ACCIDENT REPORT

Report on the investigation of

the capsize and foundering of the fishing vessel

Angelena (BM271)

south-east of Exmouth, England

on 18 June 2021

MAIB

MARINE ACCIDENT INVESTIGATION BRANCH

VERY SERIOUS MARINE CASUALTY REPORT NO 8/2024 AUGUST 2024

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

°	-	degrees
°C	-	degrees Celsius
AIS	-	automatic identification system
ALB	-	all-weather lifeboat
COVID-19	-	coronavirus
EPIRB	-	Emergency Position Indicating Radio Beacon
ftm	-	fathom (a measurement of 1.8m, used when referring to depth of water or lengths of fishing gear)
HRU	-	hydrostatic release unit
kts	-	knots
LOA	-	length overall
m	-	metre
MCA	-	Maritime and Coastguard Agency
Met Office	-	Meteorological Office, the UK national weather service
MGN	-	Marine Guidance Note
MGN 313 (F)	-	Keeping a Safe Navigational Watch on Fishing Vessels
MGN 343 (M+F)	-	Hydrostatic Release Units (HRU): – Stowage and Float Free Arrangements for Inflatable Liferafts
MGN 411 (M+F)	-	Training and Certification Requirements for the Crew of Fishing Vessels and their Applicability to Small Commercial Vessels and Large Yachts
MGN 503 (F)	-	Procedure for Carrying out a Roll or Heel Test to Assess Stability for Fishing Vessel Owners and Skippers.
MGN 628 (M+F)	-	Construction and Outfit Standards for Fishing Vessels of less than 15m Length Overall
mm	-	millimetre
MSIS	-	Marine Survey Instructions for the Guidance of Surveyors
MSN	-	Merchant Shipping Notice
MSN 1467 (M)	-	Emergency Position-Indicating Radio Beacons, Float Free Arrangements for Liferafts and Lifejackets on Fishing Vessels
MSN 1871	-	The Code of Practice for the Safety of Small Fishing Vessels Amendment No.1 (F) of less than 15m Length Overall
MSN 1871	-	The Code of Practice for the Safety of Fishing Vessels of less Amendment No.2 (F) than 15m Length Overall

nm	-	nautical mile
PFD	-	personal flotation device
PLB	-	personal locator beacon
RL	-	Registered Length
RNLI	-	Royal National Lifeboat Institution
Seafish	-	Sea Fish Industry Authority
SFVC	-	Small Fishing Vessel Certificate
STCW-F	-	International Convention on Standards of Training, Certification and Watchkeeping for Fishing Vessel Personnel 1995
t	-	tonne
UTC	-	universal time coordinated
VCB	-	vertical centre of buoyancy
VCG	-	vertical centre of gravity

TIMES: all times used in this report are UTC+1 (British Summer Time) unless otherwise stated.

Image courtesy of TelsWeb (YouTube video)

Angelena

SYNOPSIS

At 1156 on 18 June 2021, the fishing vessel *Angelena* (BM271) capsized and foundered approximately 8 nautical miles south-east of Exmouth, England. The skipper, who was operating the vessel alone, had been attempting to land a catch on deck at the time. The skipper managed to swim free, inflate and board the liferaft and then use their mobile telephone to call the coastguard. They were rescued around 40 minutes later by the range safety boat *Smit Cerne*, which was nearby.

Despite several modifications to the vessel since its build, *Angelena* was not required to undergo a stability assessment nor had recommended roll or heel tests been conducted to identify potential stability issues. Further, no guidance was available for operating a vessel of *Angelena*'s size alone and a crew of more than one person was known to have formed the basis of its risk assessments. The low fuel levels and excessive load in the suspended net lowered the margins of stability, which caused the rapid capsize and loss of *Angelena*.

Although experienced and qualified the skipper was unaware of the vessel's accumulated stability risks and the hazards they posed; the skipper was fortunate to enter the water uninjured and be able to inflate and board *Angelena*'s liferaft and raise the alarm.

Recommendations have been made to the Maritime and Coastguard Agency to improve fishers' understanding of stability, require risk assessments that define minimum crewing levels for fishing operations and align definitions across its notices and publications. A recommendation has also been made to the skipper of *Angelena* to attend the Seafish Advanced Stability Awareness course.

SECTION 1 – FACTUAL INFORMATION

1.1 PARTICULARS OF *ANGELENA* AND ACCIDENT

VESSEL PARTICULARS	
Vessel's name	*Angelena*
Flag	UK
IMO number/fishing numbers	BM271
Type	Decked stern trawler
Registered owner	Privately owned
Manager(s)	Privately managed
Construction	Steel
Year of build	1988
Length overall	13.99m
Registered length	11.82m
Gross tonnage	19.38
Minimum safe manning	Not applicable
VOYAGE PARTICULARS	
Port of departure	Brixham, England
Port of arrival	Brixham, England (intended)
Type of voyage	Coastal
Cargo information	Fish
Manning	1
MARINE CASUALTY INFORMATION	
Date and time	18 June 2021 at 1156
Type of marine casualty or incident	Very Serious Marine Casualty
Location of incident	8nm south-east of Exmouth, England
Place on board	Deck
Injuries/fatalities	None
Damage/environmental impact	Vessel total constructive loss, negligible harm to the environment.
Ship operation	Fishing
Voyage segment	Mid-water
External & internal environment	Wind northerly, force 4 to 5; sea state 3 to 4 offshore; sea surface temperature 16°C; good daytime visibility.
Persons on board	1

1.2 NARRATIVE

At approximately 0530 on Friday 18 June 2021, *Angelena*'s skipper arrived in Brixham Harbour, England, to prepare the vessel for the day's fishing. Due to the challenge of finding crew, it was the second day in a row that the skipper had been operating the vessel single-handed.

At 0600, the skipper attempted to take fuel on board from the Brixham Fish Market fuel pump but was unsuccessful as it was not working. At around 0640, *Angelena* departed harbour at 7 knots (kts) on a north-easterly course **(Figure 1)**, heading to Lyme Bay to fish for plaice and ray. The vessel's fish boxes were carried on the upper deck and the fish hold was empty.

At around 1030, *Angelena* had completed the first trawl and the skipper started hauling the fishing gear **(Figure 2)**. After recovering most of the sweeps to the deck winch it became evident to the skipper that there was a very heavy load in the net and, as they started to recover the final 70 fathoms (ftm) of combination rope, bridles and spans, *Angelena*'s powered net drum struggled under the excessive load. The skipper then varied *Angelena*'s course and speed to wash out any accumulated mud, sand, or moss[1] from the net and lighten the net load. *Angelena* unintentionally entered a mussel farm site during these manoeuvres. At 1120, when the net was at the midway point of being recovered, *Angelena*'s skipper changed course to the south-east to exit the mussel farm on a track clear of the numerous surface buoys. By 1124, the vessel had exited the mussel farm and was on a southerly course. Noting that the alterations of course and speed had reduced the weight in the net a little, the skipper then connected the Gilson rope to the lazy decky[2], which was attached to the cod end. The Gilson rope parted as it was hauled in using the starboard drum end of *Angelena*'s deck winch. The skipper fetched a new Gilson rope from the fish room on the deck below; they then returned to the working deck, climbed the aft gantry and rigged the new Gilson rope before restarting recovery of the cod end, managing to hoist a partial load up and over the deck.

The first load from the cod end was released onto the deck and noted to contain approximately 1.5 tonnes (t) of mud, sand, gravel, moss, starfish and some dogfish and plaice. At least another 1.5t was yet to be recovered from the net. By 1131, *Angelena* had settled onto a south-westerly course with the wind and sea on the vessel's starboard quarter. During the skipper's final attempt to recover the cod end the main load was on the Gilson rope, rigged over the starboard side roller on top of the aft gantry. The cod end cleared the sea surface and slewed to starboard as the skipper tied off the Gilson rope on a cleat fitted to the starboard aft end of the wheelhouse. As the skipper went aft to bring the cod end on board they noticed some of the catch on deck shift to starboard, felt *Angelena* heel over and observed water pouring over the starboard quarter and onto the vessel.

At 1156, *Angelena* capsized rapidly to starboard and the skipper floated clear of the stern. *Angelena* inverted completely, sinking by the bow before coming to rest near upright on the seabed. The skipper, who was unharmed and wearing a personal flotation device (PFD), swam through floating fish boxes and pound boards to *Angelena*'s liferaft, which had floated free. The skipper inflated and boarded the

[1] A local term used to describe both sea grass and seaweed, which can block openings in nets and stop sand, mud and gravel from being washed clear. Accumulations of sand, mud and gravel greatly increase the weight of a catch.

[2] A rope line connected to a cinch (or cut-off strop) on the net used to tighten/close off a section of the cod end. This had the effect of splitting the load in the cod end and allowed the catch to be brought on board in at least two separate loads. Only on hoisting the final load would the entire net come clear of the water.

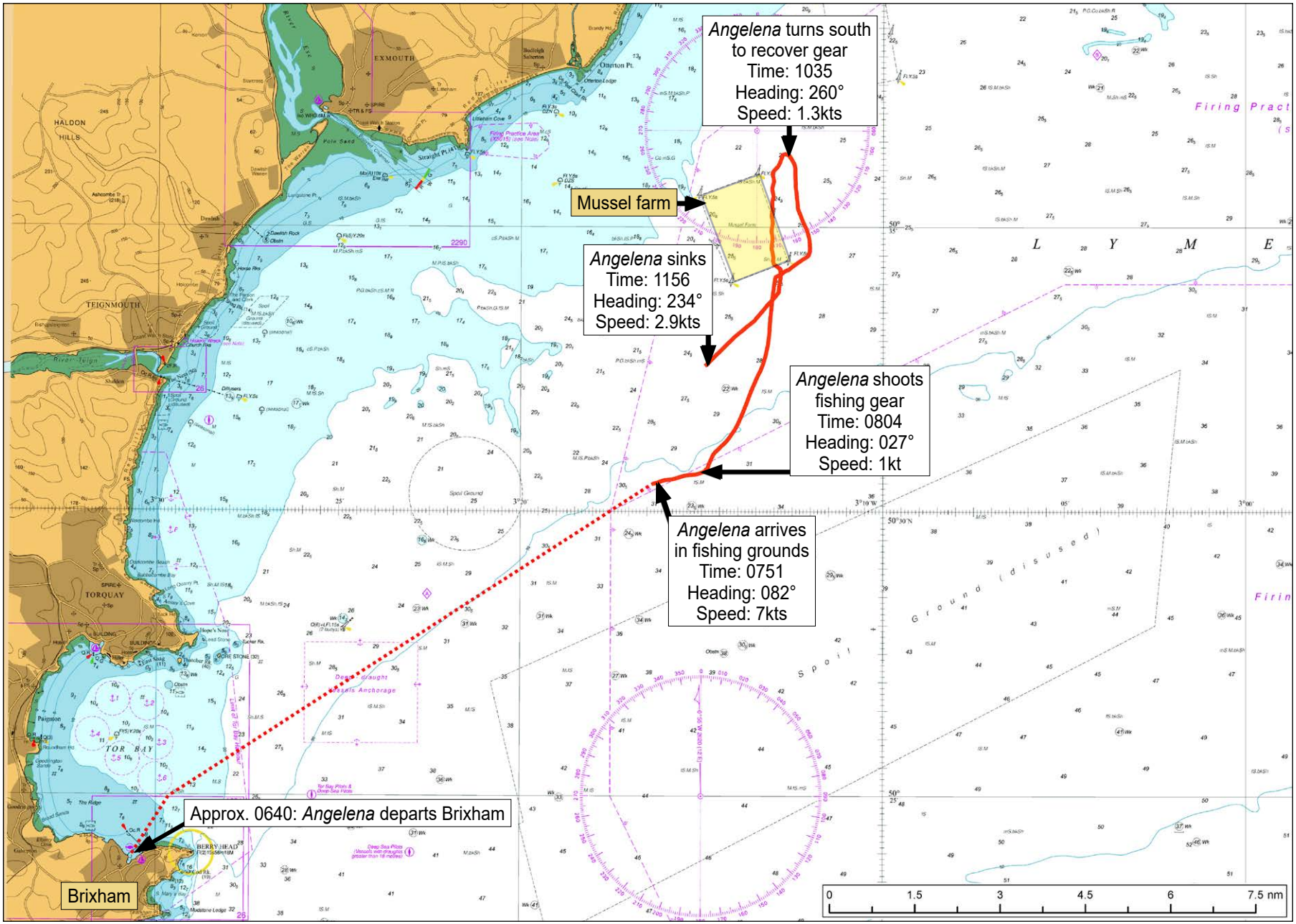

Figure 1: 18 June 2021 navigational track for *Angelena*

For illustrative purposes only: not to scale

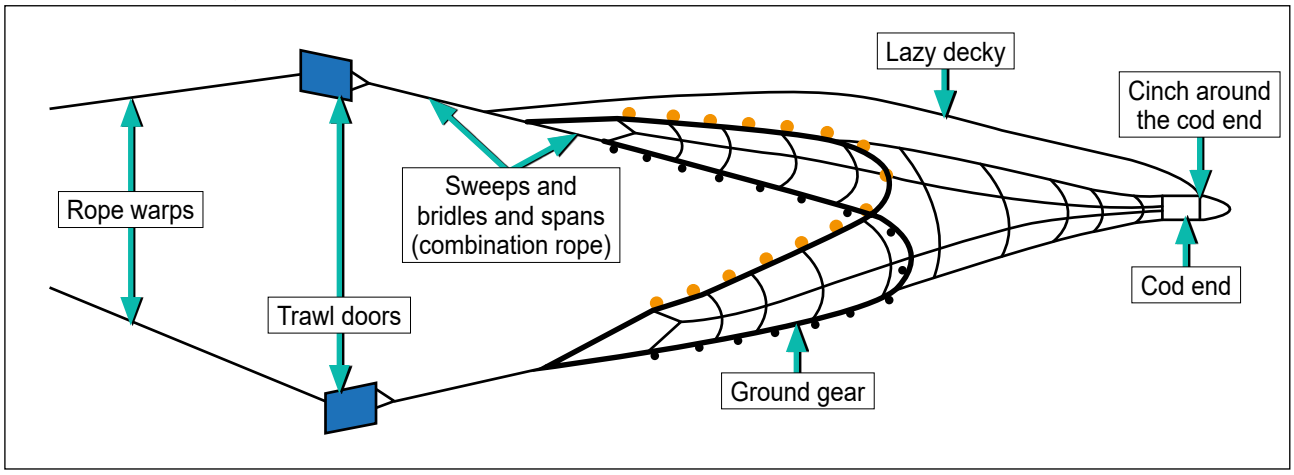

Figure 2: Layout of fishing gear

liferaft, then inflated their PFD and successfully activated the automatic identification system (AIS) enabled personal locator beacon (PLB) fitted to the PFD. At 1202, *Angelena*'s Emergency Position Indicating Radio Beacon (EPIRB) and the skipper's PLB were transmitting. At 1206, the skipper used their mobile phone to make a distress call to the coastguard.

By 1211, the coastguard had tasked the Exmouth-based Royal National Lifeboat Institution (RNLI) all-weather lifeboat (ALB) and a rescue helicopter to the scene. The crew of the range safety patrol vessel *Smit Cerne* heard the call between the coastguard and the RNLI and closed in on the skipper's position. At 1238, the crew of *Smit Cerne* recovered *Angelena*'s uninjured skipper from the liferaft. The skipper was transferred from *Smit Cerne* to the ALB and taken ashore.

1.2.1 Environmental conditions

On 18 June 2021, the wind strength was northerly force 6[3], dropping to force 4 or 5, and had decreased to force 3 by the end of the day. The associated seas were 2.5m, reducing to 1.5m in the force 4 winds, and the water temperature was 16°C . Visibility was good, occasionally moderate. These conditions matched the weather forecast issued by the Meteorological Office (Met Office) that the skipper had listened to before setting off.

The accident site was known to have a soft seabed that could cause fishing nets to become clogged with sand or mud. British Geological Survey maps and UK Hydrographic Office nautical chart BA3315 indicated that the seabed in this area was variously composed of gravelly, muddy sand and mixtures of fine sand, mud and shells.

1.3 *ANGELENA*

1.3.1 General description

Angelena was a 13.99m length overall (LOA) steel-hulled stern trawler built in 1988 by Newbury Engineering Limited in Newhaven, England. *Angelena* was operated by Leach Fishing Enterprises until September 1997, changing hands again in November 2001 before being purchased by the skipper in January 2004.

[3] Classified by the Beaufort scale and used by the Met Office to issue marine weather forecasts on behalf of the Maritime and Coastguard Agency (MCA).

At build, the main deck of *Angelena* comprised an accommodation escape hatch, wheelhouse, hydraulic deck winch and gantry with a powered net drum. A raised gunwale was fitted around the main deck, aft of the wheelhouse. The below deck arrangement consisted of crew accommodation, a fish room and the engine room. The underwater profile of the vessel was that it had a deep bow section, single skeg that ran aft to the conventional single screw propeller and blade-type rudder. The hull rose either side of the aft end of the skeg, such that the stern of the vessel had a low underwater volume.

1.3.2 Modification summary

The MCA's Consultative Marine[4] files for fishing vessels of less than 15m LOA were established in July 2010 and there was missing detail in the formal records kept for *Angelena* before January 2014.

The vessel had undergone a series of exterior modifications in its lifetime **(Figure 3)**, which included:

- removal of the original midship derricks
- extension of the wheelhouse mast
- addition of a large, powered net drum to the aft gantry
- relocation of the radar from the wheelhouse roof to the aft gantry
- addition of guardrails to raise the bulwark height to at least 1000mm[5]
- removal of the steel hydraulic deck winch cover
- multiple engine changes, the most recent being January 2014.

The investigation did not establish what internal modifications had been made to *Angelena* between 1988 and 2021.

1.3.3 Owners and crewing arrangements

Angelena was routinely operated by the skipper and two crew during winter months, and by the skipper and one crew member in the summer. The skipper occasionally operated *Angelena* single-handedly as it was difficult to both obtain and retain crew. Reportedly, this was due to job opportunities on wind farm boats, the hard nature of the fishing industry and fewer overseas crew being available since both the coronavirus (COVID-19) pandemic and the UK's exit from the European Union.

A new crew member had not shown up for work on the day before the accident so the skipper had decided to sail alone until the weekend, when they planned to find some more crew.

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[4] Consultative Marine files are an MCA record of construction, inspection, survey and modifications of vessels.

[5] To comply with Marine Guidance Note (MGN) 628 (M+F) Construction and Outfit Standards for Fishing Vessels of less than 15m Length Overall.

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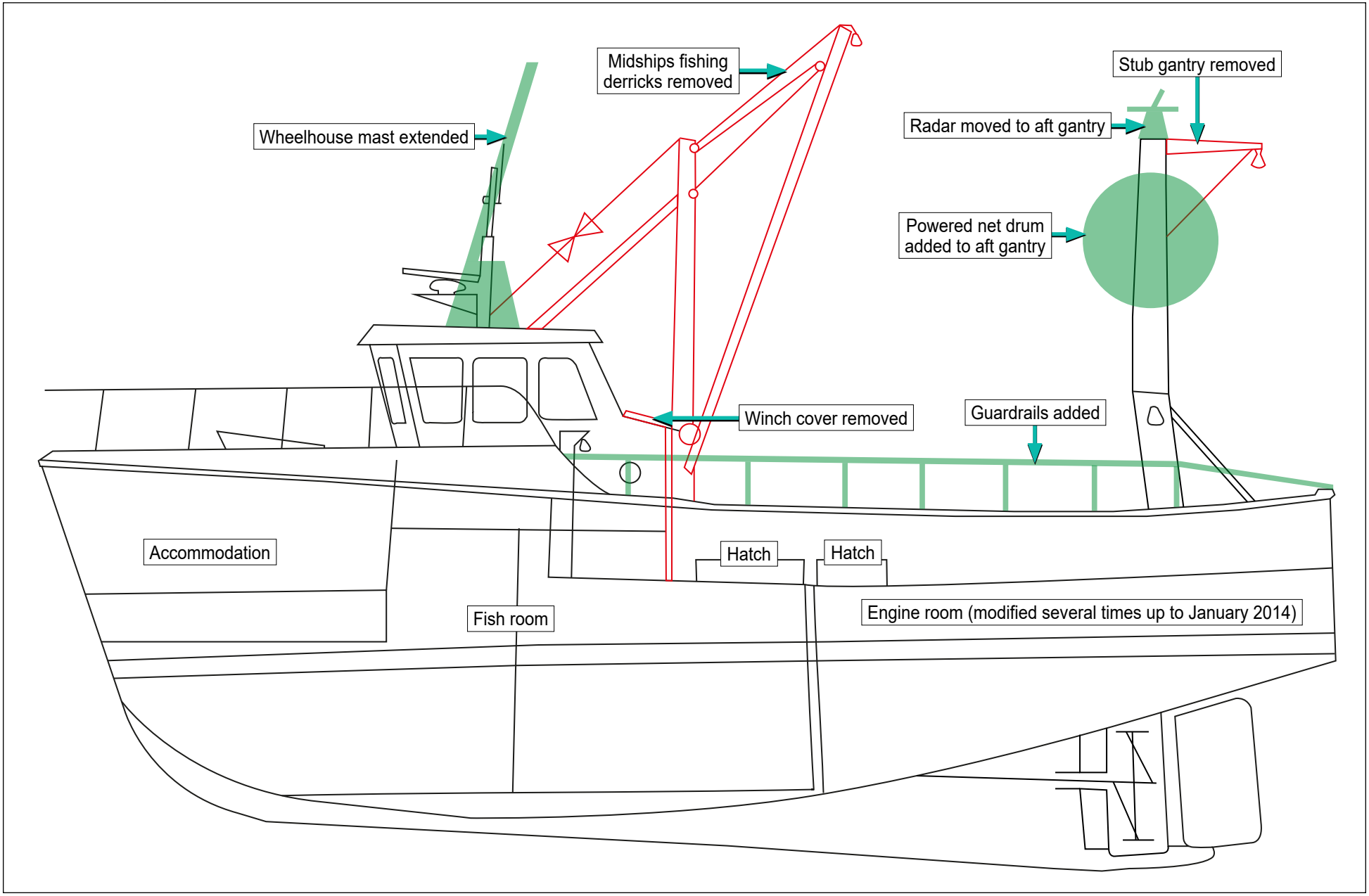

Figure 3: *Angelena* modifications from 1988 to 2021

The skipper had more than 30 years' fishing experience, over half of which was on board *Angelena*. They were qualified to operate an under 12m fishing vessel and, in 2006, had attended the Seafish[6] mandatory Safety Awareness and Risk Assessment course and one-day, non-mandatory, Intermediate Stability Awareness training. In early 2020, during COVID-19 restrictions, the skipper had completed a 30-hour MCA-approved engine, sea survival and first aid course.

1.3.4 Lifesaving equipment

Angelena was equipped with:

- a four-person liferaft, which was stored in a basket on the aft end of the wheelhouse roof. It was untethered and no hydrostatic release unit (HRU) was fitted;
- an EPIRB housed in a float-free bracket fitted to the port side of the mast; and
- two life rings.

At the time of the accident, the skipper was wearing a manually operated PFD with the crotch strap secured. The PFD was fitted with an AIS PLB. All of the lifesaving equipment was in date for service and functioned as it was designed to.

1.3.5 Liquid state

Angelena sailed from Brixham Harbour with an estimated 400 litres of fuel on board, which was 9% of its 4,500-litre capacity.

The contents of *Angelena*'s two 135-litre freshwater tanks below the main deck aft and the diameter of the cross-connecting pipework were unknown.

1.4 VESSEL OPERATION

1.4.1 General

Angelena operated year-round in the south-west of the English Channel, stern trawling for a wide range of fish using a single demersal[7] net. The largest catches were trawled from late August until early December and then again in April and May. The skipper routinely landed around 2t of fish, occasionally increasing to over 9t, all of which were performed without incident.

1.4.2 Trawl recovery sequence

The fishing gear was typically recovered after around 2 hours of trawling and the process for this followed a standard sequence, detailed at **Table 1**.

When *Angelena* was operating with two crew or more, one crew member simultaneously controlled the deck winch and the powered net drum from the wheelhouse while a second crew member managed the handling of the trawl doors, net, Gilson rope and cod end from the aft deck. This allowed the swift recovery of the catch in several loads appropriate to the size of catch. Between loads, the crew then sorted and stowed the catch and kept the deck clean of any accumulated mud, sand or rocks.

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[6] Seafish is a non-departmental public body that supports and provides training to the UK seafood industry.

[7] A cone-shaped trawling net used to catch demersal fish species, which live on or near the seabed.

Activity	Controlled from	Remarks
The rope warps were hauled in until the trawl doors came up to the blocks.	Wheelhouse	The main drums on the hydraulic deck winch were used.
The port and starboard trawl doors were connected to their respective safety chains.	Deck	The safety chains immobilised the trawl doors once disconnected from the rope warps.
The rope warps were slackened off until the weight was on the safety chains.	Wheelhouse	The main drums on the hydraulic deck winch were used.
The first set of two trawl door clips was disconnected.	Deck	
The rope warps were hauled until the second trawl door clips came clear.	Wheelhouse	The main drums on the hydraulic deck winch were used.
The second set of trawl door clips was disconnected.	Deck	
The sweeps section of the combination rope were hauled until the clips for the bridles and the spans were recovered.	Wheelhouse	The main drums on the hydraulic deck winch were used for the first 100 fathoms[8] of combination rope, the last 50 fathoms of combination rope was recovered to the powered net drum.
The net was disconnected from the combination rope and then connected to the powered net drum.	Deck	
The combination rope was hauled until the lazy decky clip was recovered.	Wheelhouse	The net drum was used for this, with the lazy decky being about 3 fathoms of rope in length.
The inboard end of the lazy decky was disconnected and made ready to connect the Gilson rope.	Deck	
The last part of the bridles and spans was hauled in.	Wheelhouse	The powered net drum was used.
The net was hauled until the cod end was at the sea surface.	Wheelhouse	The powered net drum on the aft gantry was used. The net was guided onto the drum by varying the heading of the vessel.

[8] The skipper measured lengths of fishing gear in fathoms, with one fathom measuring 1.8m or 6 feet.

Activity	Controlled from	Remarks
The net was recovered using the Gilson rope on the starboard drum end of the hydraulic deck winch.	Wheelhouse and deck	The hydraulic deck winch was operated from the wheelhouse. The Gilson rope was managed from the deck using the drum end of the hydraulic deck winch.
The cod end was recovered in several individual loads.	Wheelhouse and deck	The lazy decky was used to cinch the cod end and split the catch into several small loads. The cinched cod end was lifted over the aft deck with the rest of the cod end remaining in the water. The cinched cod end was opened, emptied and then closed off before the cinch was released and the cod end refilled with the remaining catch. The deck was cleared between loads (catch boxed and stowed and any bycatch and sand washed off the deck).
The net was either readied for the next trawl or stowed when the cod end was completely empty.		

Table 1: Trawl recovery method

1.4.3 Trawl lifting arrangement

The trawling net was lifted from two positions **(Figure 4)** on *Angelena*'s main deck: the powered net drum for small loads; and a Gilson rope rigged 5.3m above deck level (5.6m above the waterline) for large loads and to bring the cod end over the deck. Large cheek plates were fitted to either end of the powered net drum and guided the net as it was hauled; when the powered net drum was full there was no device to restrict transverse motion of the cod end.

1.4.4 Risk assessments

The operational risk assessments for *Angelena* were held on board in paper form and were lost with the vessel, although it is known that these documents reflected *Angelena* being operated by a skipper and two crew rather than single-handed.

For illustrative purposes only: not to scale

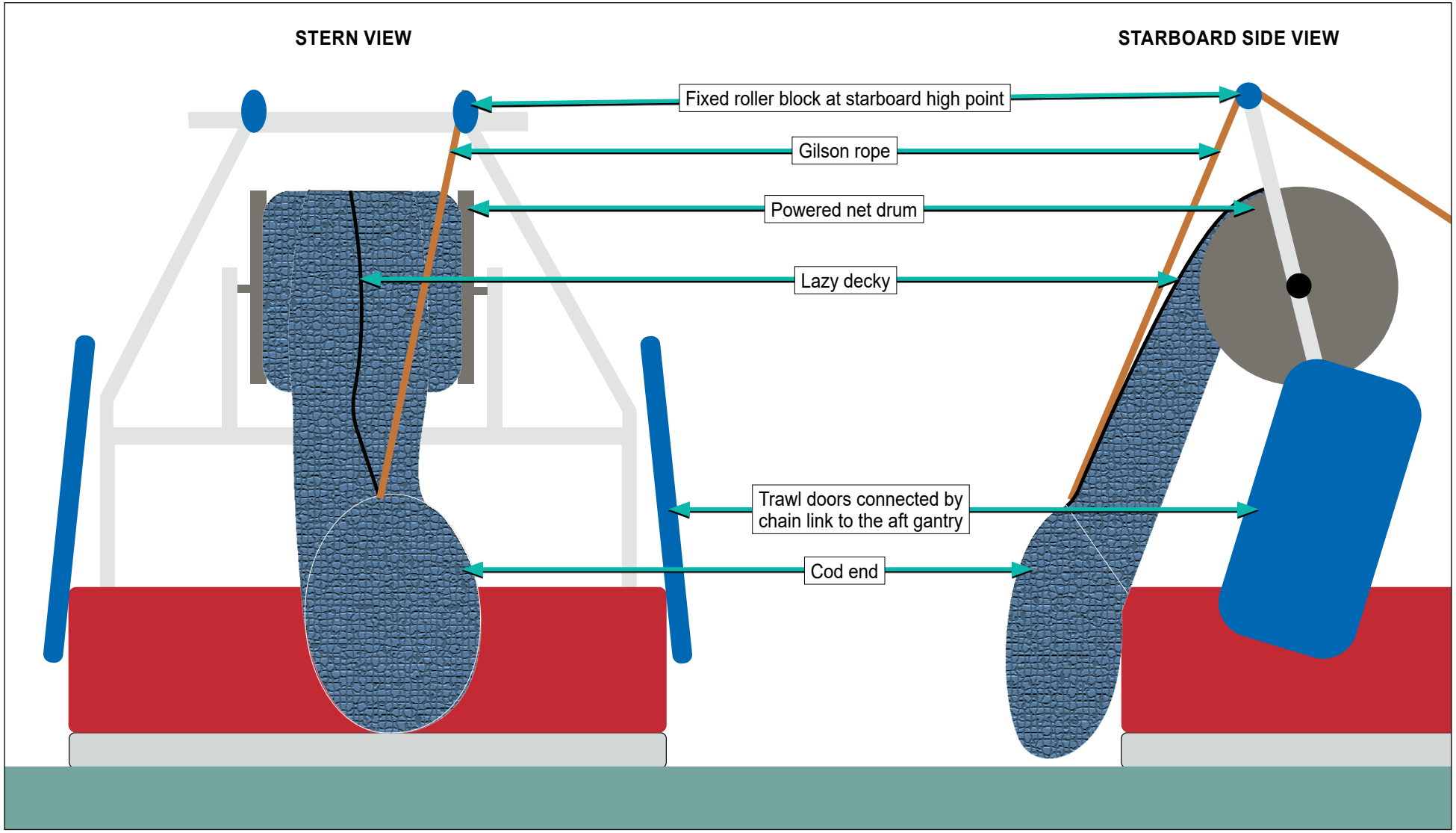

Figure 4: Cod end lifting arrangement

1.5 POST-ACCIDENT DIVE SURVEY

1.5.1 General

The insurer of *Angelena* commissioned a dive survey of the wreck, which was conducted on 4 August 2021. The divers took several photographs and videos when they found the vessel at a depth of 29m, resting on its keel and listing approximately 15° to starboard.

1.5.2 Findings

The information obtained from the dive survey of *Angelena* **(Figure 5)** established that:

- the hull was intact;
- the fish room and engine room hatches were closed but not secured;
- the accommodation escape hatch was fully open;
- the watertight wheelhouse door was open;
- of the six freeing ports inspected, none were fully open[9]; the remaining two freeing ports were obscured by thick protective rubber sheeting and could not be seen;
- the cod end was draped around the starboard trawl door;
- several of the wheelhouse windows were broken and the engine room soft patch had imploded;
- both trawl doors were secured to the aft gantry and the Gilson rope was still in place; and
- no pound boards were on board.

[9] Two were hinged and operated correctly to allow easy egress of water from the deck, three were seized shut. The remaining freeing port was stuck slightly open.

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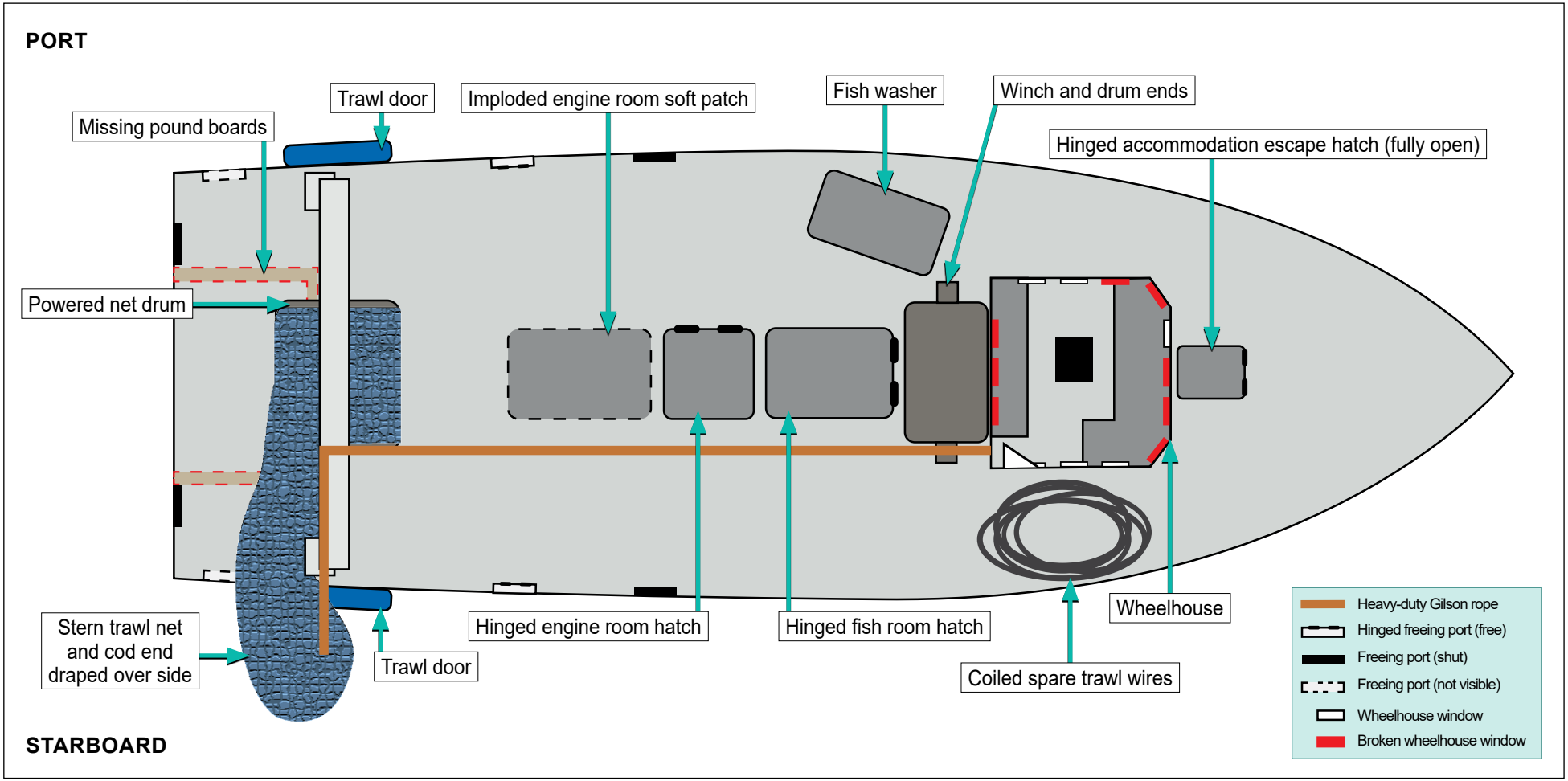


Figure 5: Detail from the 4 August 2021 dive survey

1.6 REGULATIONS AND GUIDANCE

1.6.1 Fishing vessel operation

Published in November 2018, Merchant Shipping Notice (MSN) 1871 Amendment No.1 (F) – The Code of Practice for the Safety of Small Fishing Vessels of less than 15m Length Overall (the Code) was in force at the time of the accident. In paragraph 4.37 of its Additional Guidance section, the Code stated:

> *The following control measures shall be installed for restricting moving masses (on vessels with trawl doors or codends):*
>
> *(i) devices to immobilise the trawl doors.*
>
> *(ii) devices to control the swinging motion of the codend.* [sic]

On risk assessments, paragraph 4.5 of the section noted that:

> *If there has been a change of fishing method or operational practice, the assessment must also be reviewed accordingly.*

The Code did not mandate minimum crewing levels for fishing vessels of less than 15m LOA.

MGN 313 (F) – Keeping a Safe Navigational Watch on Fishing Vessels –detailed the requirements for skippers of fishing vessels *to maintain a proper navigational watch at all times*. It also stated that, *the wheelhouse must not be left unattended at any time*.

1.6.2 Lifesaving equipment

The Code required fishing vessels operating 60 nautical miles (nm) to less than 150nm from a safe haven to be fitted with:

> *float free arrangements (hydrostatic release units) so that the liferafts float free, inflate and break free automatically.*

Fishing vessels operating less than 60nm from a safe haven were required to be fitted with liferafts that were:

> *in a float free arrangement so that the liferafts float free, inflate and break-free automatically.* [sic]

Published in April 2007, MGN 343 (M+F) Hydrostatic Release Units (HRU) – Stowage and Float Free Arrangements for Inflatable Liferafts – provided *guidance on the securing, stowage and launching of liferafts, and the fitting of the most common types of Hydrostatic Release Units*. [sic]

On the stowage of liferafts and HRUs for vessels operating in shallow waters, paragraph 2.6 indicated that:

> *On small ships, which operate in only 'favourable weather'…, it may be practicable or preferable to arrange for liferafts to float free from their stowage without the need for HRU to hold them in place. A weak link…will still be required to secure the painter to the ship so that the inflation system is activated and the inflated raft is then able to break free.* [sic]

MSN 1467 (M) – Emergency Position-Indicating Radio Beacons, Float Free Arrangements for Liferafts and Lifejackets on Fishing Vessels – required liferafts to be *automatically released and activated from a sinking vessel*. It did not mention the need for a break free arrangement.

The MCA's Marine Survey Instructions for the Guidance of Surveyors (MSIS) 27 covered the survey and inspection of fishing vessels. MSIS 27 Chapter 10 – Life Saving Appliances[10] – instructed surveyors that liferafts must be stowed:

> *in such a manner as to permit them to float free from their stowage, inflate and break free from the vessel in the event of its sinking;*

This guidance did not specify whether inflation and breaking free needed to be automatic or if HRUs were required.

1.6.3 Stability standards and training requirements

The Code did not require under 12m registered length (RL) fishing vessels to meet any stability standard but recommended that roll or heel tests be conducted and recorded. The Code strongly recommended fishing vessels to maintain a record of Wolfson Guidance Freeboard Marks and follow the advice contained in the MCA's *Fishing Vessel Stability Guidance* publication.

The Code did not mandate any stability training but did note that Seafish offered a number of voluntary courses, which included stability training.

Further, MGN 411 (M+F) – Training and Certification Requirements for the Crew of Fishing Vessels and their Applicability to Small Commercial Vessels and Large Yachts – provided a list of the voluntary courses available, which included a 1-day Intermediate Stability Awareness course intended for skippers of vessels less than 16.5m and anyone taking a navigational watch on any vessel. This course provided information on the principles of watertight integrity and stability management and included the importance of keeping watertight hatches closed and ensuring freeing port covers are not seized.

1.6.4 New training regulations

The MCA planned to replace the training requirements for a skipper of an under 12m registered fishing vessel in its forthcoming Standards of Training, Certification and Watchkeeping (Fishing Vessels) (STCW-F) regulations 2024 and to specifically focus on stability training in emerging Basic Safety Training and Certification Requirements. It is, as yet, unknown whether mandatory stability training would apply to existing skippers under acquired rights arrangements.

1.7 VESSEL INSPECTIONS

1.7.1 General

The Code required that fishing vessel owners presented their vessels to the MCA every 5 years for a Certificate Renewal Inspection. In the interim period vessel owners were required to carry out an annual vessel inspection and sign a self-declaration certificate confirming the vessel complied with the Code.

[10] As amended to 19 January 2021.

1.7.2 MCA inspections

On 16 January 2014, the 5-yearly MCA Certificate Renewal Inspection of *Angelena* noted several deficiencies. The defects were rectified and, on 29 January 2014, a Small Fishing Vessel Certificate (SFVC) valid until 15 January 2019 was issued. On 19 December 2018, the MCA completed its next 5-yearly Certificate Renewal Inspection of *Angelena*, recording markedly fewer deficiencies than in January 2014. Deficiencies associated with the vessel's flares, lifejacket lights and first aid kit were all reportedly rectified within 2 days of the inspection and, on 9 January 2019, *Angelena* was issued with an SFVC valid until 15 January 2024.

The Certificate Renewal Inspection notes for both January 2014 and December 2018 evidenced a risk assessment based on *Angelena* operating with a crew of three: the skipper and two deckhands. The surveyor had recorded a 305mm freeboard for *Angelena* during the inspection on 19 December 2018.

1.8 *ANGELENA* STABILITY

1.8.1 General

Roll or heel tests had not been conducted for *Angelena* either before or after the accident and no stability book was held for the vessel. A rudimentary stability assessment of *Angelena* was undertaken as part of this investigation.

1.8.2 The Wolfson Stability Guidance Method

There was no record of the Wolfson Guidance Freeboard Mark for *Angelena* before the accident and the investigation calculated the position of the mark based on an LOA of 13.99m and a beam of 4.88m. The results **(Figure 6)** demonstrated that *Angelena* required a freeboard of at least 550mm for the vessel to achieve a *good margin of residual freeboard*. The freeboard of 305mm[11] recorded in the December 2018 Certificate Renewal Inspection indicated that *Angelena*'s stability was at the lower end of the Wolfson amber safety zone, which was defined as *a low level of safety*. Further, 1.6m was the maximum recommended sea state for a vessel in the amber safety zone.

1.9 CAPSIZE FACTORS

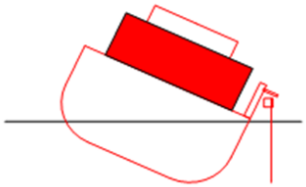
1.9.1 General stability information

The MCA's *Fishing Vessel Stability Guidance* publication defined stability as a *measure of a vessel's ability to get back on an even keel after having suffered a heel*[12] and explained how a vessel's weight and buoyancy can affect this. A fishing vessel's weight is the combined mass of the vessel itself, its fixed equipment, and anything taken on board such as fuel, water, nets and catch, all of which act downwards. Buoyancy is the upward force created by water displacement, which acts on the vertical centre of buoyancy (VCB) to *help the vessel stay upright*.

[11] Confirmed by photographs of *Angelena* taken before the vessel's loss.

[12] A vessel heels when external forces (such as wind and swell) displace it from upright.

STABILITY NOTICE

Name Angelena No. BM271 Owner Skipper Length 13.99 metres Beam 4.88 metres	Loading & Lifting Guidance	Safety Zone	Minimum Freeboard	Maximum Recommended Seastate
	Good margin of residual freeboard	Good margin of safety	At least 55 cm	
	Loading or lifting reduces minimum freeboard to less than 55 cm	Low level of safety	27 to 55 cm	1.6 metres
	Excessive loading or lifting reduces minimum freeboard to less than 27 cm	Danger of capsize	Less than 27 cm	0.8 metres

Freeboard Guidance Mark - size and location

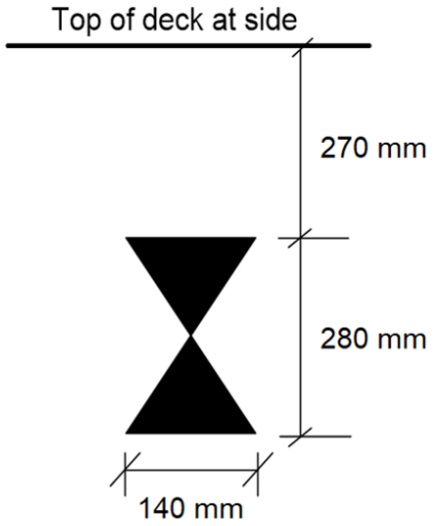


Figure 6: Wolfson Guidance Freeboard Mark calculation for *Angelena*

1.9.2 Transverse stability

Transverse stability is the relationship between the vertical centre of gravity (VCG) and the VCB. The VCG is the point at which the mass of the vessel may be assumed to be concentrated. The VCB is the geometric centre of the underwater volume of a vessel at any instant. The VCG does not move when a vessel heels over but does move towards any added weights or away from any removed weights. The VCB moves as the vessel heels over and its underwater volume changes.

With positive stability, a righting lever is created between the forces acting from the VCB and VCG as a vessel heels. This righting lever creates a restoring moment to bring the vessel upright to where the VCG and the VCB are in balance, one above the other.

1.9.3 Capsize dynamics

A vessel can capsize if its VCG is high, or raised upwards, and the underwater volume is reduced. A normally stable fishing vessel can become at risk of capsize if the liquid load is lighter than normal or weights are higher up in the vessel than normal; for example, the catch is kept on deck instead of down in the fish hold or a full net is suspended from a high point. The impact of this in combination with a raised VCG or reduced VCB due to vessel modifications might mean that a small heeling moment is enough to capsize a vessel.

1.10 SIMILAR ACCIDENTS

1.10.1 *Solstice* – capsize and foundering

On 26 September 2017, the 9.9m stern trawler *Solstice* capsized and sank with the loss of one life because it did not have sufficient transverse stability to safely lift the excessive contents of its net on board over the high lifting point at the stern (MAIB report 20/2018[13]). Another factor that contributed to the capsize was the relative reduction in buoyancy due to the vessel's limited underwater volume aft. Further, it was established that *Solstice*'s owner had no stability data for the vessel and a thorough stability assessment would have given a clearer understanding of the vessel's limits. The investigation found that previously accepted MAIB recommendations to the MCA (2015/165, 2016/130, 2013/107 and 2013/110) on stability and the Wolfson Guidance Freeboard Marks had yet to be fully implemented despite a target date of 2020. These recommendations were eventually closed by the introduction of MSN 1871 Amendment No.2 (F) in September 2021.

1.10.2 *JMT* – capsize and foundering

On 9 July 2015, the 11.4m scallop dredger *JMT* capsized and sank due to the adverse effect of structural modifications combined with aspects of the vessel's operation (MAIB report 15/2016[14]). The vessel's two crew died in the accident. *JMT* was not required to meet stability criteria and the risks associated with vessel modification and the fishing operation had not been fully recognised.

[13] https://www.gov.uk/maib-reports/capsize-and-sinking-of-fishing-vessel-solstice-with-loss-of-1-life

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

The MCA was recommended (2016/130) to include the introduction of *stability criteria for all new and significantly modified decked fishing vessels* under 15m in length. Vessels were *to be marked using the Wolfson Method or assessed by another acceptable method*. Further, the MCA was recommended (2016/131) to *require skippers of under 16.5m fishing vessels to complete stability awareness training*. The MCA planned to complete 2016/131 in April 2024, with the introduction of STCW-F regulations.

1.10.3 *Stella Maris* – capsize and foundering

On 28 July 2014, the 9.9m stern trawler *Stella Maris* capsized and sank due to insufficient stability while attempting to lift a heavy cod end that contained fish and debris (MAIB report 29/2015[15]). The vessel's two crew successfully abandoned to their liferaft and were later rescued uninjured. The risks associated with excessive weight in the net had not been sufficiently recognised by the owner and the vessel was not required to complete a stability assessment, which left the owner without any information on which to base their operations.

The MCA was recommended (2015/165) *to introduce intact stability criteria for all new and significantly modified decked fishing vessels of under 15m in length*.

As a result of this recommendation the MCA published MSN 1871 Amendment No.2 (F) on 6 September 2021, requiring existing vessels[16] under 12m RL to complete a roll or heel test[17] once every 5 years. Under these new rules *Angelena* would have been required to complete a roll or heel test and display the Wolfson Stability Notice by 15 January 2024. The stability tests would then have been repeated every 5 years and in the same conditions as the first test.

1.10.4 *Heather Anne* – capsize and foundering

On 20 December 2011, the 11.05m ring-netter *Heather Anne* was overloaded and then rolled excessively because of a free-surface effect from fish and entrained water contained in a PVC tank in the fish room (MAIB report 2/2013[18]) The roll was worsened by the effect of extensive modifications. *Heather Anne* capsized and sank with the loss of one life. The skipper survived.

The investigation recommended (2013/107) that the MCA expedited *its development and promulgation of alternative small fishing vessel stability standards* for all new fishing vessels under 15m. This recommendation was eventually withdrawn by the MAIB as it was overtaken by recommendation 2015/165 following the investigation into *Stella Maris*.

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

16 'Existing vessels' referred to fishing vessels registered for the first time as a fishing vessel before 16 July 2007.

17 Instructions were provided in MGN 503 (F) Procedure for Carrying out a Roll or Heel Test to Assess Stability for Fishing Vessel Owners and Skippers.

18 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

1.10.5 *Sapphire II* and *Silver Chord* – collision and foundering

On 12 January 2011, the 16.84m prawn trawler *Silver Chord* collided with the 14.99m prawn trawler *Sapphire II* (MAIB report 21/2011[19]). The hull of *Sapphire II* was penetrated and the vessel subsequently sank. There were no injuries and the lone skipper of *Sapphire II* managed to transfer safely to *Silver Chord*. The investigation found that neither vessel maintained a proper and effective lookout.

The investigation recommended (2011/133) the MCA to ensure that the regulations to implement the requirements of International Labour Organization Work in Fishing Convention (No.188) included *vessel design* and that a fishing vessel was sufficiently crewed for its *safe navigation and operation*. As a result of this recommendation the MCA pursued these issues through the Fishing Industry Safety Group and included them on the Safety Communications subgroup action plans.

1.10.6 *Auriga* – capsize and foundering

On 30 June 2005, the 9.74m stern trawler *Auriga* capsized and sank because of a heavy weight in the net that was being hauled over the top of a high gantry (MAIB report 3/2006[20]). The skipper and crew member were successfully recovered from their liferaft. The Fishermen's Training Advisory Group was recommended to *Highlight to the fishing industry the dangers of lifting/hauling from high points to the detriment of vessel stability, by ensuring that such information is included in stability awareness training*.

1.10.7 *Amber* – capsize and foundering

On 6 January 2003, the 9.98m stern trawler *Amber* sank with the loss of its skipper (MAIB report 25/2003[21]), having probably capsized as the skipper attempted to tow a net with a boulder in the cod end into shallow water for recovery. Poor stability was identified as a causal factor in the loss of the vessel. The lack of a stability requirement was noted as placing skippers at great risk as they were unable to judge when it was safe to lift, tow or carry heavy loads. The Department for Transport and the MCA were recommended to *develop a simple method of assessing stability, including freeboard, of small fishing vessels, and issue guidance accordingly*.

The MCA was recommended to:

- *conduct a formal safety assessment for existing under 15m fishing vessels, to ascertain whether or not a mandatory stability requirement would be appropriate.*
- *investigate how stability awareness can be raised among the owners and crew of fishing vessels under 15m.*

[19] https://www.gov.uk/maib-reports/collision-between-prawn-trawlers-sapphire-ii-and-silver-chord-resulting-in-sapphire-ii-sinking-off-stornoway-scotland

[20] https://www.gov.uk/maib-reports/capsize-and-sinking-of-stern-trawler-auriga-off-portavogie-northern-ireland

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

1.11 MAIB FISHING VESSEL SAFETY STUDY

On 28 November 2008, the MAIB published its Analysis of UK fishing vessel Safety 1992 to 2006[22]. The safety study reviewed the deaths of 256 commercial fishers operating on UK registered fishing vessels and its aim was to identify causal and contributing factors, draw conclusions and make recommendations. The safety study identified that 12% of fishing vessel losses were due to capsize, listing or missing vessels and that this contributed to just under 40% of all fishing vessel fatalities over the 14-year period. The safety study identified stability shortcomings in many of the accidents involving fishing vessels under 12m in length and made recommendations to the MCA to *work towards progressively aligning the requirements of the Small Fishing Vessel Code, with the higher safety standards applicable under the Workboat Code*.

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

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

At the time of the accident *Angelena*'s skipper was operating single-handed and had been recovering the catch, some of which was suspended in the net's cod end. The vessel heeled to starboard, started to take water on deck, rapidly capsized then foundered.

This section of the report will analyse the effect of vessel modifications and operations on *Angelena*'s stability; fishing vessel stability standards; the training available to fishers; and single-handed fishing operations. The factors that led to *Angelena*'s skipper surviving the accident will also be considered.

2.3 THE CAPSIZE AND FOUNDERING

The cod end became caught on the starboard trawl door when it slewed to starboard and the top of the starboard aft gunwale dropped to water level when *Angelena* heeled to starboard, which allowed water to pour onto the deck. It is possible that some of the freeing ports were seized and water was retained on deck, adding to the heeling moment. Similar to the *Solstice* accident, *Angelena* was unable to recover from an extreme angle of heel. It is likely that the water on deck downflooded through the open wheelhouse watertight door and possibly the fish room hatch, causing the vessel to sink by the bows, fully capsize and founder. That none of the doors or hatches were dogged shut, and that the accommodation hatch was tied open, was an indication of the lack of maintenance of watertight integrity.

2.4 *ANGELENA* STABILITY

The findings of the MAIB's Fishing Vessel Safety Study indicated that issues with small fishing vessel stability was a significant contributory factor to vessel capsize.

2.4.1 Vessel modification effect

Since its build in 1988, *Angelena* had undergone a series of modifications. The removal of the derricks and the removal of the solid steel deck winch cover both had a positive impact on stability by lowering the VCG. Conversely, the addition of the powered net drum and guardrails, lengthening of the wheelhouse roof mast and relocation of the radar to the top of the aft gantry had a negative impact on stability by raising the VCG. It was not possible to obtain a precise post-accident stability calculation for *Angelena* as height and weight detail was missing from the modification records. Using the MCA's *Fishing Vessel Stability Guidance* booklet as a basis for understanding, it was highly likely that the net change due to the modifications would have increased the VCG above its 'at build' position in 1988 and thus reduced *Angelena*'s stability.

2.4.2 Liquid state effect

Angelena's fuel level on departure from Brixham was probably sufficient for the day's planned fishing. However, operating the vessel with only 9% of its total fuel capacity raised the VCG and further reduced the vessel's stability.

The 135-litre freshwater tanks on board *Angelena* were relatively small for the size of the vessel and, while their cross-connected pipework might have lessened any rolling at sea, were unlikely to have made a substantive positive contribution to the stability of the vessel.

It is likely that three of *Angelena*'s freeing port covers were seized fully shut and a further two were unable to operate as designed due to being covered by thick rubber sheeting at the time of the accident. It was therefore possible that shipped water was able to accumulate on deck. This would have raised the VCG, causing a negative impact on stability.

2.4.3 Sea state effect

It is highly likely that *Angelena* experienced wave heights of above 1.5m associated with force 4 winds at the time of the capsize. The Wolfson Guidance Freeboard Mark calculated during the investigation indicated a *low level of safety* for *Angelena*; operating in seas any greater than the maximum recommended 1.6m height would have presented significant risk.

Angelena's freeboard was only 35mm clear of the Wolfson *Danger of capsize* red zone, within which the maximum recommended sea state was 0.8m. Given the sea state at the time of the accident, it is likely that these fine margins of stability reduced *Angelena*'s capacity to withstand any off-centre loading, such as the lifting of the heavy cod end.

2.4.4 Catch management effect

Similar to the *Stella Maris*, *Auriga* and *Amber* accidents, *Angelena*'s struggling net drum was the first indication of an excessive load in the cod end. Despite the skipper's actions to wash out the cod end by manoeuvring *Angelena* during the net recovery process, the parting of the first Gilson rope suggested that this was only partially successful in reducing the load. It was normal practice to split a large catch by cinching the cod end; however, by retaining the catch on the main deck the VCG was once again increased and the margin of stability reduced.

Further, once the cod end cleared the water its full weight became suspended from the starboard lifting point on the high aft gantry. This induced a list, which also had the effect of swinging the cod end outboard to starboard. As *Angelena* continued to heel, the point of effort moved further away from the VCG and increased the capsizing moment. This was further exacerbated by the catch on deck sliding to starboard. The vessel's VCB would have started to reduce once the deck edge aft became immersed, with the situation deteriorating further when downflooding started. Once the cod end was clear of the water *Angelena*'s capsize became a continuous roll that could not be halted.

Contrary to MSN 1871 Amendment No.1 (F), paragraph 4.37, there was no means to control the transverse slewing of the heavy cod end once the net drum was full. Consequently, large angles of heel were probably inevitable.

2.4.5 Stability, regulation and information

The above effects of modifications combined with the lack of weight low in the vessel (fuel), the sea state, the offset high lifting point, the attempt to lift the excessive load when there was already some catch on deck and the shallow hull shape aft caused the capsize.

At the time of the accident *Angelena* was certificated to the requirements of MSN 1871 Amendment No.1 (F), which did not mandate a roll or heel test, a Wolfson Freeboard Guidance Mark calculation or the production of a stability book. Consequently, the significance of *Angelena*'s stability condition and low freeboard was unknown. The introduction of MSN 1871 Amendment No.2 (F) updated the certification requirements and would have required a roll or heel test and the calculation of a Wolfson Freeboard Guidance Mark for *Angelena* before its next MCA 5-yearly Certificate Renewal Inspection, which was due in January 2024. The provisions of MSN 1871 Amendment No.2 (F) addressed the gap previously identified by the *Stella Maris* investigation. While it cannot be certain that a roll or heel test would have identified a stability concern for *Angelena*, the test would have provided an opportunity to detect any weakness and address it.

2.5 OPERATIONAL ELEMENTS

2.5.1 Crewing levels

The skipper operated *Angelena* single-handed on the day of the accident due to an unexpected lack of additional crew and what might have been perceived as having little other choice.

While no minimum safe crewing level was mandated for fishing vessels under 15m, MGN 313 (F) stated that *The wheelhouse must not be left unattended at any time*. For *Angelena*, this indicated at least two crew were needed to operate safely: one to maintain a navigational watch and a minimum of one more to work the fishing gear. There was complexity in the tasks involved with hauling *Angelena*'s fishing gear and the associated positions from where each of these was undertaken on the main deck **(Figure 7)**; it would therefore have been impossible for the lone skipper to simultaneously maintain a safe navigational watch and operate the fishing gear, as was the case for *Sapphire II*/*Silver Chord*. Analysis of all the tasks required of the skipper concluded that, when operating *Angelena* alone, the skipper could neither react quickly in the event of an emergency nor ensure the safety of their operation.

For illustrative purposes only: not to scale

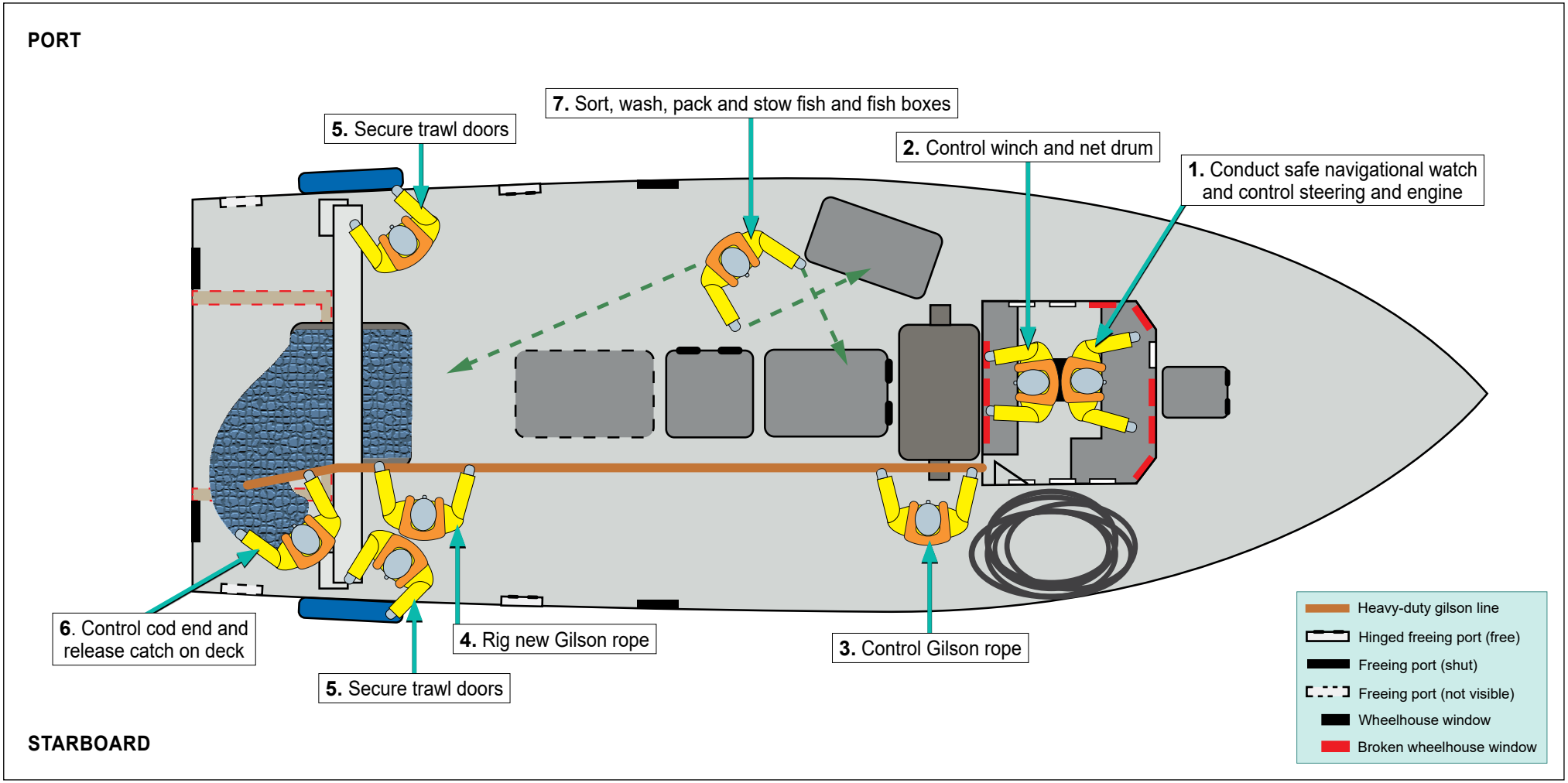

Figure 7: Seven operations carried out by *Angelena*'s skipper

2.5.2 Stability awareness

On the day of the accident *Angelena* had been operated with its deck hatches open, the wheelhouse door open, some potentially seized freeing port covers and low fuel levels, indicating a poor appreciation of the implications of the exposed risks. While the skipper had attended the Seafish Intermediate Stability Awareness course approximately 15 years before the accident, it was possible that their memory of the importance of watertight integrity and the principles of maintaining vessel stability had faded over time.

Stability awareness courses were neither mandatory for existing skippers and crew of under 15m fishing vessels at the time of the accident, nor required a refresher. The MCA planned that stability training would become a mandatory requirement as part of the introduction of STCW-F and the new Basic Safety Training and Certification Requirements, which would encompass the under 24m fishing fleet. However, as the incoming regulations might not apply to existing skippers under acquired rights arrangements, it is possible that some might continue to have no formal understanding of the stability of their vessels or be inclined to refresh a dated and faded appreciation of the subject.

2.5.3 Risk assessment

The risk assessment prepared for *Angelena*'s fishing method had been based on a crew of three people; contrary to the requirements of the Code there had been no review to assess the risks associated with the change to a single-handed operation. Although the skipper had previously demonstrated it was possible to operate the vessel single-handed, it is likely that each phase of the trawl recovery took more time and created more risk than if it had been undertaken by three crew. Thus, the risks of operating *Angelena* single-handed were foreseeable in that the hazards posed, at each phase of the day's planned fishing or in the event of a developing emergency, were able to be identified through a risk assessment.

2.5.4 Perception of risk

The skipper's risk awareness had been compromised by the lack of stability information for *Angelena* and their possible lapse in knowledge over the years since completing the stability awareness training. It is likely that the skipper did not fully appreciate the risks posed as the heavy cod end was lifted out of the water while *Angelena* operated in an increasing sea state and with low levels of fuel on board. Further, it is possible that operating *Angelena* with the hatches open indicated a negative trade-off between thoroughness and efficiency[23], with little regard for the potential risk of downflooding in the event of an emergency.

The skipper had operated *Angelena* alone on more than one occasion and the routines and processes involved in this might have started to become normal to them, lowering their perception of the risks they were taking.

[23] *…people (and organisations) routinely make a choice between being effective and being thorough, since it rarely is possible to be both at the same time. If demands to productivity or performance are high, thoroughness is reduced until the productivity goals are met. If demands to safety are high, efficiency is reduced until the safety goals are met. Hollnagel, E:* https://erikhollnagel.com/ideas/etto-principle/index.html *(accessed 22 Mar 2022).*

As the recovery of the trawl started to go wrong it is likely that *Angelena*'s skipper initially became task-focused and then overwhelmed by the challenge of controlling the heavy cod end single-handed, leaving them unable to pause and consider the dangers they faced or implement mitigations and contingencies in time to save *Angelena* from capsize.

2.6 SURVIVABILITY

2.6.1 Lifesaving equipment

Angelena's liferaft was stowed unsecured in a cradle on the wheelhouse roof and floated free when the vessel foundered. Contrary to MGN 343 (M+F) its painter was not tied to the vessel via a weak link, and the liferaft could neither inflate, nor break-free, automatically.

The skipper improved their chances of staying afloat with their airway clear of the water by wearing their manually-operated PFD and making sure the crotch strap was fitted. It is likely that the reasonably warm June seawater temperature combined with the skipper's consciousness throughout reduced the risk of cold water shock. That the skipper was able to manually pull the painter to inflate and then board the liferaft reasonably quickly further optimised their chance of survival.

With a PLB capable of AIS only, the skipper was reliant on the vessel's EPIRB floating free and activating correctly to raise the alarm should they have been incapacitated. Fortunately, the skipper was uninjured and able to both activate the PLB and call the coastguard on their mobile phone. *Angelena*'s EPIRB also successfully deployed and started to transmit the vessel's last position.

Angelena's lifesaving equipment functioned as it was designed to because it was serviced, in working order and free from obstruction; thus enabling the rescue effort to quickly find and recover the skipper.

2.6.2 Regulation and guidance

The regulations and MSIS guidance pertaining to liferaft tethers, HRUs, inflation and break free requirements contained inconsistent definitions; however, all indicated the need for a liferaft to *float free* and inflate. The requirements for either an HRU or weak link arrangement were implicit but neither clearly nor consistently stated. It is possible that such variations introduced ambiguity and hampered the ability of MCA surveyors to conduct their work reliably. This might have caused the absence of a weak link on the HRU connecting *Angelena*'s liferaft painter to the vessel's structure to go unnoticed during inspections.

SECTION 3 – CONCLUSIONS

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

1. *Angelena* was not required to meet any stability standard and no roll or heel test had been conducted to establish if the vessel's stability was adequate. Consequently, neither the stability performance of the vessel nor the significance of its low freeboard was known. [2.4.5]

2. *Angelena*'s skipper had completed voluntary stability awareness training several years before the accident and it was possible that their knowledge of the stability hazards presented by the fishing operation at the time of the accident had diminished over time. [2.5.2]

3. *Angelena*'s skipper could not maintain both a safe navigational watch and complete the tasks associated with operating mobile fishing gear safely while operating single-handed. The vessel's risk assessment was based on the vessel being operated by three crew. [2.5.1, 2.5.3]

4. *Angelena*'s skipper was unable to cope with the foreseeable emergence of difficult situations while operating the vessel single-handed. [2.5.3]

3.2 OTHER SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT

1. *Angelena* capsized as the heavy load in the cod end, suspended from a high point on the aft gantry, cleared the water and slewed uncontrollably to starboard. The stability reserves of *Angelena* were unable to resist the induced heeling moment in the developing sea state and the vessel rapidly capsized. [2.3, 2.4.4, 2.4.5]

2. It is likely *Angelena*'s stability at the time of its capsize was adversely affected by several factors, including the impact of incremental modifications, a low fuel level and a large amount of catch on the main deck. [2.3, 2.4.5]

3.3 SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. Stability awareness courses were not mandatory so existing skippers, who could gain acquired rights under arrangements related to incoming STCW-F and Fishing Training Regulations, would have had no formal understanding, or refreshed understanding, of the stability of their vessels. [2.5.2]

2. The information provided in regulations and MSIS guidance for the carriage and securing of liferafts was inconsistent. This introduced ambiguity and hampered the ability of surveyors to ensure liferafts were secured correctly and with a hydrostatic release unit fitted. [2.6.2]

3.4 OTHER SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT[24]

1. *Angelena*'s lifesaving equipment was serviced, in working order, free from obstruction and functioned as designed on the day; this enabled prompt action by those responding to the incident. [2.6.1]

2. It was fortunate that the skipper entered the water without injury and remained conscious and capable enough to both reach the liferaft and pull its painter. Although the liferaft had floated free, the painter had not been secured to the vessel via a weak link. [2.6.1]

[24] These safety issues identify lessons to be learned. They do not merit a safety recommendation based on this investigation alone. However, they may be used for analysing trends in marine accidents or in support of a future safety recommendation.

SECTION 4 – ACTION TAKEN

4.1 MAIB ACTIONS

The **Marine Accident Investigation Branch** has issued a safety flyer to the fishing industry **(Annex A)**.

4.2 ACTIONS TAKEN BY OTHER ORGANISATIONS

The **Maritime and Coastguard Agency** has:

- Conducted a concentrated information campaign about stability during the autumn and winter of 2021/2022, using social media to raise awareness among the fishing industry.

- Amended MSIS 27 to instruct surveyors on the required remedial action for a fishing vessel to take in the event it fails its roll test.

SECTION 5 – RECOMMENDATIONS

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

2024/125 In its implementation of the new Fishing Training Regulations, require fishing skippers to have completed advanced stability training before any certificate of competency is issued under acquired rights; and to engage with the fishing industry to explore, and then implement, pathways to enhance and improve fishers' practical knowledge of stability, advising fishing vessel skippers to complete small fishing vessel advanced stability training during the intervening period.

2024/126 In collaboration with the fishing industry, develop and then implement a process to ensure that owners and operators of fishing vessels undertake risk assessments to define the safe crewing required for the conduct of fishing operations, and for that definition of safe crewing to be documented in an appropriate manner.

2024/127 Align its definitions on float-free arrangements for liferafts in its marine safety, guidance and information notices, and instructions to surveyors, to ensure a consistent requirement to use hydrostatic release units so that liferafts float free, inflate and break free automatically.

The **owner and skipper of *Angelena*** is recommended to:

2024/128 Complete the Seafish Advanced Stability Awareness training course to gain a thorough knowledge of stability principles and what factors might impact the stability of any fishing vessel they operate in the future.

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

Capsize and foundering of the stern trawler *Angelena* (BM271) on 18 June 2021

Image courtesy of Alan Letcher (https://fishandships.org)

Angelena

Narrative

At 1156 on 18 June 2021, the 11.82m stern trawler *Angelena* capsized and sank while its skipper was recovering the first catch of the day. A nearby vessel responded to the call between the coastguard and the Royal National Lifeboat Institution, and the unharmed skipper was rescued from *Angelena*'s liferaft around 40 minutes later. The skipper had been operating *Angelena* single-handedly for the second consecutive day due to crewing challenges. The fishing net's cod end was full of sand, mud, starfish and fish and the excessive weight caused it to slew to starboard when it was lifted clear of the water.

Angelena was unable to recover from the starboard list and started to take water on deck, resulting in the vessel's rapid capsize to starboard. The skipper, who had no time to raise the alarm before entering the water, was wearing a personal flotation device (PFD) fitted with a personal locator beacon and managed to both swim to and inflate *Angelena*'s liferaft, which had floated free. At 1206, and without a portable radio to hand, the skipper used their mobile telephone to raise the alarm. Unbeknown to the skipper, *Angelena*'s Emergency Position Indicating Radio Beacon (EPIRB) had also floated clear of the vessel and started to transmit.

Safety lessons

1. *Angelena* had undergone several modifications since build and the weights removed and added changed the vessel's margins of stability. The skipper was unaware of the vessel's potential stability issues as no stability assessments had been carried out.

2. Wolfson Guidance Freeboard Mark calculations and roll or heel tests can warn fishers of stability hazards. However, a full stability assessment is the only real means by which to quantify the limits of a vessel's stability. Seek advice from local fishing vessel surveyors to understand what characteristics can affect stability.

3. *Angelena* capsized because it did not have sufficient reserves of stability to lift the contents of its net on board. The vessel was carrying insufficient fuel to counterbalance the destabilising forces created by lifting the excessive weight in the cod end from the high point over the stern.

4. Risk assessments reduce the severity and likelihood of a hazard and should consider factors such as the number of crew on board. The lone skipper was unable to simultaneously maintain a safe navigational watch and lift the catch efficiently; their options to recover from the foreseeable emergence of a difficult situation were limited.

5. It can sometimes be too dangerous to lift a catch on board. Ensure plans are in place to reduce hazards, including letting the catch go; no catch is worth the loss of someone's life or livelihood.

6. Wearing a PFD and maintaining regular servicing of lifesaving equipment improves the chances of survival in the event of an accident. When a vessel starts to capsize it is too late to find out that lifesaving equipment is neither fit for purpose nor accessible.

7. Liferafts must be able to float free, inflate and break free automatically without human intervention. The effects of cold water shock or injury sustained during an accident can hinder completion of the simplest tasks and reduce survivability.

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

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