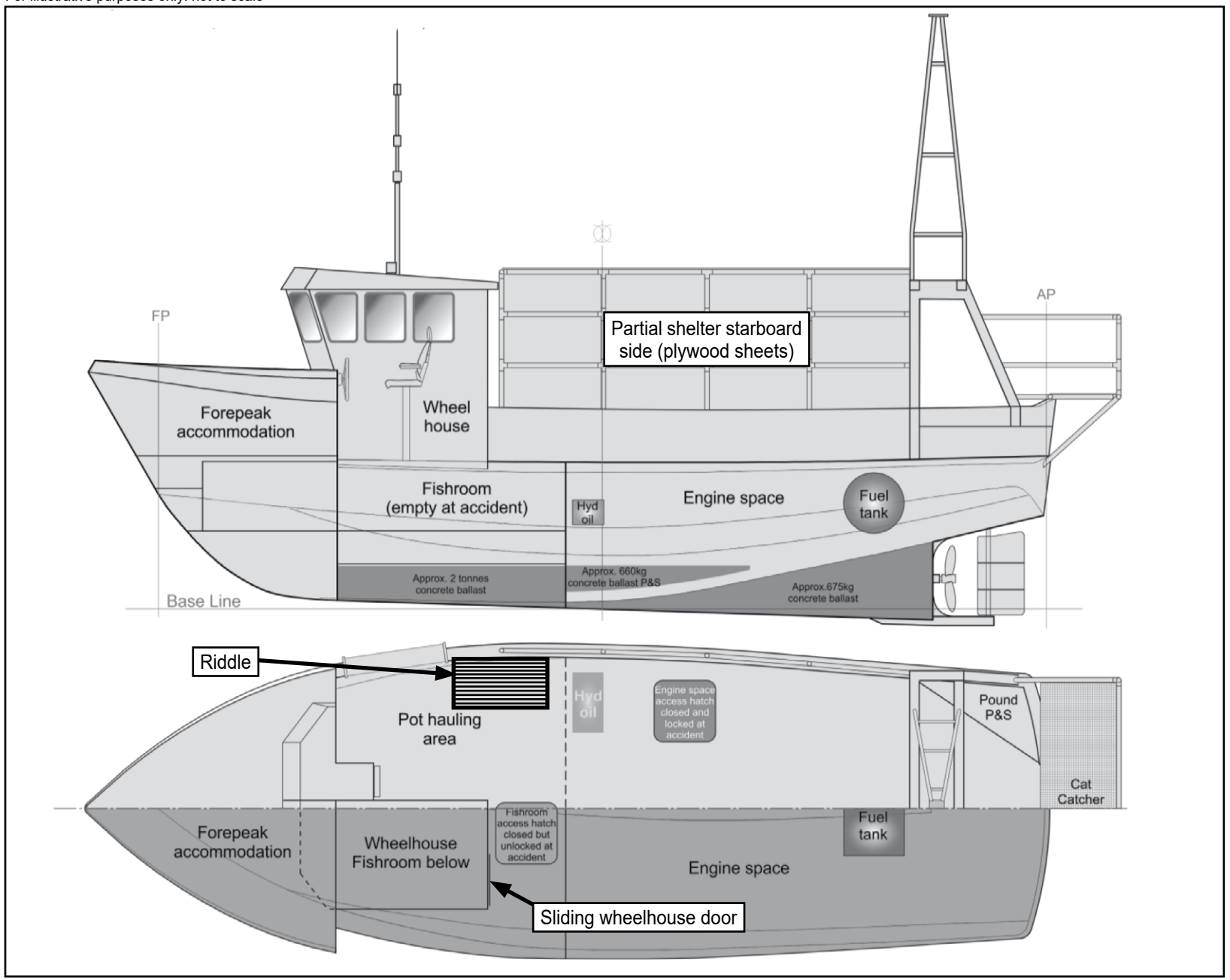

Figure 17: Naval architect's drawing of *Nicola Faith*

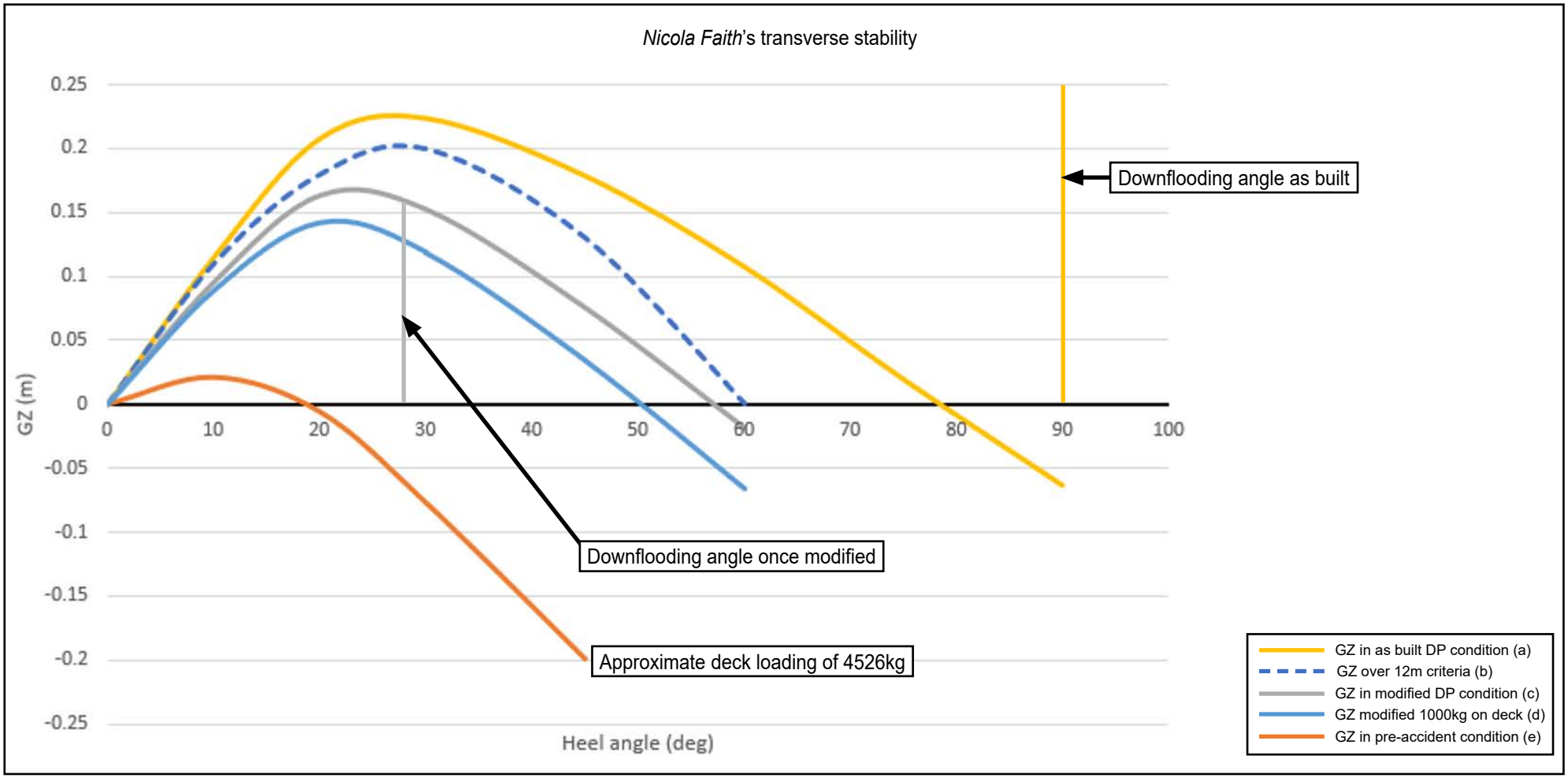

Figure 18: Graph of *Nicola Faith*'s transverse stability throughout its life

On 16 June 2021, having ensured it was watertight, *Nicola Faith* was placed back into the water and a roll test and inclining test were performed with the vessel close to lightship condition; the fuel tank was pressed full and all spare gear, tools and fishing equipment had been removed.

The roll test results revealed that in close to lightship condition *Nicola Faith* had a less than adequate level of transverse stability and was classified as tender[13].

1.8.2 Wolfson stability assessment

A Wolfson stability assessment was carried out by an MCA surveyor at the time of inspection in 2017. There was no evidence of a Wolfson mark on the recovered hull of *Nicola Faith*.

The assessment of *Nicola Faith*'s stability against the Wolfson Stability Guidance Method showed that **(Figure 19)**:

- In its as-built condition, in which the vessel passed full stability criteria, the freeboard was in the amber zone of the guidance mark under all loading conditions, indicating a low safety level of stability.

- In its modified state under condition No.2, depart port with 100% consumables on board, and condition No.6, depart grounds with 1000kg of catch stowed on deck, the Wolfson calculation indicated the freeboard to be in the amber zone.

- In the accident condition, the freeboard reduced into the red zone of the guidance mark.

These observations demonstrate that when the Wolfson Guidance Method is applied, the amber zone of the guidance mark can cover a wide range of stability conditions.

1.9 PREVIOUS/SIMILAR ACCIDENTS AND RECOMMENDATIONS

1.9.1 *Nicola Faith* – near misses

In the 12 months before the accident, *Nicola Faith* experienced at least two near capsizes caused by the loading condition of the vessel. One incident occurred when *Nicola Faith* was returning to port heavily laden with catch. The vessel rolled and bags of catch shifted to one side of the deck, causing it to list heavily. When it did not return to an upright position, the crew were forced to jettison bags of catch over the side to enable *Nicola Faith* to regain stability and safely return to port.

On another occasion, while at sea relocating gear, a large number of pots stacked on the deck fell over when *Nicola Faith* rolled. The listing vessel was forced to return to port at slow speed and the crew spent several hours untangling the pots and hundreds of metres of rope.

It is unknown if these are the only two incidents of this type that occurred.

[13] A term used to indicate a low level of transverse stability, which results in a vessel being slow to return to the upright position after being rolled.

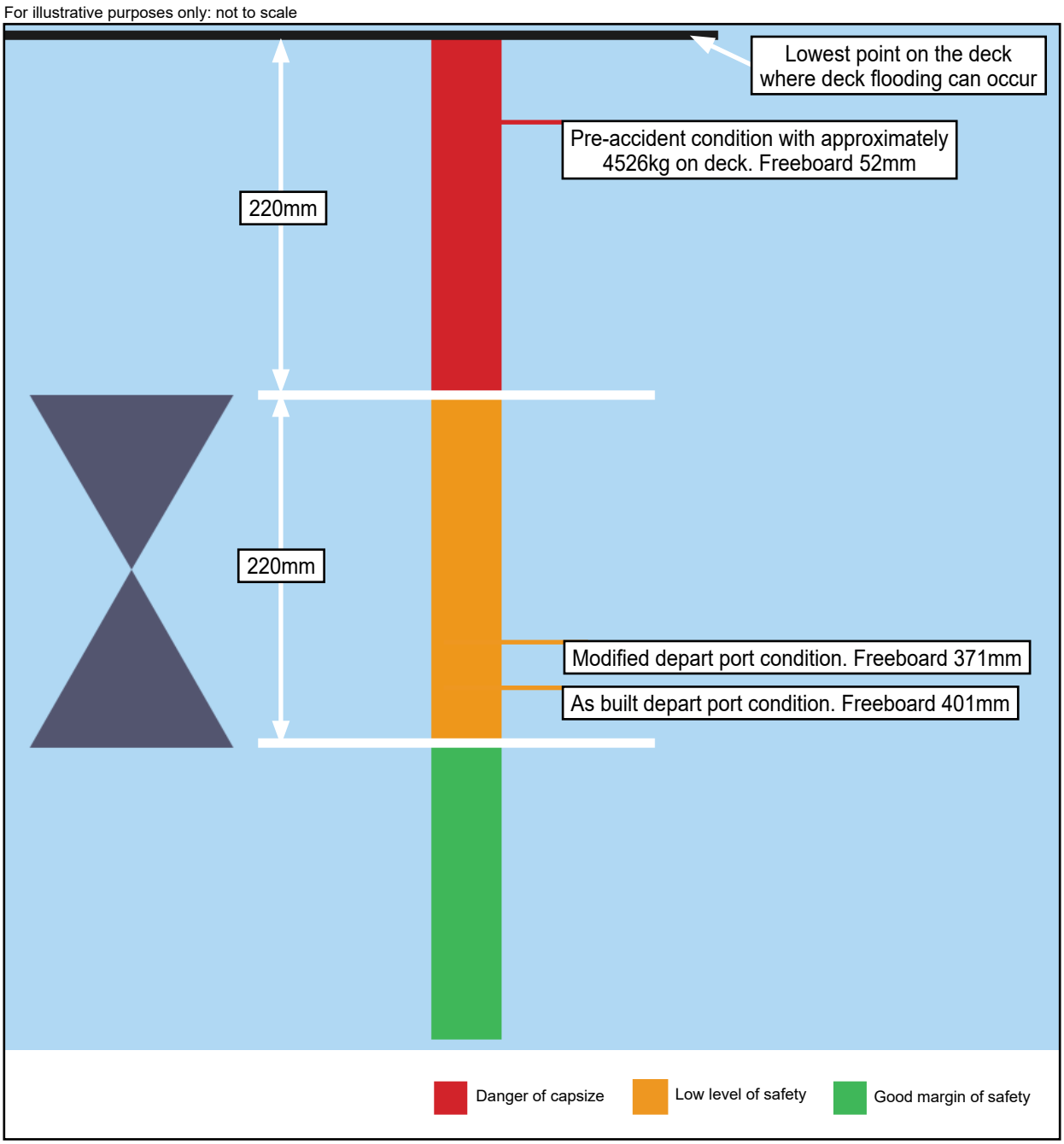

Figure 19: Wolfson Stability Guidance Method guidance mark for *Nicola Faith*

1.9.2 *Nancy Glen* – capsize and foundering

At about 1750 on 18 January 2018, the prawn trawler *Nancy Glen* capsized and later sank in Lower Loch Fyne, Scotland; only one of the three crew survived (MAIB report 6/2019[14]).

Nancy Glen was trawling when its starboard net became fouled with mud and debris from the seabed during a turn to starboard, and the vessel capsized rapidly. One of the crew escaped but the skipper and the other crewman were trapped inside. The missing crewmen's bodies were recovered when the wreck was salvaged.

The MAIB investigation established that through life modifications to *Nancy Glen*, culminating in the replacement of the crane with a heavier model, had reduced the vessel's stability, significantly increasing its vulnerability to capsize. Despite

[14] https://www.gov.uk/maib-reports/capsize-and-sinking-of-prawn-trawler-nancy-glen-with-loss-of-2-lives

the skipper's attempt to bring the situation under control, the combined effect of the increased towing load from the fouled net, the turn to starboard and the limited reserve stability meant that *Nancy Glen* was unable to recover from the rapid heel to starboard.

The investigation report highlighted that evidence from small fishing vessel capsizes, coupled with the limited adoption of the Wolfson Stability Guidance Method, indicated that many owners and skippers were unaware of the risks of not conducting stability assessments.

1.9.3 *JMT* – capsize and foundering

During the afternoon of 9 July 2015, routine contact was lost with the skipper and crewman on board the 11.4m scallop dredger *JMT*, which was fishing off Plymouth, UK (MAIB report 15/2016[15]). A search and rescue operation was initiated the following morning when the vessel did not return alongside as expected. The body of the crewman was found floating in a life-ring; he was not wearing a lifejacket. The skipper was not found. *JMT* was recovered from the seabed by the MAIB. The investigation identified that:

- It was almost certain that *JMT* capsized suddenly and without warning. It also probably sank very quickly.

- The vessel had only 25% of the reserve of stability required for larger fishing vessels. The vessel's stability had been adversely affected by structural modifications and by aspects of the vessel's operation.

- Capsize was possibly triggered by the release of the contents of the starboard dredges while the port dredges and their contents remained suspended. The crew's likelihood of survival was reduced by not having the opportunity to broadcast a distress message or release the EPIRB from its stowage, lifejackets not being worn and the failure of the liferaft to surface.

At the time of this accident, fishing vessels less than 15m length overall did not have to meet stability criteria.

1.9.4 *Stella Maris* – capsize and foundering

On 28 July 2014, the 9.96m LOA trawler *Stella Maris* capsized and sank while hauling fishing gear. The vessel's two crew were uninjured (MAIB report 29/2015[16]).

Stella Maris had been significantly modified prior to its loss, including the fitting of an A-frame gantry and a winch for lifting the cod end. No calculations were required or carried out regarding the effects of this work on the vessel's stability.

The subsequent MAIB investigation report identified that *Stella Maris* capsized as a result of insufficient stability due to an overly high gantry supporting a heavy cod end, lifted by a winch with excessive power. *Stella Maris* had a sister vessel that was similarly modified.

[15] https://www.gov.uk/maib-reports/capsize-and-sinking-of-scallop-dredger-jmt-with-loss-of-2-lives

[16] https://www.gov.uk/maib-reports/capsize-and-sinking-of-stern-trawler-stella-maris

Following the accident, the MCA undertook to:

- Commit to introducing a requirement for the carriage of EPIRBs on board all registered fishing vessels in its next revision of the Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations.

- Require fishing vessel owners to notify and seek approval from the agency prior to carrying out substantial modifications.

1.9.5 *Purbeck Isle* – foundering

At about 1000 on 17 May 2012, the 11.64m wooden potting vessel *Purbeck Isle* foundered in the English Channel, about 9 miles south of Portland Bill, resulting in the loss of the skipper and his two crewmen (MAIB report 7/2013[17]). They had been moving their whelk pots from their winter grounds in Lyme Bay to their summer grounds in deeper water south of Portland Bill. *Purbeck Isle* went down so suddenly that the skipper and his crew were unable to raise the alarm, collect their lifejackets or manually release and inflate the vessel's liferaft. Due to the environmental conditions, it is likely that all three fishermen had perished by the time the coastguard was informed that *Purbeck Isle* was overdue. *Purbeck Isle* probably sank as a result of rapid flooding following the catastrophic failure of its hull fastenings.

The skipper and his crew were lost because they were unable to raise the alarm before entering the water, and their liferaft did not deploy because it had been lashed to the wheelhouse roof. The alarm was not raised because the vessel sank suddenly and an EPIRB was not carried on board. Recommendations were made to the MCA to ensure that fishing vessels' health and safety legislation applied to all fishermen regardless of their employment status, that EPIRBs are carried on all fishing vessels under 15m in length, and to introduce a more robust inspection regime for such fishing vessels.

1.9.6 MAIB recommendations with regard to small fishing vessel stability

In the 20 years between 2002 and 2022, the MAIB had previously made many recommendations to the MCA to improve the regulatory framework for small fishing vessel stability, leading to amendments to the codes of practice for fishing vessels.

MAIB report 38/2002[18] into the capsize and sinking of the mussel dredger *Charisma* made a recommendation to the MCA to consult with the fishing industry to develop and promulgate guidance for the loading of fishing vessels under 15m LOA.

MAIB reports 19/2003[19] and 25/2003[20] into the loss of the fishing vessels *Kirsteen Anne* and *Amber* made recommendations to the MCA to conduct a formal safety assessment of the introduction of a mandatory stability requirement for existing fishing vessels under 15m and develop a simple method of assessing the stability, including freeboard, of small fishing vessels, and issue guidance accordingly. These reports also recommended that the MCA investigated how stability awareness can be raised among the owners and crew of fishing vessels under 15m.

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[17] https://www.gov.uk/maib-reports/flooding-and-sinking-of-potter-purbeck-isle-south-of-portland-bill-england-with-loss-of-3-lives

[18] https://www.gov.uk/maib-reports/capsize-and-sinking-of-mussel-dredger-charisma-in-carlingford-lough-near-rostrevor-pier-northern-ireland-with-1-person-injured-and-loss-of-1-life

[19] https://www.gov.uk/maib-reports/capsize-and-sinking-of-creeler-kirsteen-anne-off-oban-scotland-with-loss-of-2-lives

[20] https://www.gov.uk/maib-reports/capsize-and-sinking-of-prawn-trawler-amber-in-the-firth-of-forth-scotland-with-loss-of-1-life

The above recommendations were made before the introduction of the MAIB's closed loop tracking process. The revised process ensured that the actions taken by the recipients of recommendations were tracked and recorded.

In 2008, the MAIB safety study *Analysis of UK Fishing Vessel Safety 1992 to 2006*[21] made several recommendations to the MCA, one of which was to develop a plan to address the unacceptably high fatality rate in the fishing industry and work towards progressively aligning the requirements of the Small Fishing Vessel Code with the higher safety standards applicable under the Workboat Code.

The MCA accepted the recommendation with an initial target date for implementation of 1 January 2015.

MAIB report 02/2013 into the capsize and foundering of the fishing vessel *Heather Anne*[22] recommended that the MCA revise its guidance in MGN 427 (F) to provide clearer and more comprehensive guidance to surveyors and fishermen on the methods available to assess small fishing vessel stability.

The MCA accepted the recommendation with a target date for completion of 31 December 2016. This was subsequently revised to 31 December 2020.

MAIB report 29/2015 into the capsize and sinking of the stern trawler *Stella Maris* recommended that the MCA introduce intact stability criteria for all new and significantly modified decked fishing vessels of under 15m in length.

The MCA accepted this recommendation and stated that, *As part of our work to progressively align the standards of the Small Fishing Vessel Code with the Workboat Code, the MCA will consider the application of suitable stability standards for new and significantly modified vessels of under 15m*. The MCA's target date for the completion of this action was 31 December 2020.

MAIB report 15/2016 into the capsize and foundering of the fishing vessel *JMT* made a recommendation to the MCA to introduce stability criteria for all new and significantly modified decked fishing vessels of under 15m in length, and all existing vessels of under 15m to be marked using the Wolfson method or assessed by use of another acceptable method.

The MCA accepted this recommendation with a target date for completion of 31 December 2020.

MAIB report 06/2019 into the capsize and sinking of the fishing vessel *Nancy Glen* made recommendations to the MCA to include in its new legislation, addressing the stability of existing fishing vessels of under 15m, a requirement to undertake both a freeboard check and stability check and to introduce the requirement for stability criteria for all new and substantially modified vessels, validated by a 5-yearly lightship check.

The MCA accepted this recommendation with a target date for completion of 31 December 2020.

Many of these recommendations were actioned by the publication of MSN 1871 Amendment No. 2 (F) on 6 September 2021.

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[21] https://www.gov.uk/government/publications/fishing-vessel-safety-study

[22] https://www.gov.uk/maib-reports/capsize-and-sinking-of-under-12m-ring-netter-heather-anne-in-gerrans-bay-cornwall-england-with-loss-of-1-life

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 OVERVIEW

Nicola Faith foundered, apparently rapidly as the crew were unable to raise the alarm, when the vessel was heavily loaded with catch and fishing gear. The indications are that the vessel capsized to port and the crew were trapped on board and taken down with the vessel when it sank. This analysis section will look at why *Nicola Faith* foundered, the stability characteristics of the vessel, and why all three crew were lost.

2.3 SEARCH AND RESCUE

2.3.1 Overdue report

Nicola Faith was reported overdue more than 16 hours after the last iVMS transmitted position was received. The RNLI lifeboats and other coastguard assets found no debris in the water that could be linked to the vessel or crew, there was no oil slick observed or debris washed up on the shoreline. It is almost certain that *Nicola Faith*'s liferaft deployed correctly as the vessel sank, and had drifted outside of the search area before the search commenced.

2.3.2 Location of the crew

The fitting of the steel framework clad with plywood sheets, covering most of the working deck, combined with the volume of pots and catch stacked onto the deck and cat catcher of *Nicola Faith*, would have provided the crew with a congested working area, and a very limited opportunity for escape **(Figure 20)**. The information obtained from the iVMS indicated that they were hauling and processing a string of pots at the time of the accident, and therefore it is almost certain that all three crew were on deck. It is likely that, as the vessel quickly capsized, the three crew were trapped underneath the steel and plywood framework by ropes, pots, and bags of catch both during and after the accident. This is also further supported by the lack of a distress call, as *Nicola Faith*'s VHF radio was in the wheelhouse and not accessible from the deck. None of the crew were found in the 2 days of SAR asset searching; their bodies were washed ashore over a 3-day period, the first one found 44 days after the accident. A storm had passed through the area 3 days before the first body was found and it is likely that the wave action it created dislodged the bodies of all three crewmen from the wreck.

As the crew were not wearing PFDs they had no additional buoyancy to help them escape via any available deck exits.

For illustrative purposes only: not to scale

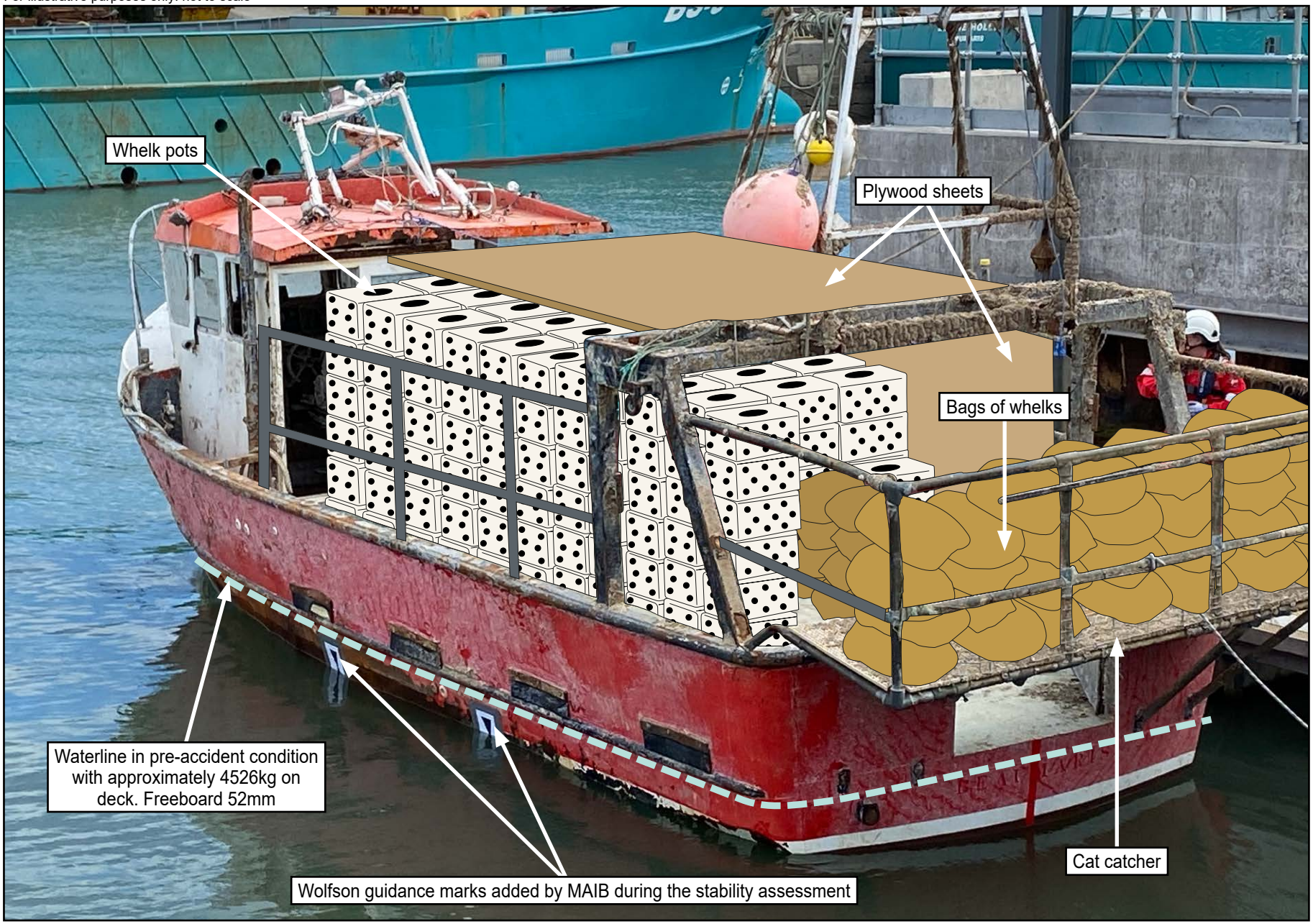


Figure 20: Possible loading condition of *Nicola Faith* before the accident

2.4 THE FOUNDERING

The investigation considered several potential causes of the foundering of *Nicola Faith*, which included:

- collision with another vessel
- flooding due to hull failure
- down-flooding through deck openings
- internal flooding due to pipework failure
- loss of stability.

No evidence was found to indicate that *Nicola Faith* had been in collision with another vessel. The rudder frame damage noted during the post recovery inspection was consistent with being caused by the vessel hitting the seabed after it sank, and the hull damage on the port side was most likely caused as the vessel rocked on the seabed for a prolonged period.

The engine room vent pipe noted as missing during the inspection was a steel pipe that had been welded through the deck, underneath the whelk riddle. It is most likely to have been ripped off by the whelk riddle at an indeterminate time either during or after the accident. The fish hold hatch cover was found to be displaced from the hatch opening. The fish hold was not routinely used to store catch and was found with spare gear inside. It is unlikely that the crew would open this hatch during normal fishing operations as it was close to the working area and would have posed a serious fall hazard. It is most likely that the fish hold hatch cover became dislodged during the capsize due to its broken locking mechanism.

Because the engine room hatch was found undamaged and secured in the closed position, it was considered highly unlikely as a source of down-flooding.

It is unknown whether the escape hatch, found open by divers, was habitually left unlatched, possibly to aid ventilation of the cabin area. The mode in which the capsize and foundering occurred, as outlined in section 2.5, meant that it was unlikely that the forward escape hatch was a route for down-flooding to have occurred.

The sea conditions were calm on the evening of the accident, with a very low sea swell. Down-flooding of water shipped onto the deck is thought to have been unlikely in the lead up to the accident.

Examination of the wreck once it had been landed ashore confirmed the watertight integrity of the hull and that all internal seawater pipework and hull fittings were undamaged and intact. This verified that *Nicola Faith*'s capsize was not caused by internal flooding as a result of compromised watertight integrity, and no evidence was found to indicate that flooding originated from any of these sources.

As a result of the evidence gathered during the dive survey, the volume of pots found attached to the vessel on the seabed, and the stability assessment, it is most likely that the foundering of *Nicola Faith* was caused by the vessel suddenly capsizing as a consequence of a loss of stability due to its loaded condition.

Nicola Faith had carried similar and heavier weight of catch previously without incident. On this occasion, the skipper was also moving multiple strings of pots to fresh grounds. The attempt to move four strings, having processed a significant catch volume that was then stacked on deck, not only added significant additional weight to the vessel but also resulted in a cramped and dangerous workspace. The additional 2521kg of fishing gear took the deck loading to more than a tonne over *Nicola Faith*'s previous highest landing total in recent times of 3436kg on 17 December.

2.5 THE CAPSIZE

The modifications to the vessel's structure and concrete ballast added to the engine room and fish hold gradually eroded *Nicola Faith*'s margins of stability to such an extent that, on 27 January 2021, the vessel sailed from port in its fully modified condition with dangerously low levels of positive transverse stability[23]. The margin of positive stability was likely further reduced when catch was stowed on both the stern cat catcher and on deck as the crew fished during the day, culminating at 1759 with an estimated 2090kg of catch on board. The storing of catch in the fish hold would have made a small improvement to the margin of positive stability and would have compromised the vessel's stability to a lesser extent. The relocation of strings of pots necessitated their stowage on deck.

The skipper's decision to relocate four strings of pots at the same time (2521kg) combined with the volume of catch (estimated as 2090kg) meant that *Nicola Faith* was probably carrying over 4.6t of catch and fishing gear on deck, and its already poor margin of positive stability had almost completely disappeared. Had the skipper restricted his loading to 1000kg, preferably stowed in the fish hold, *Nicola Faith* could have been operated within the Wolfson amber zone in calm seas, albeit with a low level of safety.

However, in the loaded condition on the day of the accident, any one or a combination of the following factors would have been sufficient to move the vessel to an unstable state:

1. The catch shifting across the deck, particularly to port, as the vessel turned and/or rolled.

2. A crew member walking across the deck.

3. Water, taken on board through freeing ports and transom aperture, moving across the deck.

4. A heel to port, resulting from *Nicola Faith* turning quickly to starboard.

5. Wave action, however small.

The evidence from the wreck site, indicates that *Nicola Faith* capsized to port, the side with the smallest down-flooding angle at 29°.

As *Nicola Faith* heeled to port the catch stowed on the starboard side of the main deck is likely to have shifted to port, making the capsize inevitable. The dive survey indicated that the majority of the pots fell out through the railings on the vessel's port

[23] Observation by naval architect within the report of full stability assessment on *Nicola Faith*.

side. The weight of the pots hanging out of the port side would have pulled the port quarter down lower in the water, further increasing the list. The vessel would then have started to flood, most likely into the fish hold through the access hatch in the deck, which had become dislodged during the capsize. The bulkhead penetrations between the fish hold and the engine room were not watertight, which would have allowed water to flood into the engine room once the fish hold filled up. The wheelhouse, followed by the forward cabin area, would have started to fill with water as the vessel listed to 29°, leading to *Nicola Faith* sinking.

2.6 SAFETY PREPAREDNESS

2.6.1 Emergency Position Indicating Radio Beacon and personal locator beacons

The lack of any VHF "Mayday" call, DSC distress alert or mobile phone call indicates that the crew were quickly overwhelmed by the accident. Their chances of an early rescue therefore relied on automated alerting systems.

The fitting of an EPIRB to *Nicola Faith* would have alerted the coastguard to the vessel's sinking, and would have provided them with a location for the accident. The search and rescue could then have been initiated some 16 hours earlier.

If an under 10m fishing vessel is not fitted with an EPIRB, then each crew member must be issued with and carry a PLB. If *Nicola Faith*'s crew had been carrying PLBs and been able to activate them, then it is possible that the coastguard could have been alerted to both their distress and location. However, because the capsize happened so quickly, it is unknown if the crew would have had time to activate any emergency location equipment.

It is unknown whether the skipper was aware of the grant funding, which was available between October 2017 and October 2019, for the provision of additional non-mandatory safety equipment or if he had made efforts to take advantage of it.

2.6.2 Liferaft

Nicola Faith's liferaft was found on 4 March, approximately 90 miles north of the accident scene at Kirkcudbright, and it might have been sighted on 24 February. It is therefore considered highly likely that the liferaft deployed correctly. From the time *Nicola Faith* sank to the vessel being reported overdue, the liferaft would have drifted for over 16 hours and was most likely not spotted because the wind had blown it outside the SAR area.

2.6.3 Personal flotation devices

In 2000, the MAIB made its first recommendation about the compulsory wearing of PFDs by fishermen working on deck. In November 2018, following the introduction of the ILO 188 mandatory requirements, the provision of PFDs was mandated and this requirement was promulgated in MGN 588 (F) *Compulsory Provision and Wearing of Personal Flotation Devices on Fishing Vessels*.

Evidence indicated that *Nicola Faith*'s crew did not routinely wear the auto inflate lifejackets that were noted during surveys and found on board after the accident by MAIB inspectors. It might have been perceived that the lifejackets may unexpectedly inflate in poor weather, but is more likely to be due to a belief that the wearing of a

lifejacket interfered with clothing and reduced the efficiency of potting operations. The skipper had previously been challenged on the lack of lifejacket use on board *Nicola Faith* but refused to admit that this was a problem. It is possible that, without the opportunity to learn from others with more experience, he regarded the safety of the operation on board *Nicola Faith* as sufficient for the fishing he was engaged in.

If the crew had routinely worn their lifejackets, they would have had a chance of floating to the surface had they escaped as the vessel capsized, even if unconscious. In seawater temperature of 6.4°C it is likely that the crew would have started to lose dexterity within 10 minutes, and consciousness between 30 minutes and 2 hours. They would have been unlikely to survive much beyond 2.5 hours immersed in the cold water[24]. However, if the coastguard had been alerted, it is likely that the search and rescue operations would have started well within that time.

Despite the wealth of campaigns and education disseminated by fishing safety organisations, some fishermen still do not routinely wear lifejackets while working on deck. Until this attitude changes, the avoidable tragic loss of fishermen to drowning will continue.

2.6.4 Training

The local training centre at Rhos-on-Sea was closed due to the COVID-19 pandemic; however, training was available in other parts of the country throughout this period. Neither Ross Ballantine nor Alan Minard had completed any of the mandatory fishing industry safety training courses. Attendance at these free basic training courses would have increased their awareness of the hazards and dangers they faced and exposed them to industry best practice, which may then have led them to challenge many of the normalised unsafe practices on board *Nicola Faith*.

2.7 MAXIMISATION OF YIELD

There is often limited time available to undertake activities on a fishing vessel. The mismatch between the time needed to complete tasks and the time available is usually only resolvable by increasing the time available, working faster or simplifying the task to reduce the time taken. *Nicola Faith*'s skipper took several actions to improve the vessel's fishing yield that compromised the safety of the vessel and those on board. These included:

- Developing and making lighter pots that could be emptied, rebaited and shot quicker than commercially available pots. This allowed the vessel to be loaded more heavily, more frequently.

- Insisting that the crew worked harder and faster using the lighter pots, which increased the physical demands on them and resulted in one crew member leaving the vessel with permanent nerve damage in his shoulder.

- Adding a larger cat catcher to store more bags of catch, which started the cumulative effects of the modifications that eroded the vessel's stability.

- Electing to relocate multiple strings of pots at the same time as carrying a full day's catch.

[24] Oakley and Pethybridge, 1997.

The skipper invested time to make *Nicola Faith* more efficient. These actions demonstrated his eagerness to optimise the vessel's potential to land as much catch as possible from each trip. While this is desirable for any maritime operation, it should never be such a focus that the safety of the vessel and its crew are overlooked or the risks from unwanted events, such as vessel capsize, remain unrecognised. The actions taken by the skipper to maximise *Nicola Faith*'s yield put the vessel at an increased risk of capsize and beyond the limits of its safe operation.

2.8 JUDGEMENT OF STABILITY

The information provided by the Wolfson stability assessment in 2017, coupled with the skipper's stability training, should have equipped the skipper with an understanding of how to load weight onto *Nicola Faith* safely and the effects of that load on its stability. The Wolfson assessment showed that in the depart port condition the vessel's freeboard would have been in the amber section, indicating a 'low level of safety'. Despite this, the skipper did not load catch into the fish hold and regularly loaded the vessel to the point where the deck was awash. *Nicola Faith* was regularly loading over 1000kg of catch, and over 70% of the catch landed in the 8 weeks before the accident weighed over 2000kg. *Nicola Faith* reportedly experienced at least two near capsizes due to heavy loading when Carl McGrath was on board as skipper. On one of those occasions, the catch was jettisoned to correct the vessel's stability and avoid capsize.

These events did not appear to have acted as a warning to the skipper and he did not alter his loading practices in response to these near misses. *Nicola Faith* was often so heavily loaded that water shipped onto the deck through the freeing ports, an indication that the vessel had very limited freeboard and diminished reserve stability. Because this happened frequently, the skipper may have come to regard it as normal, without realising how close to capsize his vessel was. The skipper may have considered the near capsize events as abnormal 'close-calls', the benefits of heavily loading the vessel with larger quantities of catch outweighing the risk of capsize, and the subsequent jettisoning of a small amount of catch being accepted as a one-off necessity.

2.9 OPPORTUNITIES TO INTERVENE

2.9.1 Modifications

The MCA's small commercial fishing vessel code required vessels to be presented for a safety inspection at 5-yearly intervals, or any other time at the discretion of the MCA. The next formal inspection of *Nicola Faith* to renew its fishing vessel certificate was due in 2022.

The two unannounced inspections were opportunities for the MCA to pause the operation and request a stability assessment for *Nicola Faith*. In December 2020, the local MCA surveyor had not considered the structural alterations made to the vessel substantial enough to trigger a further stability assessment. A roll test in the depart port condition would have highlighted that the vessel was tender and could have required further assessment of the vessel's stability.

2.9.2 Vessel owner

The informal agreement for the purchase of *Nicola Faith* meant that the ownership of the vessel and the fishing license remained the property of The Big Ship Limited until receipt of the final payment of £15,000 that was due in April 2021.

Had the vessel's registered owner taken joint responsibility for *Nicola Faith*'s onboard safety management in line with the ILO 188 Convention, underpinned by SI 2018 No.1106, a higher safety standard could have been maintained. This could have included mandatory crew safety training, installation of the required EPIRB, and enforcement of a requirement to wear PFDs when working on deck.

If the registered owner had no wish to be part of the operational safety of *Nicola Faith*, a formal agreement should have been in place to transfer this responsibility to the skipper, Carl McGrath, as required by SI 1997 2962 and the ILO 188 Convention and in line with Annex 1, section 1.1.2, of MGN 596 (F) *Fishing Safety Management Code: Helping to improve the management of safety on fishing vessels*, which came into force in November 2018.

SECTION 3 – CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. *Nicola Faith* foundered when the vessel was heavily loaded with catch and fishing gear. The indications are that the vessel suddenly capsized to port and the crew were trapped on board and taken down with the vessel when it sank. [2.2]

2. It is likely that the crew were trapped on board underneath the plywood deck canopy by the catch, pots and rope, during and after the vessel foundered, resulting in all three crew members drowning. [2.3]

3. It is almost certain that *Nicola Faith* capsized because it was loaded with catch and pots to the point of instability, and that it capsized suddenly with little warning. [2.4]

4. The skipper's decision to relocate four strings of pots at the same time (2521kg) combined with the volume of catch (estimated as 2090kg) meant that *Nicola Faith* was probably carrying over 4.6t of catch and fishing gear on deck, and its already poor margin of positive stability had almost completely disappeared. If the skipper had restricted his loading to about 1000kg and preferably stowed at least part of this in the fish hold, *Nicola Faith* could have been operated within the Wolfson amber zone, in calm seas, albeit with a low level of safety. [2.5]

5. *Nicola Faith* was habitually operated in an unsafe manner, with heavy loads of catch stowed on both the deck and the cat catcher. This resulted in the vessel having very limited freeboard and a reduced margin of positive stability. [2.7]

6. Numerous modifications were made to *Nicola Faith* that collectively eroded its margin of stability. MCA surveyors were aware that several modifications had been made to the vessel but did not consider them significant enough to trigger a stability assessment. [2.5] [2.9]

7. Although the skipper had experienced at least two near capsize events when *Nicola Faith* was heavily loaded, and he had attended stability awareness training, he prioritised the benefits of heavily loading *Nicola Faith* over the risk of capsize. [2.8]

8. The crew's chance of survival was reduced by the vessel not being fitted with an EPIRB, not having PLBs on board, and PFDs not being worn by the crew. [2.6]

SECTION 4 – ACTION TAKEN

4.1 MAIB ACTIONS

The **MAIB** has issued a safety flyer to the fishing industry **(Annex A)**.

4.2 ACTIONS TAKEN BY OTHER ORGANISATIONS

The **Maritime and Coastguard Agency** has in response to the MAIB recommendations listed at 1.9.6, on 6 September 2021, published MSN 1871 Amendment No.2 (F) *The Code of Practice for the Safety of Small Fishing Vessels of Less than 15m Length Overall*, which includes the following requirements:

- As part of the conditions for issue of a Small Vessel Fishing Certificate, an out of water inspection at intervals of not more than 5 years.

- New stability assessment requirement that includes, but is not limited to, for existing vessels, a roll test or heel test to be repeated every 5 years.

- Any vessel that carries out modifications or alterations or changes fishing method to one that it has not previously undertaken must inform the MCA to seek approval and comply with the relevant stability requirements applicable to New Vessels (2021) employing the proposed category of fishing.

- New vessels that intend to carry over 1000kg of catch must carry out a stability assessment.

SECTION 5 – RECOMMENDATIONS

The **Maritime and Coastguard Agency** is recommended to:

2022/125 Revise the wording in MSN 1871 Amendment No. 2 (F) *The Code of Practice for the Safety of Small Fishing Vessels of Less than 15m Length Overall* to refer to a load limit rather than a catch limit.

2022/126 Review and enhance the guidance to surveyors contained in MSIS 27 Chapter 3 to clarify what level of modification triggers further investigation into a vessel's stability.

The Big Ship Limited is recommended to:

2022/127 Ensure that a written agreement is in place to identify the organisation or person with responsibility for the operation of any vessels it may own.

Safety recommendations shall in no case create a presumption of blame or liability

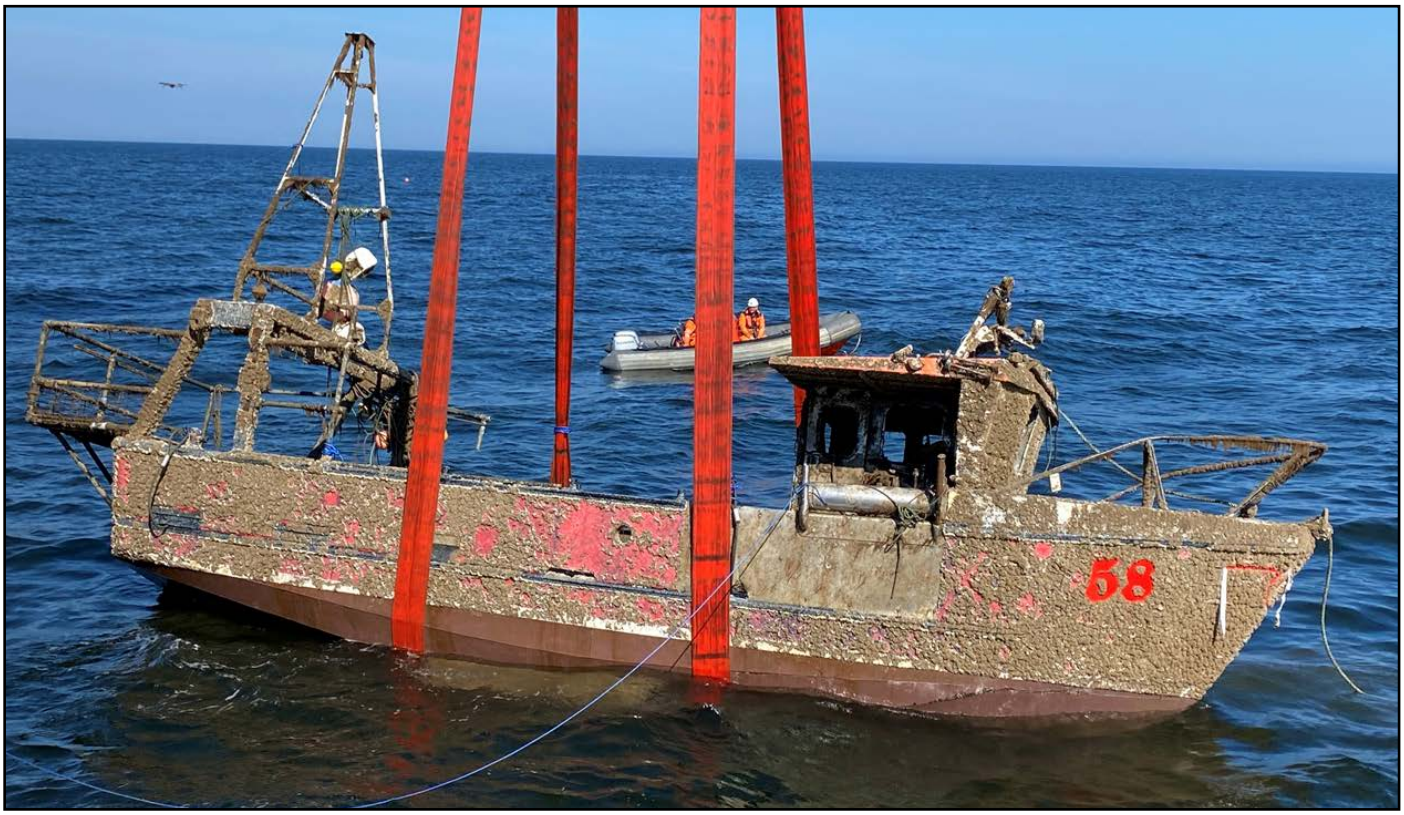
MAIB safety flyer to the fishing industry

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

SAFETY FLYER TO THE FISHING INDUSTRY

Foundering of the whelk potter *Nicola Faith* (BS58), resulting in the loss of all three crew, in Colwyn Bay, North Wales, on 27 January 2021



Nicola Faith

Narrative

On the 27 January 2021, the 9.81m whelk potter *Nicola Faith* was fishing about 2-3 miles offshore and relocating whelk pots. Loaded with a day's catch and four strings of pots (approximately 240 in total) to be relocated, the vessel capsized and foundered with the loss of all three of its crew.

The vessel was not equipped with an Emergency Position Indicating Radio Beacon (EPIRB) nor were the crew wearing personal locator beacons (PLBs). The absence of this mandatory safety equipment meant the alarm was not raised for some 16 hours after the foundering, and the subsequent search and rescue operation found no trace of *Nicola Faith* or its crew.

The MAIB investigation found that the boat had undergone extensive modifications in the 2 years before the accident, none of which had been approved by the Maritime and Coastguard Agency (MCA). The modifications had eroded its stability safety margin and this meant that, when combined with an estimated 2090kg of catch plus a weighed 2521kg of fishing gear on board at the time of the accident, the vessel had a very small amount of positive stability. The working deck was cluttered and partially covered by a canopy made from steel tubes and plywood sheets. The vessel capsized quickly; this is likely to have trapped the crew on board and they were probably taken down with the vessel when it sank.

Safety lessons

1. When *Nicola Faith* was built it had adequate stability for its designed purpose. The unauthorised modifications carried out to the vessel severely compromised its stability. Thought must be given to how planned modifications will affect a vessel's stability and may involve the services of a naval architect to accurately calculate what effect the additions or changes to the vessel will have on the stability safety margin. Additionally, permission must be sought from the MCA before any significant modifications are undertaken.

2. Skippers should have a good understanding of their vessel's underlying stability and how this can change during fishing operations. Simple roll tests, heel tests, or a Wolfson assessment will provide skippers with the basic information. Loading a vessel heavily with catch, and then adding retrieved fishing gear, can quickly render a vessel unstable.

3. EPIRBs and/or PLBs are mandatory safety equipment for very good reason. Their purpose, to transmit the location of an incident and thereby focus any search and rescue effort, undoubtedly saves lives. A PFD can keep a casualty afloat sufficiently long enough for the rescue services, or their own vessel, to find them.

This flyer and the MAIB's investigation report are posted on our website: www.gov.uk/maib

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Extract from The United Kingdom Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an such investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This safety flyer is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

Marine Accident Report

INVESTORS IN PEOPLE