MCIB
Marine Casualty Investigation Board
Bord Imscrúdú Taismí Muirí

REPORT INTO THE SINKING OF *"FV ALIZE"* OFF HOOK HEAD, CO. WEXFORD 4 JANUARY 2020

REPORT NO. MCIB/297
(No.2 OF 2021)

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

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

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

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

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

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

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Glossary of Abbreviations and Acronyms

AGS	An Garda Síochána
ALB	All Weather Lifeboat
AUV	Autonomous Underwater Vehicle
BIM	Bord Iascaigh Mhara
CGR	Coast Guard Radio
CoP	Code of Practice*Note 2
DAFM	Department of Agriculture Food and the Marine
DoC	Declaration of Compliance stating vessel complies with the Code of Practice
DSC	Digital Select Calling
EPIRB	Emergency Position Indicating Radio Beacon
ETA	Estimated Time of Arrival
FPN	Fixed Payment Notice
FV	Fishing Vessel
GMDSS	Global Maritime Distress and Safety System
GPS	Global Positioning System
GT	Gross Tonnage*Note 1
HSA	Health and Safety Authority
ILT	Irish Lights Tender
IMA	Irish Maritime Administration
IMO	International Maritime Organisation
INS	Irish Naval Service
IRCG	Irish Coast Guard
LOA	Length Overall
MCC	Mission Control Centre
MN	Marine Notice
MRCC	Marine Rescue Coordination Centre
MRSC	Marine Rescue Sub-Centre
MSO	Marine Survey Office
PFD	Personal Flotation Device
PLB	Personal Locator Beacon
ROC	Restricted Operators Certificate
ROV	Remotely Operated Vehicle
RNLI	Royal National Lifeboat Institution
SAC	Sub Aqua Club
SAR	Search and Rescue
SHWW Act	Safety Health and Welfare at Work Act 2005
SITREP	Situation Report
S.I.	Statutory Instrument
SSDE	Surface Supplied Diving Equipment
SSS	Side Scan Sonar
STCW	Standard of Training, Certification and Watchkeeping
UK	United Kingdom
UTC	Co-ordinated Universal Time
VHF	Very High Frequency
WNWS	Worldwide Navigational Warning Service.

Kilometres	km
Kilowatts	kW
Litres	(lts)
Metres	m
Nautical miles	NM
Tonnes	t

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*Note 1: Gross Tonnage is a nonlinear measure of a ship's overall internal volume. In the regulations which govern the measurement of ships the 'tonnage' measurement is one of capacity, the unit of one ton being a capacity measurement of 100 feet cubed (ft 3). Gross Tonnage should not be confused with measures of mass or weight such as 'deadweight', 'tonnage' or 'displacement'. Gross Tonnage is calculated based on "the moulded volume of all enclosed spaces of the ship" and is the total internal capacity of a ship measured from the top of floors or ceiling to the tonnage deck including the fore and aft peak tanks above the floors. Gross Tonnage is used to determine issues such as a ship's manning regulations, safety rules, registration fees and port dues.
Gross tonnage is defined by the International Convention on Tonnage Measurement of Ships, 1969, adopted by the International Maritime Organization in 1969, and came into force on 18 July 1982.

*Note 2: Code of Practice: Design, Construction, Equipment and Operation of Small Fishing Vessels of less than 15 m Length Overall (2014) can be downloaded in electronic format at:
https://www.gov.ie/publication/b2d313-code-of-practice-fishing-vessels-less-than-15m-length-overall/

Report MCIB/297 published by the Marine Casualty Investigation Board.

Produced 3rd August 2021.

1. SUMMARY

1.1 On 3 January 2020, the fishing vessel (FV) *"Alize"* departed Duncannon Harbour with two persons onboard to fish for scallops.

1.2 At 20.45 hours (hrs) the following day the Skipper, during a mobile telephone conversation with a family member, indicated that they were on their last tow (trawl) and would be returning to Duncannon Harbour. At 22.34 hrs Marine Rescue Coordination Centre (MRCC), Dublin, were advised that an Irish registered Emergency Position Indicating Radio Beacon (EPIRB) had activated seven nautical miles (NM) southwest of Hook Head.

1.3 Dublin MRCC tasked Irish Coast Guard rescue helicopter R117 and the Dunmore East and Kilmore Quay RNLI lifeboats to proceed to the EPIRB activation location. Rescue helicopter R117 recovered one person from the sea. The Casualty was transported to Waterford University Hospital where he was later pronounced dead. An extensive search operation was conducted for the missing crewmember.

1.4 The wreck of *"FV Alize"* was located on the sea bottom in the vicinity of the EPIRB activation position. The body of the second crewmember was recovered by divers from the wreck on 24 January 2020.

Note: All times are local time = Co-ordinated Universal Time (UTC).

See Appendix 7.1 Photograph No.1 – *"FV Alize"*.

2. FACTUAL INFORMATION

"FV Alize" registered number WD207, was a small beam trawler rigged for scallop fishing.

See Appendix 7.2 Photograph No.2 – *"FV Alize"* before the vessel's major refit.

See Appendix 7.3 Figure No.1 - General arrangement *"FV Alize"* (before 2014 refit).

The vessel had a quantity of scallops onboard and was due to offload the catch in Duncannon Harbour.

2.1 Vessel Details

Name:	*"FV Alize"*.
Official Number:	404649.
Flag State:	Irish.
Registration Number:	WD207.
Type of Vessel:	Beam Trawler.
Port of Registry:	Wexford.
Call Sign:	EI7149.
Builder:	A & J Marine, Cornwall, UK.
Year Built:	1989.
Construction:	Steel hull and upperworks. Multi-chine, transom stern trawler. Arranged with forward lantern style wheelhouse set over a raised flush foredeck. Main deck, (working deck), with midships gantry approximately 5 metres (m) high with derricks port and starboard rigged for beam trawling. Fish hold hatch just aft of the midships gantry. Transom fitted goal post type gantry fitted with outriggers and hydraulic derrick topping-lift winches (port and starboard).
Length Overall:	11.61 m.
Beam:	5.22 m.
Maximum Draught:	2.855 m.

Lightship Displacement:	51.707 tonnes (t)
Maximum Displacement:	62.042 t.
Gross Tonnage:	29.6 (t)*Note 1
Main Engine:	Cummins NTA 8556 diesel engine developing 221kW power for propulsion, hydraulic and electrical power. Two 2273 litre (ltr), capacity fuel tanks located on each side of the engine compartment.

2.2 Vessel Alterations

The vessel was substantially refitted in a New Ross boatyard in 2014. This work involved:

- Concrete ballast. 1.6 t under the fish hold floor.
- Additional steel to the keel totalling 3.3 t
- Replacement of a major portion of hull plating.
- After most pair of water tanks put out of use.
- Watertight compartments (void spaces) constructed in the port and starboard sides of the vessel above the main deck to the height of the whaleback (flush foredeck). Photographic evidence shows that two compartments were constructed each side of the centre freeing port into the port and starboard gunwales for reasons of improved high angle stability.
- Prior to the 2014 refit the vessel had four freeing ports fitted each side. Post refit the vessel had three freeing ports fitted each side with flap type arrangements fitted. The 2015 Code of Practice (CoP) Declaration of Compliance (DoC) authorised person stated to the MCIB that the freeing ports measured to 3% of bulwark area and therefore complied with CoP Chapter 2 section 2.19 Freeing Ports requirements.

See Appendix 7.4 Photograph No.3 – *"FV Alize"* freeing ports (port side).

After the 2014 refit:

- An inclining experiment was carried out on 18 December 2014 by a qualified naval architect.
- A CoP Design, Construction, Equipment and Operation of Small Fishing Vessels of less than 15 m Length Overall (2014)*Note 2 DoC inspection survey and stability check was carried out on 9 January 2015 by an authorised person.

- A Stability Book was compiled for *"FV Alize"* by a qualified naval architect and published on 13 January 2015.
- A CoP[*Note 2] DoC inspection survey and stability check was carried out 13 April 2018 by an authorised person.

During and after the 2014 refit the naval architect made note of various weights and dimensions of items required to be included in the calculations of the new stability conditions for the vessel.

See Appendix 7.5 Inclination Experiment - Naval Architect Notes.

From these notes the MCIB calculated that

- The length of each derrick was approximately 6.7 m (22 feet long from the notes).
- The foot of each derrick was attached to the midships gantry approximately 1.2 m (4 feet), above the main deck.
- Therefore, the total height of the derrick head above the main deck is 7.9 m (6.7 m +1.2 m), in the housed, vertical position.

2.3 Stability Information Booklet (Stability Book)

The Stability Book was provided to the vessel's owner and the Marine Survey Office (MSO), and a copy of the 2015 and 2018 CoP DoCs were also forwarded to the Marine Survey Office by the authorised person(s) conducting the CoP surveys in accordance with the regulations.

The inclining experiment: An inclining experiment is used to relate certain mathematical principles to the practical behaviour of a vessel in the water. The inclining experiment is used to determine the position of the vertical centre of gravity above the keel line in either a newly constructed vessel or in one where large alterations have taken place.

The analysis from the inclining experiment carried out on the 18 December 2014 was included in the vessel's Stability Information Booklet (Stability Book) published on 13 January 2015.

The inclining experiment used several factors described and tabulated in the Stability Book and found in Part 5. Background Information, section 5.4. Inclining Test and Lightship Derivation and section 5.5. Inclining Results.

Lightship or Light Displacement or Lightship Condition is the weight of the vessel when complete and ready for service in every respect, including hull, engines, permanent ballast, spare parts, lubricating and hydraulic oil in the systems at operating levels and working stores but without fuel, stored

lubricating and hydraulic oils, cargo, drinking water, crew and their effects, temporary ballast or any other variable loads.

- In the Stability Book for *"FV Alize"* these variable loads are tabulated and found in Part 2. Maximum Permissible KG: Simplified Check on Stability. Section 2.3. 'Example Loading Condition' which lists fuel, water, ice, catch and stores and gear and also includes the dredges which weigh 3.00 tonnes total and crew which were allowed as 300 kilogram (kg) (this equates to three average sized persons wearing fishing work gear weight).

The MCIB considers the inclusion of the dredges and associated equipments (as being variable loads) would be a significant factor for the inclining experiment calculations and freeboard measurements.

Section 5.4 Inclining Test and Lightship Derivation, pages 47 and 48 tabulates the details of the conditions during the actual experiment under the following headings:

- Date.
- Vessel.
- Location.
- Present (those in attendance).
- Conditions (weather and sea state).
- S.G. of water.
- Persons onboard, Number and Position (location onboard).
- Main Tanks, Name, Level (content).
- Minor Tanks, Name, Level.
- Weights Off, Description, Position.
- Weights On, Description, Position.
- Inclining Weights.
- Pendulum, Position, Length.
- Freeboard measurements, Reading, Position.
- Draft equivalents, mm.
- Results.

The Description in the 'Weights On' headings listed:

- Main Wire.
- Minor Wire.
- Conveyors.
- Dredges.

There were no notations regarding the 'Position' or 'Weights On' of the above items.

Freeboard Measurements were notated as follows:

- Aft Port. Reading, 690 (mm). Position, Fr (frame) 22
- Aft Stbd. Reading, 730 Position, Fr 22
- Fwd. CL Reading, 2560 Position, Top gunwale

2.3.1 Section 5.5 Inclining Results, page 55 and pages 49-50 tabulates the results of the experiment calculations under the following headings:

- Pendulum Date.
- Draught readings.
- As Inclined Condition.
- Items to be added to calculate lightship.
- Items to be removed to calculate lightship.
- Lightship condition.

Under the heading 'Items to be added to calculate lightship' the Main Wire, Lifting Wire and Conveyors were included. Weight corrections were applied for items to be added to calculate lightship as follows:

- Main winch wires (port and starboard) 800 kg.
- Derrick lifting wires (port and starboard) 80 kg.
- Port and starboard Conveyors 800 kg.

However, the MCIB considers it significant that there was no inclusion of the 3.00 tonnes weight of the dredges and associated equipment.

2.3.2 Notes from the inclining experiment lightship condition, results and analysis were recorded as being:

- The freeboard*Note 3 measured at inclining: port side 0.690 m, starboard side 0.730 m.
- The vessel's displacement was calculated (As Inclined Condition) = 52.449 t
- The vessel's GM (Metacentric height) (GMT) (As Inclined Condition) = 0.821 m
- The vessel's displacement was calculated (Lightship Condition) = 51.707 t
- The vessel's GM (Metacentric height) (Lightship Condition) = 0.804 m

*Note 3: Freeboard is the height amidships of the freeboard deck at the vessel's side above the normal summer load line. The freeboard deck is the uppermost complete deck having permanent means of closing all openings in weather portions of the vessel. Usually on a fishing vessel this would be the working deck or main deck as in the case of *"FV Alize"*.

Stability Analysis: Factors mentioned in the Stability Information Booklet and allowed for in the fishing vessel's stability analysis:

- Crew weight at 300 kg. This equates to three average sized persons wearing fishing work gear weight.
- Dredges total weight at 3000 kg. The equates to 1500 kg per dredge.

2.4 Code of Practice 'Declaration of Compliance' (DoC) Surveys

"FV Alize" was subject of a compliance survey under the provisions of the Code of Practice: Design, Construction, Equipment and Operation of Small Fishing Vessels of less than 15 m Length overall, (CoP) immediately post refit and in 2018 for renewal.

2015 CoP 'Declaration of Compliance' inspection and survey:

Date of issue: 9 January 2015.

Date of expiry: 10 January 2019.

2018 CoP 'Declaration of Compliance' inspection and survey:

Date of issue: 13 April 2018.

Date of expiry: 12 April 2022.

See Appendix 7.6 Figure No.2 - 2015 – CoP Declaration of Compliance certificate.

See Appendix 7.7 Figure No.3 - 2018 – CoP Declaration of Compliance certificate.

2.4.1 The 2015 CoP DoC inspection survey and stability check roll test was carried on 9 January 2015.

The DoC included the following details:

- The number of crew was stated as 3 crew at 'page i' of the DoC.
- BIM Cards numbers were provided for 3 crewmembers at 'page i' of the DoC.
- At 'page ii' of the DoC it was indicated that the vessel did not comply with the roll test as per 3.1, Chapter 3 Stability and it was also notated as 'FAIL' on 'page ix' of the DoC .
- At 'page iv' of the DoC it was indicated at Chapter 7 'Life Saving Appliances' that there was 1 lifejacket for every person onboard and there was found to be 1 lifejacket onboard.
- At 'page iv' of the DoC it was indicated at Chapter 8.2 that the vessel was manned in accordance with the Fishing Vessels (Certification of Deck Officers and Engineer Officers) Regulations, S.I. No. 289 of 1988 and S.I. No. 192 of 2000.
- Also at 'page iii' it was indicated (as per 8.8 section 'Manning') and furthermore described in the CoP Chapter 8 paragraph 8.8 'Safe Navigational Watch' that an "alert person with adequate experience was in charge of the navigational watch".

The stability check roll test results were recorded in the DoC. The following details are of note:

- For the purposes of the roll test the freeboard is the smallest freeboard measurement from the top of the upper deck at side to the actual waterline in metres and was recorded as 0.69 m.
- The roll test period (Tr) was 5.3 seconds (s).
- The GM was calculated at 0.62 m.

Note: The minimum freeboard measurement at 0.69 m (recorded in the 9 January 2015 CoP Roll Test) was approximately the same as the freeboard measurement recorded at the stability check inclining experiment on 18 December 2014, (i.e. port side 0.69 m and 0.73 m starboard side). Therefore, it may be deduced that the dredges were more than likely not onboard for the 2015 roll test.

2.4.2 A CoP DoC and stability roll test was carried out for DoC renewal purposes on 13 April 2018. The vessel was subjected to the roll test and the results recorded in the DoC. The following details are of note:

- The number of crew was stated as 3 crew at 'page i' of the DoC.

- BIM Cards numbers were provided for 2 crewmembers at 'page i' of the DoC.

- At 'page ii' of the DoC (as per 3.1, Chapter 3 Stability section), it was indicated that the vessel did not comply with the required MSO parameters for the roll test and it was also notated as 'Fail' on the roll test section 'page ix' of the DoC.

- At 'page iii' of the DoC it was indicated (as per Chapter 7 Life Saving Appliances, 7.3 section), that there was 1 lifejacket for every person onboard and there was found to be 3 lifejackets onboard. Also at section 7.6 it was indicated that there was 1 Personal Flotation Device (PFD) for every person onboard and there was found to be 3 PFDs onboard.

- At 'page iii' of the DoC it was indicated (as per Chapter 8 Manning Training & Certification section 8.2), that the vessel was manned in compliance with the Fishing Vessels (Certification of Deck Officers and Engineer Officers) Regulations, S.I. No. 289 of 1988 and S.I. No. 192 of 2000.

- Also at 'page iii' it was indicated (as per 8.8 section 'Manning') and furthermore described in the CoP Chapter 8 paragraph 8.8 'Safe Navigational Watch' that an "alert person with adequate experience was in charge of the navigational watch".

The stability check roll test results were recorded in the DoC. The following details are of note:

- For the purposes of the roll test the freeboard is the smallest freeboard measurement from the top of the upper deck at side to the actual waterline in metres and was recorded as 0.35 m.

- The average roll test period was recorded as 4.7975 seconds (s). MCIB checked this figure and found a discrepancy in that the average roll test period was in fact 6.43 seconds. See page ix of the 13 April 2018 CoP DoC.

- The GM was calculated at 0.752 m. MCIB checked this figure and found a discrepancy in that the GM was in fact 0.419 m. (This figure would also be recorded as a 'FAIL' in the CoP DoC).

See Appendix 7.8 Table 1 Corrected CoP DoC Roll Test Period and GM.

A copy of the CoP DoC certificate was sent to the Marine Survey Office for their authorisation and files.

Note: In comparison with the vessel's previous 2015 CoP Roll test when its freeboard was recorded as 0.69 m, the vessel's freeboard measured at the 2018 roll test was recorded as 0.35 m. (Therefore the 2015 roll test may not have been conducted in the "normal departure port condition" as required in CoP Chapter 3 Stability, paragraph 3.2.2. and the measured Freeboard was not indicative of the "normal departure port condition").

The dredges were onboard for the 2018 roll test, ("normal departure port condition" as required in CoP Chapter 3 Stability, paragraph 3.2.2. Therefore, the measured freeboard at 0.35 m was indicative of the "normal departure port condition").

2.4.3 It can be seen that the 2018 freeboard at 0.35 m was significantly reduced from the 2015 freeboard at 0.69 m, a reduction of 0.34 m. MCIB investigators calculated that with a freeboard of 0.35 m, an 8 degree (°) heel angle would immerse the bottom part of the freeing ports on the lower side below the waterline.

The 2018 average roll test time was recalculated by the MCIB as being 6.43 seconds. This roll period is higher and therefore longer than the 2015 CoP average roll tests time of 5.3 seconds. This indicates that the vessel's stability was more tender in 2018 than in 2015.

MCIB deduce that the dredges were not onboard for the 2015 CoP DoC stability check roll test when the freeboard was measured at 0.690 m. The freeboard was recorded in 2018 at 0.350 m. MCIB calculate that the weight of the dredges (3000 kg) and other equipment onboard in 2018 accounts for this reduction in freeboard as recorded in the 13 April 2018 CoP DoC survey and the increase in the roll test time.

Note: The UK's Maritime Coastguard Agency (MCA) published Marine Guidance Note (MGN) MGN4 27(F) – Stability Guidance for Fishing Vessels of under 15 m Overall Length includes a method of assessing a fishing vessel's stability by roll-period approximation which is a simple operational comparative method to determine whether a vessel's motion is 'stiff' or 'tender'. If the roll period (in seconds) is less than the vessel's beam (in metres), the vessel is considered to be 'stiff'. If the roll period is more than the vessel's beam the vessel is considered to be 'tender'. A vessel with a stiff rolling motion is relatively uncomfortable; persons onboard would be subjected to quick accelerations with abrupt changes in direction. Conversely, a vessel with a tender rolling motion is relatively more comfortable in that persons onboard are not subjected to quick accelerations or abrupt changes in roll direction.

A copy of the CoP DoC certificate was sent to the MSO.

2.5 Crew Details

"FV Alize" had 2 crew onboard at the time of the incident:

- The Skipper had completed Bord Iascaigh Mhara (BIM) Basic Safety Course in November 2012.
- The crewmember completed a BIM Basic Safety Course in 2015.

- The crewmember had been issued with a Second Hand Special Certificate (No.531) in May 1980
- Both crewmembers were regular employees of the owner and familiar with the fishing vessel and its operating systems.

2.6 Fishing Rig and Method

"FV Alize" was rigged as a beam trawler for scallop fishing using fishing gear comprising two dredges; one dredge to port and one dredge on its starboard side. Each dredge consisted of a steel pipe approximately 5 m in length to which were attached 6 dredges bags configured side by side along the pipe. Each bag was attached to the dredge pipe at the opening with the collection section at the end of the bag made of steel rings. The dredge was designed to be dragged along the seabed as the dredge bags scooped up and collected a mix of spoil (mud, stones, shells) and scallops. It was conservatively estimated that the weight of the scallop catch and spoil contents of six full dredge bags would amount to 250 kg.

The 5 m long steel dredge tow pipe was fitted with towing lugs welded at each end to one end of a chain tow bridle and towing ring which was then connected to a steel trawl wire rigged via derricks to the towing winches onboard the fishing vessel.

The tail of each dredge was attached by a chain to a tipping bar to enable all of the dredges to be inverted at the same time in order to disgorge the contents of the 'bag'. The weight of one empty dredge was approximately 1500 kg. The weight of one full dredge was estimated to be approximately 1750 kg

See Appendix 7.9 Photograph No.4 - Typical scallop beam trawler rig.

See Appendix 7.10 Figure No.4 - Typical scallop dredge arrangement.

2.6.1 Normal method when hauling (bringing onboard) the trawl dredges:

While fishing, the port and starboard dredges would be streamed outboard from the fishing vessel by port and starboard derricks which would be extended out horizontally from the vessel's midships gantry.

Both trawls with tow pipes and dredges would be hauled to the sea's surface simultaneously using the main trawl winches. As the trawl gear broke surface the port and starboard derricks would be hoisted together using the topping lift wires and winches. This action would draw both trawl tow pipes and attached dredges towards the side of the trawler and then as the derrick heads approached the vertical the tow pipes with dredges attached would simultaneously rise above the sea's surface, the tow pipes would swing inboard over the top edge of the port and starboard gunwales. As both tow pipes and dredges swing inboard the tow pipes would be clipped and secured from movement.

2.6.2 As each dredge was secured the winch operator would lower the dredge(s) onto their captive pennants and clips thereby transferring the weight of the dredges from the derrick head to the vessel's main deck. Witnesses stated that after the 2014 refit, the Skipper and crew of *"FV Alize"* had carried out this operation many times a day without mishap. Family members stated that the operation was efficient, quick and designed to avoid any delays in lowering the dredges to the gunwales expeditiously.

2.7 Marine Casualty

This was a very serious marine casualty resulting in the deaths of two persons and the loss of the fishing vessel.

2.8 Voyage Particulars

Duncannon (52° 13'16"N 6° 55'55"W) is a fishing port located on the west side of the Hook Peninsula in Waterford Harbour at the mouth of the River Suir. Duncannon is in County Wexford.

See Appendix 7.11 Chart No.1 - Dungarvan to Bannow Bay.

See Appendix 7.12 Chart No.2 - Incident area off Hook Head.

"FV Alize" departed its home port of Duncannon, at 10.30 hrs on 3 January 2020 for a planned 36 hour voyage dredging for scallops off Hook Head. *"FV Alize"* regularly trawled for scallops in this area and its sea bottom contours and obstacles were well known to the Skipper. The fishing was uneventful and the Skipper confirmed to a family member by mobile phone that they had 29 bags of scallops aboard and were commencing their final trawl at around 18.30 hrs on 4 January. *"FV Alize"* was trawling approximately 7 NM southwest of Hook Head at this time.

According to chart data the seabed in this area is relatively unobstructed and *"FV Alize"* regularly fished this particular area. Family members stated that the Skipper was familiar with obstacles on the seabed and avoided them when trawling. INFOMar (www.infomar.ie) confirmed seabed survey showed no obstacle within 0.5 NM of position of the wreck.

The vessel's EPIRB was activated in position 51° 58.10'N 007° 01.20'W, approximately 7 NM southwest of Hook Head.

2.9 Emergency Response

Note: All times are stated in UTC. i.e. ZULU (Z) time

MRCC SITREP UIIN0025/20

4th January 2020

22:34 Z: UK MCC pass details of an active Irish registered EPIRB to MRCC Dublin. MRCC Dublin take coordination.

22:39 Z: Owner of casualty vessel contacted. Confirms vessel at sea fishing. Owners son onboard vessel.

22:49 Z: IRCG rescue helicopter R117 tasked / Dunmore east RNLI lifeboat tasked.

23:04 Z: Dunmore east RNLI lifeboat proceeding.

23:32 Z: R117 proceeding.

23:39 Z: Kilmore Quay RNLI lifeboat tasked.

23:43 Z: R117 on scene.

23:57 Z: R117 recover one casualty from water.

5th January 2020

00:31 Z: R117 back at Base – Apparent T4 passed to HSE ambulance/ Kilmore Quay RNLI on scene. Incident ongoing.

00:37 Z: R117 ON RAMP RETURNING TO SEARCH AREA.

0057 Z: MRCC DUBLIN IN CONTACT WITH FMC NAVAL BASE.

01:04 Z: R117 ONSCENE.

02:49 Z: R117 RETURNED TO BASE. DUNMORE EAST RNLI (OSC) AND KILMORE QUAY RNLI CONTINUING SEARCH.

02:59 Z: MRCC DUBLIN REQUEST ASSISTANCE WITH SEARCH FROM NAVAL OPS. INCIDENT GOING.

0350 Z: NAVAL OPS INFORM MRCC DUBLIN THAT LE CIARA HAVE BEEN TASKED TO ASSIST WITH SEARCH.

06:52 Z: RESCUE HELICOPTER R116 TASKED.

07:10 Z: FETHARD ILB PROCEEDING.

08:43 Z: FETHARD CGU TASKED TO ASSIST.

08:55 Z: R116 ON SCENE.

09:04 Z: KILMORE QUAY CGU TASKED TO ASSIST.

09:03 Z: LE CIARA ON SCENE.

10:51 Z: LB 16-13 DEPARTS KQ TO ASSIST.

11:20 Z: R116 DEPARTS SCENE.

13:31 Z: R117 ON SCENE.

13:54 Z: DUNMORE EAST LB RELAUNCHED.

16:03 Z: LE CIARA SUSPENDS SEARCH DUE TO WEATHER CONDITIONS AND FAILING LIGHT.

16:06 Z: MAYDAY RELAY INFO 6 SENT. ALL SRU'S RTB AND DEBRIEFED. ADVISED ON AVAILABILITY FOR LW SEARCH TOMORROW.

16:16 Z: 6 FISHING VESSELS REMAIN ON SCENE SEARCHING, REGULAR HEALTH CHECKS CONDUCTED BY VHF.

18:30 Z: KILMORE QUAY CGU CONDUCTING LW SEARCH OF BALLYTEIGE BURROWS.

20:00 Z: ALL FV DEPART SCENE TO RESUM LW SEARCH TOMORROW.

The following Search and rescue Units were tasked during the two day (4 -5 January) search for *"FV Alize"* and its crew:

IRCG - Rescue helicopters R116 and R117. Fethard CGU. Kilmore Quay CGU.

RNLI - Dunmore East ALB. Kilmore Quay's ALB. Fethard ILB. Kilmore Quay Relief ALB 16-13.

Fishing Vessels – 6 vessels (unidentified).

Naval Service - Naval Patrol *"LE CIARA"*.

2.10 Weather and Tides

2.10.1 Information from Met Éireann 24 hour coastal report:

Wind: Southwest Beaufort force 4 to 5 (14 to 21 knots). Occasionally gusting force 6 (22 to 27 knots)

Visibility: Occasionally good, but generally moderate to poor in any mist, rain and drizzle. At 23.00 hrs, the visibility at Tuskar Rock was reported as greater than 10 nautical miles, at Roches Point the visibility was reported as 1.9 nautical miles.

Sea State: Total sea-state: Moderate (~1.5 to 2 metres) significant wave height. Mean wave direction southwest (225 to 235 degrees). Mean wave period 5 to 6 seconds.

Swell: Wave height less than 1 metre, wave period ~11 seconds, wave direction southwest to west-southwest (230 to 245 degrees).

Wind sea: Wave height ~1.5 metres, period ~5 seconds, direction southwest (225 to 235 degrees).

Maximum individual wave at buoy M5: 3 metre wave height, 8.1 second wave period, ~240 degrees wave direction at 21.00 hrs. Buoy M5 is located approximately 30 nautical miles south of Hook Head.

See Appendix 7.13 Figure No.5 - Met Éireann weather conditions report.

2.10.2 Tidal information for 4 January 2020 at Dunmore East.

All times UTC. (Coordinated Universal Time)

Source: www.tidetimes.co.uk/dunmore East 20200104

LOW TIDE:	06:56 hrs	HEIGHT:	1.50 m
HIGH TIDE:	12:49 hrs	HEIGHT:	3.40 m
LOW TIDE:	19.23 hrs	HEIGHT:	1.50 m

See Appendix 7.14 Figure No.6 - Tide times for Dunmore East 4 January 2020.

2.11 Crew Personal Safety Equipment

PFDs were normally kept onboard. The crewmember was wearing a PFD when he was recovered from the sea by rescue crew of IRCG Rescue Helicopter R117. It was stated by the helicopter recovery crewmember that the PFD was incorrectly worn and was seen to be riding high up and not keeping the Casualty's face out of the water. There was no crotch strap or spray hood fitted to the PFD. The Skipper was not wearing a PFD when his body was recovered from the wreck.

Personal Location Beacons (PLB). A former crewmember reported that three PLBs were normally kept in the wheelhouse. No PLBs were recovered from the wreck and none of the crew had PLB attached on their clothing.

The liferaft, normally fitted on the wheelhouse roof, was not found during the extensive sea and shore searches. Hook Sub Aqua Club (SAC) civilian divers reported that the liferaft was not attached to the wreck on the seabed. The whereabouts of the liferaft remains unknown at this time.

2.12 Search for *"FV Alize"*

Search and Recovery (SAR) operations for the wreck of *"FV Alize"* and the missing crewmember were conducted by the Naval Service Diving Section (NSDS) of the Irish Naval Service (INS). Search operations commenced on 7 January 2020. A seabed search commenced 8 January using Side Scan Sonar (SSS) and an uncharted wreck was detected in position 52° 00.9'N, 007° 01.9'W at a depth of approximately 50 m. On 9 January, an Autonomous Underwater Vehicle (AUV) capable of taking sonar scan images was deployed and remotely guided over the uncharted wreck. A series of sonar scan images taken of the wreck enabled NSDS AUV operators to determine that the wreck was likely to be *"FV Alize"* and that the wreck was lying on its port side and appeared to be relatively undamaged.

This information was relayed to An Garda Síochána (AGS) who were the civil authority for the SAR operations for the missing crewman and *"FV Alize"*. The NSDS team departed the scene of the casualty and returned to Base.

The Garda Water Unit of AGS conducted search operations of the wreck commencing 20 January 2020. Garda divers reported that the wheelhouse was at 49 m and, although visibility was less than one metre, established that there were no remains (human) inside the wheelhouse. The remainder of the hull was below 50 m and beyond the operational limits of the Garda Water Unit and the Unit suspended operations at that time.

On 22 January civilian divers from Hook SAC dived on the wreck of *"FV Alize"* and located a body trapped, inboard, under the starboard gunwale of the wreck. The information was relayed to MRCC Dublin and AGS.

Following a request from AGS to recover the body, the Naval Service's NSDS returned to the incident scene and commenced recovery operations on 23 January 2020. Naval divers descended to the wreck to clear the area immediately around the location of the body which was found to be trapped behind pipes running along and under the starboard gunwale conveyor. Due to the depth of water (approximately 50 m) ten minutes was the maximum safe bottom time achievable for diver operations. Due to this restriction a detailed examination of the wrecks condition was not possible. The body was recovered on 24 January and identified as being that of the missing crewmember; the Skipper of *"FV Alize"*.

See Appendix 7.15 Photograph No.5 - Sonar Scan image *"FV Alize"* - Stern view.
Photograph No.6 - Sonar Scan image *"FV Alize"* – Bow view.

3. NARRATIVE

3.1 The vessel left Duncannon Harbour in Co. Wexford at 10.30 hrs on 3 January 2020 to fish for scallops south-west of Hook Head. There were two people onboard; the Skipper and one crewmember. Onboard *"FV Alize"* the normal duration of a tow was one and a half to two hours. After this time elapsed both dredges would be recovered (hauled) to the surface simultaneously. The procedures adopted by the two crew of *"FV Alize"* when hauling the dredges was for the Skipper to leave the wheelhouse and take up his station beside the winch hydraulics controls immediately behind the wheelhouse on the main deck with clear view of both sides and the trawl gear. By moving a system of toggles and levers on the hydraulic winch control panel the Skipper/winch operator controlled:

- The two main trawl winches each winding in a trawl wire.
- The two derrick topping-lift winches raising and lowering each of the two derricks.
- The dead weight at the end of the derricks.
- The dead weight tension in the trawl wires.

All winches were independently controlled by their dedicated hydraulic controls.

3.2 The trawl rig onboard *"FV Alize"* was as follows: Both trawl wires were each attached at their ends to a tow ring, tow bridle and a towing pipe with six dredge scallop 'bags' attached to the tow pipe(s).

See Appendix 7.9 Photograph No.4 - Typical scallop beam trawler rig.

See Appendix 7.10 Figure No.4 - Typical scallop dredge arrangement.

Witnesses reported that normally both trawls with tow pipes and dredges were hauled to the sea's surface simultaneously by the winch operator using the hydraulic trawl winches. As the tow bars become visible on the surface the port and starboard derricks would be hoisted together under the control of the winch operator using the topping-lift winches and wires. This action would draw both tow pipes and dredges towards the side of the trawler and then as the derrick heads approached the vertical the tow pipes with dredges attached would rise above the sea's surface. The tow pipe would swing inboard over the top edge of the gunwale. As both tow pipes and dredges swing inboard the task of the deck crewmember was to clip and secure the tow pipe and dredges from movement due to the pitching and rolling motion of the vessel; in both fore and aft direction and transversely. Once the dredges are secured from movement the winch operator would then release the tension on the trawl wire and thereby allow the weight of the tow pipes and dredges to transit from the derrick heads to the securing clips and brackets holding the tow pipes and dredges in place at their housed position.

3.3 At the time of the incident *"FV Alize"* had one crewmember carrying out this operation while the other crewmember operated the winch controls. A former crewmember of *"FV Alize"* indicated that there were normally three crew onboard for fishing trips and it was normal practice for one crewmember to secure one dredge while the other crewmember simultaneously secured the other dredge, and a third crewmember operated the winch controls.

3.4 *"FV Alize"* trawl handling equipment's configuration at the end of the hauling operation would normally be as follows:

- Both derricks vertical to the deck and secured by the topping-lift rig to the vessel's midships gantry's port and starboard posts.
- Both tow pipes clipped and secured at working deck gunwale level with the weight of the dredges and contents supported on the gunwales.
- Both trawl wires slack having had the weight taken off them.
- Dredge bags and contents hanging outboard over the gunwales.

3.5 The crew's next task would be to invert the dredge bags and tip out the contents onto a conveyor running fore and aft immediately under the gunwale. On the conveyor, the contents would be hand sorted by the crew; scallops removed into bags while the spoil travelled aft automatically along the conveyor to an open chute at the aft end of each side gunwale and jettisoned overboard.

The scallop catch would be bagged on deck and set aside. Once the sorting had been completed, the bagged scallop catch would be moved below main deck to the fish hold.

The crew's final task would be to prepare the dredges for the next trawl (and deploy the trawl if fishing was to continue), and clear off any debris (spilled spoil from the sorting and conveyor process), from the work deck and jettison overboard through the freeing ports.

3.6 The planned duration of the voyage was 36 hours and the voyage proceeded as normal. In the evening of the following day, at 18.30 hrs on 4 January 2020, the Skipper in discussion with the owner, confirmed that they had onboard 29 bags of scallops and were about to commence their last tow (trawl). 29 bags of scallops equates to between 1.05 tonnes and 1.1 tonnes which is approximately 37% of the maximum catch allowed for this vessel.

3.7 By this time the vessel was operating in darkness and homeward bound towards Duncannon Harbour. The crew had been at sea and fishing for 36 hours and may have been fatigued as they prepared to haul in the last trawl. Verifiable records of hours worked by each member of the crew during the voyage were not available as they were likely lost with the vessel.

4. ANALYSIS

4.1 Loss Scenario

At approximately 20.45 hrs on 4 January, the Skipper of *"FV Alize"* confirmed by phone to a family member that they were finishing up their last tow before they returned to port. No mobile phone was recovered with the Skipper's body and its whereabouts is not known. At 21.45 hrs the family member tried to contact the Skipper but received no response. The phone may have been in the unattended wheelhouse and was therefore unanswered or the vessel had sunk at this time and the phone submerged.

At 22.34 hrs UK MCC pass details of an active Irish registered EPIRB to MRCC Dublin which was determined to have been activated from *"FV Alize"*. The wreck of the *"FV Alize"* was found lying on the vessel's port side on the seabed. Side scan sonar images showed the vessel's starboard derrick in its housed position. Therefore it may be reasonably deduced that *"FV Alize"* foundered while the vessel was hauling or just finished hauling in the scallop catch while on course returning to its home port of Duncannon sometime between 20.45 hrs and 22.34 hrs.

Evidence so far indicates that:

- There was no emergency VHF radio broadcast heard on channel 16.
- There were no distress phone calls from either of the crew.
- There were no flares or other emergency distress signals seen at the time of the incident.
- The vessel's EPIRB activated at 22.34 hrs
- The crewmember recovered by the rescue helicopter was not in the vessel's liferaft.
- The body of the Skipper was found trapped behind equipment on the wreck's main deck.

It is therefore reasonable to deduce *"FV Alize"* sank quickly with little warning to the crew.

There are several scenarios whereby a fishing vessel off the coast may sink quickly.

Broadly, these are:

a. Collision with another ship or large object.

b. Overwhelmed by seas in adverse weather.

c. Structural hull break-up.

d. Failure of ships equipment causing damage to hull watertight integrity.

e. Capsize due to loss of stability.

f. Explosion.

g. Snagged nets or 'girding' on a 'fastener' on the seabed causing capsize.

Evidence so far indicates that:

a. There were no collision reports from other ships and there appeared to be no significant damage to *"FV Alize"* s hull in the sonar scan images of the wreck. This scenario is rejected as being unlikely.

b. The prevailing weather was not bad and seas were not excessively rough at the time of the EPIRB activation. If the vessel's stability was within approved stability criteria, adverse weather and/or sea conditions would not normally be a causal factor to a vessel sinking. However, the stability of the vessel during hauling has been found to be significantly reduced and the weather may have been a factor. This scenario remains as being potentially likely.

c. The wreck appeared to be in one piece with no signs of a hull break-up. *"FV Alize"* was reportedly well maintained and had undergone a major refit six years previous renewing large sections of hull under the guidance of a naval architect and surveyor. This scenario is rejected as being unlikely to be the cause or a factor to the sinking.

d. The vessel may have suffered damage to the hull due to lifting equipment failure. This scenario remains as being potentially likely.

e. The vessel may have capsized and sank due to loss of stability. The stability of the vessel during hauling has been found to be significantly reduced. Therefore, this scenario remains as being potentially likely.

f. There were no reports of an explosion or fire heard or seen around the time of the incident. This scenario is rejected as being unlikely.

g. The FV was not fishing and was not under tow. INFOMar surveys indicates no sea bottom obstacles within 0.5 NM of the wreck. The Skipper was reported to be familiar with the location of obstacles on the seabed in the locality of the wreck's position. Sonar imagery of the wreck showed the vessel had completed hauling its trawl. This scenario is rejected as being unlikely to be a causal factor in the sinking.

4.1.1 Considering the weather and seas factor, (scenario 4.1 'b'): Adverse weather and/or sea conditions affects a vessel's motion in a seaway. The weather and sea state off Hook Head during the evening of 4 January was not unusual for the time of year. Waves up to 2 m significant height and mean wave period between 5 to 6 seconds with wind and seas running in a south-westerly direction force 4 to 5 occasionally 6 with a flood tide in the direction of Carnsore Point and the Irish Sea would be uncomfortable for the crew but would not normally present difficulties to a modern commercial fishing vessel of this size. Although, at the approximate

time of the incident the vessel was operating in night time conditions, and wind, seas and tide was in the same direction, the environmental conditions would not be considered abnormal. However, the motion of a vessel stopped in the water and drifting while hauling its dredges would be considerably worsened by shortcomings in its freeboard or if the vessel was lying beam on to prevailing weather and seas. The vessel's rolling motion with a limited freeboard would run the risk of allowing seawater to enter the working deck area through the vessel's freeing ports if they were open or malfunctioning.

The manner in which a vessel is loaded governs the vessel's motion. Vessels which are stiff tend to roll sharply and quickly whilst those which are tender are slower in the transverse motion. A simple operational comparative method to determine whether a vessel is stiff or tender is by roll period approximation. If the roll period in seconds is less than a vessel's beam in metres, the vessel is considered to be stiff. If the roll period is greater than the vessel's beam, the vessel is considered to be tender. *"FV Alize"* had a beam of 5.22 m and the CoP 2018 roll period was re-calculated as being 6.4288 seconds. Therefore, the vessel would be considered 'tender'.

Wave period is the distance between two consecutive waves passing through a stationary point, measured in seconds. From the coastal weather report, sea state and wind/sea interactions resulted in wave periods between 5 to 6 seconds (reference paragraph 2.10.1).

The time taken for a vessel to complete a roll from one side to another and back again is known as the 'period of roll'. This time interval will depend on weight distribution within the vessel in as much as alterations of distributions will alter both the vessel's metacentric height and its radius of gyration (the turning or power of revolution about the fore and aft axis of the vessel).

Where there exists a similarity between the rolling period of the ship and the period of the waves, rolling is apt to promote dangerous circumstances onboard. A vessel in such cases tends to 'keep time' with the waves producing a condition known as 'synchronism'. When such conditions exist, a vessel which is rolling from side to side may receive an added impulse at the extremity of the vessel's roll and consequently, provided that statical forces within the vessel are small, the vessel will lurch heavily in the direction of that particular roll.

Where there exists a synchronism or similarity between the rolling period of the vessel and the period of the waves, continued rolling of the vessel is likely to promote extreme heel angles and potentially hazardous circumstances with respect to vessel's intact stability. MCIB investigators calculated the roll period for *"FV Alize"* in 2018 as being 6.4288 seconds while the wave periods were close to this figure (between 5 – 6 seconds). It would be reasonable to surmise that if *"FV Alize"* was lying beam on to the waves, the vessel would possibly enter conditions of synchronism between the vessel's roll period and the seas wave

period. A vessel experiencing synchronism and lurching heavily would present difficult and challenging conditions to a crew working on the deck of a beam trawler at night. It may be reasonably surmised that this scenario may have been a factor or contributory factor in the sinking of *"FV Alize"*.

4.1.2 Considering damage to the hull (scenario 4.1 'd'): Sonar images of the wreck show that *"FV Alize"* is lying on its port side. The sonar scan images of the wreck indicates that the vessel appears to be intact with no significant damage to the hull.

4.1.2.1 The starboard derrick is clearly defined and appears to be close to, or in its stowed position. The port derrick is not seen in these images. It was normal practice for the crew to raise both derricks simultaneously. If the starboard derrick is in its housed position then the port derrick should be in a similar attitude. It may be reasonably deduced that:

- The vessel sank during hauling of the dredges when both derricks were in their respective vertical attitude.

- The port derrick is not in sonar scan view and maybe either lying on the seabed under the wreck or broken off and remote from the wreck.

The possible reasons for the port derrick not being seen to be in place:

- Port derrick is in place but obscured by sea bottom and sonar scan image shadows and clutter.

- Component failure of the derrick luffing equipment allowing the derrick to fall and hidden under the wreck or detached and lying elsewhere on the sea bottom.

4.1.2.2 *"FV Alize"* was rigged for beam trawling using a system of lifting equipment, including winches, derricks, sheaved blocks and wires. This particular type of rig requires an amount of lifting equipment which is by virtue of their position, exposed to corrosive sea conditions.

The CoP, Section 4.5 'Fishing and Handling Equipment' section applies to all fishing vessels.

Section 4.5.1 states "Every vessel provided with winches, tackles and lifting gear must have this equipment efficiently and safely installed having regard to its intended service of the vessel. All parts of lifting gear and similar equipment, whether fixed or movable and items used in connection with such equipment must be of solid construction, designed and built to withstand foreseeable loads. They must be appropriately and suitably secured, supported or hung in relation to the purpose for which they are. There must be easy access for maintenance purposes".

The CoP: Section 4.5.2 states: "All parts of the running gear including wires and chains and the like must be of sufficient strength and safe working load to withstand foreseeable loads. All load bearing parts must be regularly maintained and inspected for condition."

The operation, care, maintenance and examination of lifting equipment is thoroughly regulated in other industries. Companies and users of lifting equipment are required by legislation to ensure the equipment is examined periodically by a competent person.

Merchant ships carry a register of lifting equipment which is subject to regular scrutiny. The register lists every lifting equipment item used on the vessel in detail to ensure that before the item is brought into service that it is appropriate for the task, of suitable quality and construction, suitably marked showing a unique identification code and safe working load. Unless the lifting equipment has an EC declaration of conformity less than 12 months old, all lifting equipment must be thoroughly examined prior to being used for the first time. Lifting equipment exposed to conditions which may cause deterioration and result in hazardous situations must be thoroughly examined by a competent person in accordance with an inspection regime.

Periodicity of examinations of lifting equipment exposed to offshore conditions, which cause deterioration due to the sea's corrosive atmosphere, should be not more than six months. It was the Skipper's policy to inspect and turn around (end for end) each wire every six months and replace the wires annually which reflected best practice on his part.

The CoP DoC survey takes place every four years and is conducted and certified by an authorised person. Part of this survey examines fishing and handling equipment and at section 4.5.2 running gear is examined for compliance to the CoP. Fish handling equipment include lifting equipment, not only for fishing but also for moving and handling the fish catch around the vessel.

The Intermediate Declaration takes place on the second anniversary of the DoC and is a self-declaration by the owner of the fishing vessel that the vessel arrangements, fittings and equipment have been maintained in accordance with the Code. There is a substantial gap between the CoP regulation regarding lifting equipment and land based legislation with respect to the use of lifting equipment in that there is no:

- Requirement to examine the vessel's lifting equipment other than that required for the CoP DoC and Intermediate Declaration.

- Requirement that the authorised person or the owner is deemed to be a competent person for the examination of lifting equipment.

- Requirement for the vessel's lifting equipment be tested for its Safe Working Load.

Failure of any component in the trawling equipment while hauling could result in hazardous conditions on the deck of the vessel. More seriously, a failure of a component in the derrick's topping-lift rig (lugs, shackles, shackle pins, sheaved blocks, sheaved block pins), would result in the derrick dropping to the lowered position. This may likely cause some material damage to the vessel itself but would also result in lowering the weight from the derrick head which would have a positive effect on the vessel's dynamic stability at that moment in time. Although an event of this nature would be extremely hazardous to crew working on deck and likely cause extensive damage to the hull upperworks and equipment of the vessel, evidence collected does not indicate that component failure, in an isolated instance, would be a causal factor in the sinking of the vessel.

4.1.3 Considering the vessel capsized and sank due to a loss of stability factor (scenario 4.1 'e'):

The importance of, and effect on a vessel's stability by correctly maintaining an adequate stability condition is paramount. Weather decks must incorporate weathertight decking, hatches, and doors which should be kept closed when the vessel is experiencing adverse weather of working cargo at sea in a seaway to avoid free water entering below decks and down flooding. Decks should be kept clear of water, spoil, debris and other moveable weights. A vessel may be 'stiff' in its movement in a seaway due to its large beam, but, if the freeboard is small there may be little reserve of stability when the vessel heels or is in large waves due to the dangers of down-flooding. Conversely, a vessel which is 'tender' and seems very sea-kindly and comfortable with a slow roll period can potentially be unsafe in terms of stability, again because there may be little reserve of buoyancy. Keeping water off the deck by closing scuppers or freeing ports may seem sensible and safe but does have the opposite effect if a wave comes onboard and causes instability because of the trapped water and its free-surface effect. It is also vital that a fish catch is not stored on deck but bagged and moved into a lower position in the fish hold and secured from movement as soon as is practicable.

4.1.3.1 It is generally accepted within the beam trawler fishing industry that the hauling operation carries a particular risk to the trawler and its crew due to changes in the vessel's stability. There is a critical time period during this particular operation when the combined weight of both dredges act through the head of the vertically positioned derricks above the main deck and the vessel's condition of stability and motion would become significantly more 'tender'.

It is generally known that trawler crews must be alert and their actions deft so that the trawler does not remain in this condition for longer than is necessary to secure the tow pipes and dredges suspended from the derricks.

Once the trawler's crew secure the tow pipes and dredges and lower their combined weights to the deck then the vessel's motion and stability would return to normal.

4.1.3.2 Both the 2015 and 2018 CoP DoC stated that the fishing vessel crew numbered 3. The Stability Information Booklet allowed for 3 crewmembers onboard. Therefore, CoP DoCs and the Stability Information Book indicated that the *"FV Alize"* was shorthanded by 1 crewmember when the vessel hauled in the last tow.

Being shorthanded would have a negative impact on the hauling operation for *"FV Alize"*. As both tow pipes and dredges swung inboard the task of the deck crewmember to clip and secure both tow pipes and dredges from movement would be delayed as the deck crewman's actions in securing the dredges could not be simultaneous.

Once the first dredge aboard was clipped and its weight lowered, the crewmember was required to carry out the same procedure to the second dredge on the opposite side of the vessel's main deck thereby resulting in a time lapse between completion of the two securing tasks. This would also delay the winch operator's actions to release the tension on the second trawl wire and thereby allow the weight of the dredge to transit from the derrick head to the securing clips and brackets holding the tow pipe and dredges in place at their housed position (4.55 m above baseline).

4.1.3.3 The vessel's lifting equipment for hauling the dredges was complex. The topping-lift rigging of each derrick acted about a single articulated joint at the foot of the 6.7 m long derrick and attached to the midships deck gantry 1.2 m above the deck level (the head of the derrick was 7.9 m vertical distance above main deck level). The derrick was restricted from slewing by fixed length stay wires attached between the vessel's bows and stern to the head of each derrick. Therefore both derricks were restricted to vertical raising and lowering movements only. Hauling the dredges involves two sets of winches (the main trawl winches and the derrick topping lift winches) and two sets of wires (two trawl wires attached to the dredges and two topping-lift wires controlling the derrick movements). The wires are reeved through several pulley blocks secured by welded lugs to the derricks and gantries.

Failure of the wire or any of the components comprising the fixed lugs (derricks and gantry's), pulley blocks and shackles would cause the derrick to descend in an uncontrolled manner. Witnesses reported that it was the Skipper's policy to inspect and turn around (end for end) each wire every six months and replace the wires annually.

"FV Alize" trawl handling equipment's configuration at the end of the hauling operation would normally be as follows:

- Both derricks vertical to the deck and secured by the topping lift rig to the vessel's midships gantry's port and starboard posts.

- Both dredges clipped and secured at working deck gunwale level with the weight of the dredges and contents supported on the gunwales.

- Both trawl wires slack having had the weight taken off them.

- Dredge bags and contents hanging outboard over the gunwales.

Images from the sonar scans show the starboard derrick is in the housed position and therefore the trawl wire is wound in. The port derrick is not visible in the scan and is likely lost in the images background clutter. A witness reported that the trawl handling and topping-lift equipment was totally renewed during the 2014 refit. Even so, it would be reasonable to deduce that if a topping-lift component failed then the derrick would descend, lowering the weight from the derrick head which would have a nett positive effect on the vessel's dynamic stability at that moment in time. It is reasonably deduced that a component failure in the lifting equipment rig would result in a positive effect on the vessel's stability condition and would therefore not be a factor in causing the loss of the vessel.

4.1.3.4 The following Working Instructions were included in the Stability Information Booklet:

- Instruction No. 1. Operation: The voyage cycles shown in Part III (voyage cycle assumptions, stability criteria and loading conditions), are the assumed loading conditions for the vessel. The vessel must not be loaded, unloaded or operated is a way that reduces stability and freeboard without first checking that these remain above the minima.

- Instruction No. 6. Water on deck of enclosed fish washing spaces: Loose water on deck can cause significant loss of stability due to its ability for transverse movement. The deck should be maintained clear of water. In the event of build-up of water occurring in the processing spaces, the water supply should be stopped until the deck has been cleared.

- Instruction No. 8. Watertight Structures: The stability of the vessel is entirely dependent on water being excluded from within the main hull and watertight deck structures. Open doorways, hatchways, etc. breach this watertight integrity leaving the vessel vulnerable to capsize when suddenly heeled, or when taking sea onboard. Doors, hatches and similar openings, leading within watertight structures should therefore be kept closed at sea when not in use.

The following Statement was included in the Stability Book for counter signature by the owner and Skipper:

"The loading/operation conditions set out in Part III of this stability information book in conjunction with other information contained therein, are based on the worst foreseeable service conditions in respect of the weights and disposition of fish carried in the hold or on deck, ice in the hold, fuel, water and other consumables. Notes. 1. The Skipper is obliged to ensure that his operation of the vessel does not render the above statement invalid."

Both crewmembers had completed the BIM Basic Safety Course, the vessel's Skipper in 2012 and the crewmember in 2015, but the course syllabus had no content addressing fishing vessel stability awareness or stability safety measures. Both were professional fishers, very experienced and regular employees of the owner and described as very familiar with *"FV Alize"* and its operating systems. The Skipper had stood by the vessel during its refit in 2014 and operated the vessel since 2015. However, despite his extensive experience he had no formal instruction in stability enabling him to fully appreciate the contents, the Working Instructions and Statement contained within the Stability Information Booklet, whereby a number of factors, inconsequential on their own, might, cumulatively endanger the vessel's stability.

4.1.3.5 The Stability Information Booklet Stability calculations were made for 7 loaded conditions:

- Condition 1: Lightship. i.e. (as calculated plus dredges weight).
- Condition 2: Departure 98% ; consumables.
- Condition 3: Arrival at grounds; 88% consumables.
- Condition 4: Depart grounds; 20% consumables; 100% catch.
- Condition 5: Arrival ; 10% consumables; 100% catch.
- Condition 6: Depart grounds; 20% consumables; 20% catch.
- Condition 7: 10% consumables; 20% catch.

A curve of statical stability was plotted for each condition. In each condition the vessel satisfied the six criteria for IMO intact stability for a beam trawler less than 24 m in length (being 20% increase on the conditions set for a normal fishing vessel). These IMO criteria were used for intact stability analysis for *"FV Alize"* 2015 Stability Information Booklet and are as follows:

Criteria No. 1. Area under the righting lever curve (GZ curve) between angles 0 degrees and 30 degrees not to be less than 0.066 mrad.

Criteria No. 2. Area under the righting lever curve (GZ curve) between angles 0 degrees and 40 degrees not to be less than 0.108 mrad.

Criteria No.3. Area under the righting lever curve (GZ curve) between angles 30 degrees and 40 degrees not to be less than 0.036 mrad.

Criteria No.4. The righting lever GZ to be at least 0.24 m at an angle of heel greater than 25 degrees.

Criteria No.5. The maximum righting lever GZ to occur at an angle of heel not less than 25 degrees.

Criteria No.6. The initial metacentric height to be not less than 0.42 m (for a beam trawler less than 24 m in length).

4.1 3.6 A CoP DoC roll test was conducted on 9 January 2015 immediately after the vessel's refit. The CoP DoC recorded freeboard for the roll test was 0.690 m. The Stability Information Booklet's inclining experiment recorded the freeboard also at 0.69 m. It is reasonable to surmise that the vessel was in the same condition for the inclining experiment and the CoP DoC roll test as the recorded freeboards were the same (0.69 m).

The DoC roll test result for the vessel's GM was recorded as 0.62 m obtained from a roll test, described in Annex 1, the Code of Practice for fishing vessels under 15 metres in length (CoP). The stability standard states that this figure shall be 10% greater than the minimum metacentric height GMmin calculated using the formula in Chapter 3 of the CoP.

It can be seen that the calculated GM using the roll test method (0.62 m) was less than the calculated GMmin (0.68 m). A reason for this may be that, in the roll test method, a factor is applied per type of vessel. In the case of *"FV Alize"* the factor used is 0.8. This is a generic factor for fishing vessels and not accurate in some instances according to the dimensions of the particular vessel form and construction.

4.1.3.7 Stability of small fishing vessels: The issue of stability for small fishing vessels is complex and often difficult to assess. The best method to analyse the stability of any vessel is to carry out a full and detailed stability analysis. This is done by means of a computer model of the vessel and development of a Stability Booklet for that vessel. Carrying out such an analyses requires the owner to engage a qualified naval architect who needs to develop full detailed drawings of the vessel and often for small fishing vessels such an analysis is not possible.

The International Maritime Organisation (IMO) has recognised this in its Code for Small Fishing Vessels. The Irish Code is based on the IMO Code. Essentially what the IMO Code states is that a full stability analysis should be carried out and that, in cases where this is not possible, the approximate method of a roll test can be used. Reference IMO Code Section 3.2 and 3.2.1.

See Appendix 7.16 Figure No.7 – IMO Code of Safety for Fishermen and Fishing Vessels, Chapter 3.

Section 3.2.6 sums up the situation as follows:

> 3.2.6 The above formula is not intended as a replacement for the basic criteria given in 3.2.1 and 3.5 but is to be used only if circumstances are such that cross-curves of stability, KM curve and subsequently GZ curves are not and cannot be made available for judging a particular vessel's stability.

The formula referenced in 3.2.6 is the approximation formula used for the GM in both Codes, and the cross-curves etc. refers to a full stability analysis.

The IMO Code applies for fishing vessels between 12 m – 24 m length; the *"FV Alize"* was just under 12 m. The IMO does not have a Code for smaller fishing vessels, it does have recommendations which are similar to the Code. The Irish CoP applies to all fishing vessels less than 15 m length. Also, of note is that the Irish CoP recommends compliance for existing fishing vessels with Annex 7 paragraph 4.2 of the Irish CoP which is the new standard for new vessels and this requires full stability from section 3.2 of the IMO Code.

Therefore, in the case of *"FV Alize"* it is not the case that it "Failed" its stability roll test and derived GM, on the contrary the owner applied a higher stability standard and engaged a naval architect to carry out a stability analysis and the vessel complied with the more detailed stability calculations and had a full Stability Book.

MCIB stability calculations concur with the vessel's stability analysis contained within the Stability Book and also concur with the IMO criteria for the vessel's stability Conditions 1 through to Condition 7.

4.1.3.8 *"FV Alize"* - stability immediately before its final tow: The vessel's stability before its final tow may only be estimated at this juncture. The following factors are known with some degree of certainty:

- 1.1 tonnes (t) or 37% of catch (29 bags of scallops) in the fish hold.
- Consumable (fuel, oil, and water) depleted to 20%.

The stability of *"FV Alize"* at this time is estimated as more or less Condition 6 'Departure Grounds' i.e. 20% consumables; 20% catch in the Stability Book. The following stability factors are pertinent to this condition:

- GZ curves of statical stability calculated for this condition passed the IMO's 6 criteria for a beam trawler less than 24 m length overall.
- Angle of heel of vanishing stability at this condition is estimated as in excess of 90° angle of heel.

It can be seen that in this condition the vessel was not overloaded and passed all IMO criteria.

See Appendix 7.17 Figure No.8 - *"FV Alize"* Stability Information Booklet, Condition 6 'Departure Grounds'.

4.1.3.9 The safe operation *"FV Alize"*: CoP DoC certification indicates a crewing level of 3. However, the vessel was being operated by 2 crew on 4 January 2020. This had ramifications to the safe operation of *"FV Alize"* in that:

- The wheelhouse was unattended; there was no one in charge of the navigational watch; therefore, the vessel was uncontrolled in a seaway.
- With one crewmember working the winches, the remaining crewmember was required to secure the dredges in sequence and not simultaneously, i.e., the dredges were secured consecutively and not simultaneously. Therefore, while the first dredge was being secured the other dredge was unsecured; its movement influenced completely by the roll of the vessel with its weight acting like a pendulum and its weight acting at the head of the derrick, 7.9 m above the main deck.
- The Stability Information Booklet contained no analysis and was not required to make analysis for this type of operation.

Hauling operations involving the hoisting of both derricks and bringing the dredges onboard immediately changes the stability conditions of the vessel. These conditions are described in this report as condition 8.2, Condition 8.1 and Condition 8.0 in that order:

4.1.3.10 MCIB calculated that, when hauling, the vessel's stability transits in sequence through 'Condition 8.2' to Condition 8.1 and finally to Condition 8.0:

- Condition 8.2 being the situation when both derricks are in a vertical position immediately after the dredges are drawn inboard with the dredges suspended and not secured is recognized as being the most vulnerable time for the vessel's stability.
- Condition 8.1 being the situation when both derricks are in a vertical position with one dredge secured and lowered to the gunwale and the other dredge still suspended and not secured. In sequence after Condition 8.1 is when the vessel's stability transits to Condition 8.0.
- Condition 8.0 is the condition when both dredges are secured and there is no weight acting from the derrick heads.

Condition 8.2: Hauling the dredges simultaneously with both derricks in their vertical position with the dredges unsecured and using the following stability factors:

- 37% of catch i.e., 29 bags of scallops (1.1 t), in the fish hold.
- Consumable (fuel, oil and water) depleted to 20%.
- An estimated 250 kg of spoil and scallops in each dredge.

- Each dredge weight (full), at 1750 kg.
- Both dredge weights acting through the head of each derrick 6.7 m above its stowed position and 7.9 m above the main deck (6.7 m + 1.2 m).

See Appendix 7.18 Figure No.9 – *"FV Alize"* Stability Condition 8.2.

Condition 8.2 does not comply with all six of the six IMO intact stability criteria for beam trawlers of less than 24 m in length:

- Criteria 1. "Area under the righting lever curve (GZ curve) between angles 0 degrees and 30 degrees not to be less than 0.066 mrad." The calculated actual value is 0.032 mrad, less than the required criteria.
- Criteria 2. "Area under the righting lever curve (GZ curve) between angles 0 degrees and 40 degrees not to be less than 0.108 mrad." The calculated actual value is 0.037 mrad, less than the required criteria.
- Criteria 3. "Area under the righting lever curve (GZ curve) between angles 30 degrees and 40 degrees not to be less than 0.036 mrad." The calculated actual value is 0.005 mrad, less than the required criteria.
- Criteria 4. "The righting lever GZ to be at least 0.24 m at an angle of heel greater than 25 degrees." In Condition 8.2, the maximum GZ of 0.095 m righting level occurs at 22 degrees angle of heel which is less than the required criteria.
- Criteria 5. "The maximum righting lever GZ to occur at an angle of heel not less than 25 degrees." In Condition 8.2, the maximum righting lever GZ occurs at 22 degrees angle of heel which is less than the required criteria.
- Criteria 6. "The Initial Metacentric height to be not less than 0.42 m (for a beam trawler less than 24 m in length)." The calculated value for GM in Condition 8.2 is 0.252 m which is less than the required criteria.

Note: In this condition the vessel has a point of vanishing stability at approximately 42° angle of heel and is in a dangerously unstable condition.

Condition 8.1: Hauling the dredges simultaneously and securing the dredges consecutively would induce the following stability factors:

- 37% of catch, i.e. 29 bags of scallops, (1.1 t), in the fish hold.
- Consumable (fuel, oil, and water) depleted to 20%.
- An estimated 250 kg of spoil and scallops in each dredge.
- Each dredge weight (full) at 1750 kg.
- One dredge lowered and secured with the weight acting at main deck level.
- The weight of the other dredge acting through the head of its derrick 6.7 m above its stowed position and 7.9 m above the main deck (6.7 m + 1.2 m) and swinging as a pendulum.

This condition is not described in the 2014 Stability Booklet. The stability condition of *"FV Alize"* taking into consideration the above factors is therefore described as Condition 8.1 in this report.

See Appendix 7.19 Figure No.10 – *"FV Alize"* - Stability Condition 8.1.

In condition 8.1, the vessel does not comply with the following four of the six IMO intact stability criteria for beam trawlers of less than 24 m in length:

- Criteria 1. "Area under the righting lever curve (GZ curve) between angles 0 degrees and 30 degrees not to be less than 0.066 mrad." The actual calculated value is 0.060 mrad and less than the required criteria.
- Criteria 2. "Area under the righting lever curve (GZ curve) between angles 0 degrees and 40 degrees not to be less than 0.108 mrad." The actual calculated value is 0.087 mrad and less than the required criteria.
- Criteria 3. "Area under the righting lever curve (GZ curve) between angles 30 degrees and 40 degrees not to be less than 0.036 mrad." The actual calculated value is 0.026 mrad and is less than the required criteria.
- Criteria 4. "The righting lever GZ to be at least 0.24 m at an angle of heel greater than 25 degrees." In Condition 8.1 the actual calculated value is the maximum GZ of 0.18 m righting level occurs at 28 degrees angle of heel and is less than the required criteria of 0.24 m.

However, in this condition the vessel does comply with two of the six IMO intact stability criteria for beam trawlers of less than 24 m in length; these being:

- Criteria 5. "The maximum righting lever GZ to occur at an angle of heel not less than 25 degrees." The maximum righting lever GZ occurs at 28 degrees angle of heel and complies with the required criteria.
- Criteria 6. "The initial metacentric height to be not less than 0.42 m (for a beam trawler less than 24 m in length)." The calculated value for GM is 0.463 m and complies with the required criteria.

In this condition the vessel fails four out of six stability criteria. However, the righting moment of the vessel and the capsizing moment caused by the freely swinging unsecured dredge must be considered.

The righting moment of the vessel is a product of the vessel's righting level (GZ) and the vessel's weight (W). In Condition 8.1 the righting moment is at maximum at an angle of heel of just under 30° and rapidly decreases thereafter. The capsizing moment due to the product of the weight of the port dredge (1.75 t), the lever length (derrick) and the sine of the angle of heel and increases with the angle of heel. When the vessel is upright the capsizing moment is zero and increases to its maximum at 90° angle of heel. It can be seen that the righting moment is overtaken by the effects of the capsizing moment at an angle of heel just under 40° and likely to risk capsize. This scenario represents a highly

dangerous and near critical stability condition.

Both the foregoing conditions (8.1 and 8.2) fail a number of IMO stability criteria and indicates the vessel is at risk of capsize throughout this particular phase of hauling the dredges.

Condition 8.0: Derricks both secured, dredges lowered and secured on the port and starboard gunwales with the following stability factors:

- 37% of catch, i.e. 29 bags of scallops (1.1 t) in the fish hold.
- Consumable (fuel, oil, and water) depleted to 20%.
- An estimated 250 kg of spoil and scallops in each dredge.
- Each dredge weight (full) at 1750kg.

This condition is not described in the 2014 Stability Booklet. The stability condition of *"FV Alize"* taking into consideration the above factors is therefore described as Condition 8.0 in this report.

See Appendix 7.20 Figure No.11 – *"FV Alize"* – Stability Condition 8.0.

4.1.3.11 Freeboard:

The freeboard of *"FV Alize"* was from its load line to the working deck or main deck level measured amidships and is a critical factor to be taken into account when considering the intact stability of the vessel. At the 2018 CoP DoC survey the freeboard for *"FV Alize"* was recorded as being 350 mm. At this freeboard, an 8° angle of heel would place the lower parts of the freeing ports at seawater level in calm water. Taking into consideration the vessel was rolling then the freeing ports and the conveyor chute would become immersed. The conveyor hatch is an open aperture at the aft end of the vessel and, if the freeing ports were also malfunctioning, seawater would wash into the working deck space and introduce a free surface effect to the vessel's stability condition due to trapped and moving water. A free surface effect caused by trapped deck water greatly exacerbates the unstable conditions described in intact stability Conditions 8.1 and 8.2. Free surface effect caused by trapped deck water carries a specific warning in the vessel's Stability Book, (reference paragraph 4.1.3.4 'Instruction No.3').

See Appendix 7.18 Figure No.9 – *"FV Alize"* Stability Condition 8.2.

See Appendix 7.19 Figure No.10 – *"FV Alize"* Stability Condition 8.1.

The stability of *"FV Alize"* during hauling (Conditions 8.2 and 8.1) has been found to be significantly reduced from its normal operating conditions analysed in the vessel's Stability Book (Conditions 1 -7 inclusive) to highly dangerous and near critical stability conditions.

The sonar scan images show the vessel's starboard derrick to be housed while the port derrick is not seen to be housed. It would be reasonable to surmise the starboard derrick was the first derrick to be secured and its weight taken off the derrick head during dredge hauling. With only two crew on deck, one of whom was operating the winches, it would be reasonable to deduce that the other crewmember's task of securing the dredges could only be accomplished one at a time, in sequence. Therefore, while the starboard dredge was being secured the port dredge remained unsecured at main deck level free to move with the rolling motion of the vessel with the dredges full weight (including its 6 bags full of debris and scallops), acting through the head of the port derrick. This condition is described as Condition 8.1 where (by calculation) the stability *"FV Alize"* was found to be near critical. Any small external force exacerbating the vessel's roll or heel would trigger a capsize event. It is reasonable to surmise that impetus resulting from a possible synchronous roll motion with the seas and/or the sudden release of the weight from the starboard derrick head to the main deck level and/or the effects of free surface water on deck and/or free weight swinging pendulum effect of an unsecured port dredge would be sufficient force to promote extreme heel angles in excess of 26° angle of heel (Condition 8.1) and 22° angle of heel (Condition 8.2). It is projected that the de-stabilising moment of the unsecured dredge exceeds the stabilising moment of the vessel's intrinsic at just under 40° angle of heel. This scenario represents a highly dangerous stability condition in which any otherwise insignificant destabilizing influence, e.g., water and/or spoil trapped on deck, loose scallop bags in the hold, synchronism of the rolling motion or a combination of these influences, would be sufficient to trigger a capsize event.

4.2 Stability Awareness of Crew Operating Small Fishing Vessels of Less Than 15 m Overall Length

Stability awareness among fisher crews has been a concern for many years, especially in respect of operators of fishing vessels of less than 15 m length overall. Generic stability awareness alone is insufficient for skippers to operate their vessels safely. They also need to be able to refer to vessel-specific operating criteria to meet acceptable stability and freeboard standards as would be found in the vessel's Stability Information Book. The Skipper of *"FV Alize"* attended a BIM Basic Safety Training Course in 2012; the course did not address stability awareness as a component in the syllabus. The contents of the 2015 Stability Information Booklet assumed the Skipper had knowledge of stability issues and calculations in order to comply with its Working Instructions and keep the vessel in a safe operating envelope of stability.

Likewise, the crewmember was not STCW qualified and, while he did attend a more recent BIM Basic Safety Training Course in 2015, this course had no stability awareness component in its syllabus. In particular it would appear that the crew had no knowledge of the stability effects of hauling the dredges and particularly

the dangers of allowing the dredges weights to hang off the derrick heads. MCIB report 10/2015 into the capsize of the fishing vessel *"Quo Vadis"* in Rosslare Harbour, made a Safety Recommendation for "Bord Iascaigh Mhara (BIM) should provide stability awareness training for operators and crew of vessels less than 24 m, with a focus on vessels less than 15 m."

4.2.1 Stability Awareness Training: In January 2015, the RNLI initiated a voluntary campaign aimed at improving the stability awareness of commercial fishermen, specifically targeting vessels of less than 15 m length overall. The campaign was entitled 'Keep it stable, bring it home', and featured five short videos giving practical advice on the hazards associated with:

- Vessel modifications.
- Free surface effect.
- Hauling operations.
- Overloading.
- Watertight integrity.

The videos were distributed to commercial fishers via social media on a voluntary basis.

4.2.2 The Report of the Working Group on Safety, Training and Employment in The Irish Fishing Industry, www.agriculture.gov.ie/publications/2015, published in 2015, made several recommendations addressing standards and safety in the 'fishing vessels under 15 m length' fishing sector. Of particular note were the following recommendations:

Chapter 1: Safety standards:

- Para.1. DTTAS should develop specified, safe manning levels for all fishing vessels.
- Para.4.

  (a) In relation to occupational health and safety: fishing enterprises should prepare a safety statement in accordance with the requirements of the Safety Health and Welfare at Work Act (SHWW) 2005.

  (d) DTTAS and the Health and Safety Authority (HSA) should continue to work to complete an MOU to facilitate co-ordination referred to above.
- Para.8. DTTAS should explore additional enforcement approaches such as a Fixed Payment Notice (FPNs) for appropriate offences, in relation to wearing of Personal Flotation Devices.

Chapter 2: Safety Training:

- Para.9. Mandatory Certificates of Competency (Deck and Engine) should be introduced by DTTAS for the operation of all vessels with appropriate safety-

training in stability and work-related safety.

- Para.10. Mandatory Certificates of Proficiency (Deck and Engine) should be introduced by DTTAS for the operation of all vessels with appropriate safety-training in stability and work related safety.
- Para.12. BIM should provide stability awareness training for operators and crew of vessels less than 24 m, with an immediate focus on vessels under 15 m within 12 – 36 months.

The above particular recommendations made in 2015 have relevance to the findings in this investigation but have not been implemented at this juncture.

4.3 Beam Trawler Casualty Investigations

The nature of trawling, particularly beam trawling, has, historically, resulted in serious accidents occurring at sea. Analysis of MCIB casualty data has shown that human error, failure of equipment, snagging of gear and loss of stability are recurring factors. There have been a number of serious incidents involving beam trawlers in UK and Irish waters; listed hereunder is a list of similar accidents that have occurred since 2005 in UK and Irish waters:

1. Capsize of the Belgium registered beam trawler *"Noorster"* 13 December 2005 (UKMAIB/Belgian Maritime Administration). Insufficient stability reserve while operating derricks at sea.
2. Capsize of the UK registered beam trawler *"FV Sally Jane"* 17 September 2013 (UK MAIB report 21 of 2014). Loss of transverse stability when hauling catch.
3. Capsize of the UK registered beam trawler *"FV JMT"* 9 July 2015 (UK MAIB report 15 of 2016). Insufficient stability reserve and incorrect operating procedures.
4. Capsize of Irish registered beam trawler *"FV Quo Vadis"* 11 February 2015 (MCIB report 10/2015). Loss of stability when hauling catch.
5. Capsize of Irish registered razorfish dredger *"FV Shanie Boy"* 26 May 2017 (MCIB report 271). Loss of stability when hauling catch.

It can be seen that incidents very similar to the circumstances leading to the sinking of *"FV Alize"* are not uncommon and are widely documented for accident investigation purposes and general public information.

5. CONCLUSIONS

5.1 *"FV Alize"* capsized and rapidly sank without warning while hauling its trawl dredges.

5.2 The crew's likelihood of survival was reduced by:

- Not having the opportunity to broadcast a distress message.
- Not complying with S.I. 586/2001 – Fishing Vessel (Personal Flotation Devices) Regulations 2001. by not wearing a PFD/lifejackets or wearing an incomplete PFD/lifejacket in that the crotch strap was missing.

5.3 The vessel was being operated below the optimum crew level of 3 persons. Therefore, the number of crew onboard at the time of the incident on 4 January 2020 was insufficient to operate the vessel safely and enable the recovery of the vessel's dredges in a safe and efficient manner.

5.4 The crew were not trained in stability awareness and were therefore unaware of critical stability factors or methods to mitigate the effects of marginal safe stability conditions while operating the vessel's fishing gear. The pronounced transient reduction in the stability of the vessel when hauling and docking the derricks was unrealised by the crew and they were likely unaware of the stability implications of leaving the port dredge suspended while the weight of the starboard dredge was landed onto the main deck bulwarks.

5.5 The absence of a detailed lifting equipment planned maintenance and inspection system onboard fishing vessels of less than 15 m length overall was recognised as a safety issue and addressed in this investigation but did not directly contribute to the loss of *"FV Alize"* and the vessel's crew.

6. SAFETY RECOMMENDATIONS

6.1 The Minister for Agriculture, Food and the Marine should amend the Bord Iascaigh Mhara (BIM) safety training syllabi for its Basic Safety Training Course (vessels less than 15 m) to include a module on stability awareness, factors affecting stability, dynamic stability and the instability warning signs and precautions available to avoid such situations.

6.2 The Minister for Transport should issue a Marine Notice warning owners and operators of small fishing vessels of less than 15 m Length overall of the hazards associated with trawling, including beam trawling and scallop dredging.

6.3 The Minister Transport should adopt Actions 9 stated in the Maritime Safety Strategy published by the Irish Maritime Administration and MCIB recommendations in respect of stability standards, stability criteria, crew training for small fishing vessels of less than 15 m length overall.

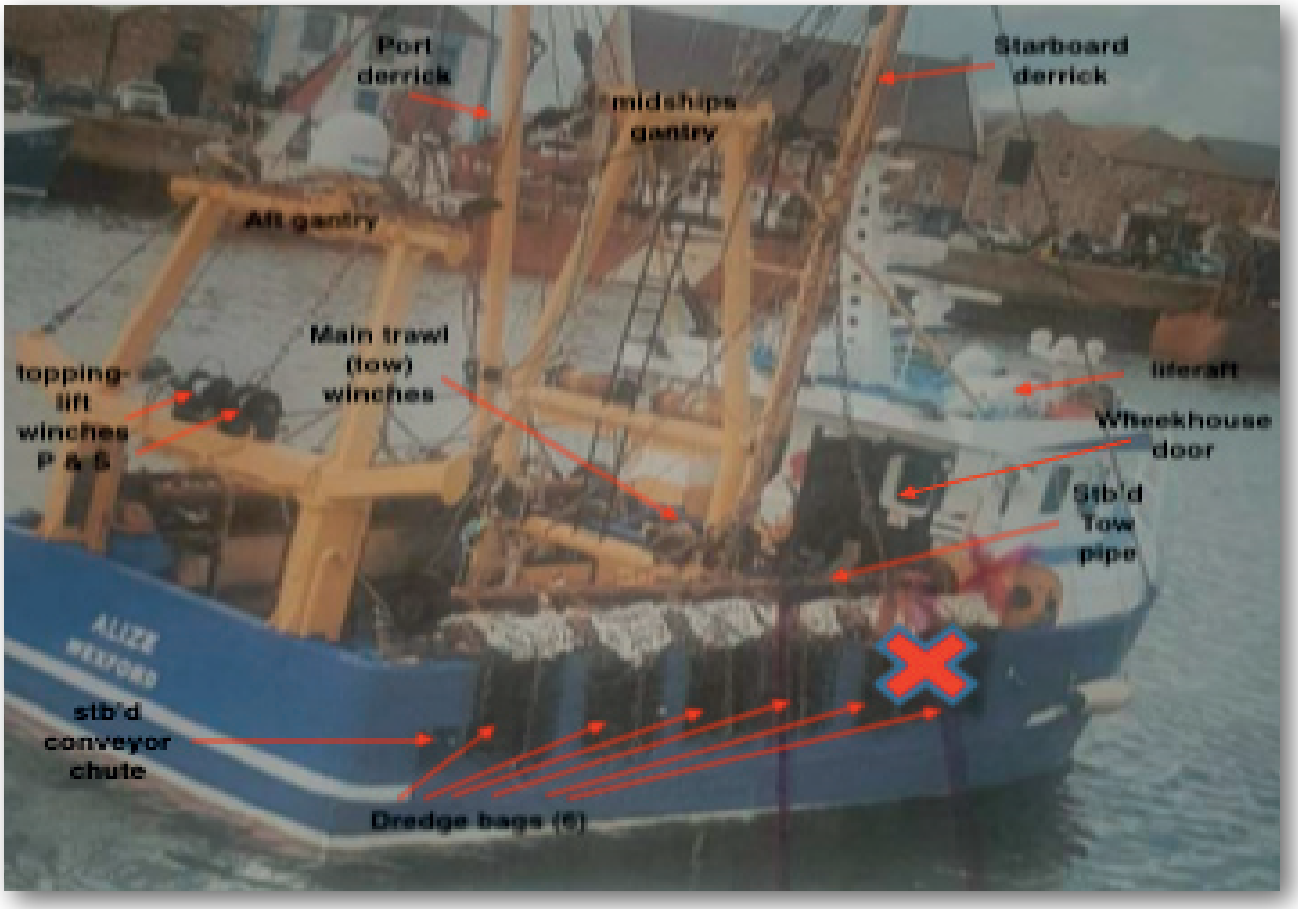
6.4 The Minister for Transport should issue a Marine Notice warning owners and operators of small fishing vessels of less than 15 m length overall to practice the requirements contained in S.I. 586/2001 – Fishing Vessel (Personal Flotation Devices) Regulations 2001, when working on deck of fishing vessels and highlighting the correct wearing of PFDs including crotch straps, spray hoods and PLBs.

6.5 The Minister for Transport amend S.I. 586/2001 – Fishing Vessel (Personal Flotation Devices) Regulations 2001 specifying that crotch straps should be permanently attached to the PFD harness.

6.6 The Minister for the Department of Transport should amend the requirements of the Code of Practice: Design, Construction, Equipment, and Operation of Small Fishing vessels of less than 15 m Length overall, Chapter 4, Fishing and Handling Equipment, Section 4.5.2 to reflect the importance of periodic examination and testing of lifting equipment by a competent person on a regular basis of not less than 6 months, in accordance with an inspection regime and aligned with industry best practice. Inspections should be certified as completed in the vessel's official logbook.

7. APPENDICES

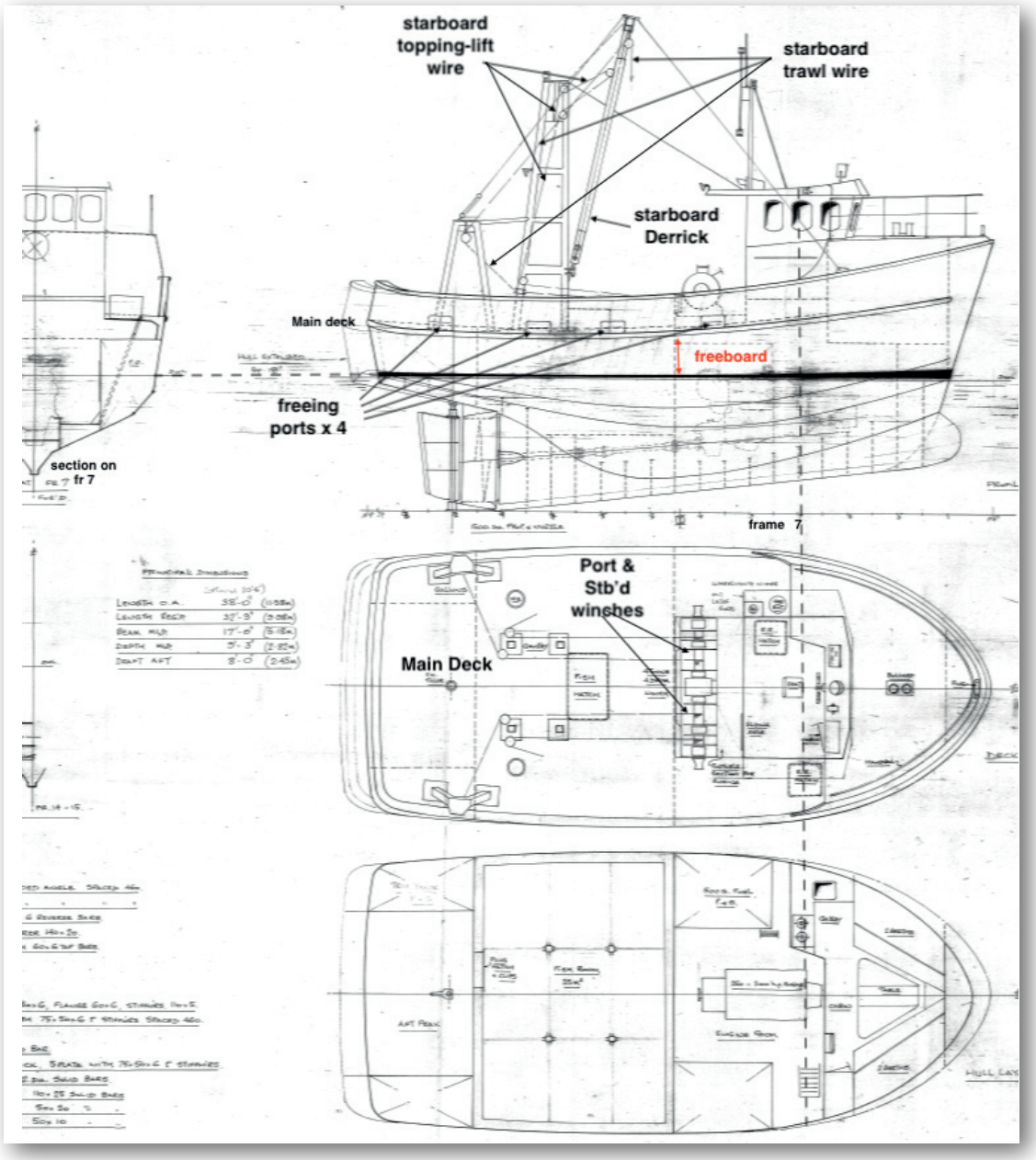
Appendix 7.1 Photograph No.1 - *"FV Alize"*



Courtesy NSDS Report (SAR Recovery)-WD207 *"FV Alize"* 03 Feb 2020.

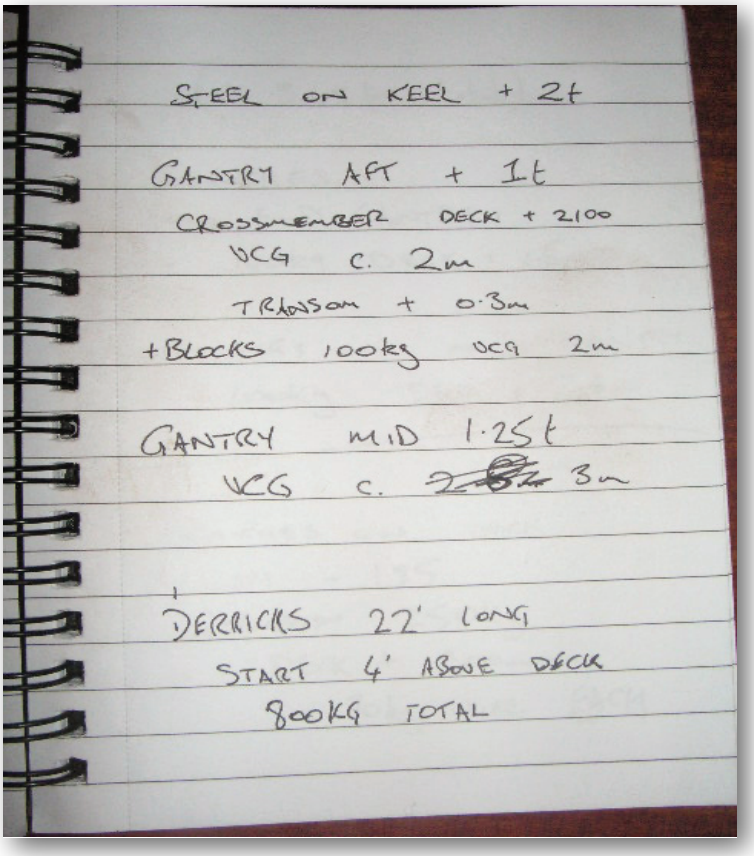
Appendix 7.2 Photograph No.2 – *"FV Alize"* before vessel's major refit

Appendix 7.3 Figure No.1 – General Arrangement *"FV Alize"* (before 2014 refit)



Appendix 7.4 Photograph No.3 – *"FV Alize"* freeing ports (port side)

Appendix 7.5 Inclination Experiment - Naval Architect Notes



Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate

Design, Construction, Operation and Equipment of
Small Fishing Vessels of less than 15 m Length overall

Code of Practice
Declaration of Compliance

To be completed by an Authorised Person

Declarations on page v *to be signed by the Authorised Person and Owner*

Name of Vessel	Fishing Letters & Number	Official Number	Port of Registry
ALIZE	WD 207	GRB000B11036	Wexford
Overall Length (less than 15 metres)	Breadth	Depth	Date keel laid
11.61	5.22	2.94	1990
Engine Make & Model			Engine Power (kW)
Cummins NTA 8556 cylinder			221
Call Sign	Radio Operators Cert no.	No of Crew	BIM Card no.
EI 7149	5702	3	5086 /6518/2335

Name, Address & Contact Number of Owner	[redacted]

Description of vessel including type of fishing vessel is engaged in
Steel hull, high bow ,cabin fwd with large working deck aft. Gantry and booms to facilitate Scallop dredging

Description of operational area
With 30Nm of the coast

Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate

Chapter 2 **Construction, Structural Strength and Weathertight Integrity**

*2.1	Is hull suitable for the intended fishing method and sea areas?					Yes / No☐
*2.2	Construction Materials	Hull	Steel	Superstructure		Steel
*2.3	Is structure sound, watertight & free from significant damage & corrosion?					Yes X/ No☐
*2.4	Do decks comply?					Yes **X** / No☐/ NA☐
2.5	Number of bulkheads	Non-watertight	N/A	Watertight		
*2.6	Do bulkhead doors comply with Annex 7 (2.3.4)?					Yes X / No☐/ NAX
*2.7	Doors	Coaming height				400mm
		Are doors of sound construction and weathertight?				Yes **X** / No☐/ NA☐
2.8	Hatchway coaming height					400mm
*2.9	Can hatches be secured weathertight?					Yes **X** / No☐/ NA☐
*2.10	Do flush hatches comply?					Yes **X** / No☐/ NA☐
*2.11	Do skylights comply?					Yes☐ / No☐/ NAX
*2.12	Do side scuttles & portlights comply?					Yes☐ / No☐/ NAX
*2.13	Do windows comply?					Yes **X** / No☐/ NA☐
*2.14	Do ventilators comply?					Yes **X** / No☐/ NA☐
2.15	Is exhaust system acceptable					Yes **X** / No☐/ NA☐
*2.16	Do air pipes comply?					Yes **X** / No☐/ NA☐
*2.17.2	Do sea inlets and discharges comply?					Yes **X** / No☐/ NA☐
*2.18.3	Do valves, piping & hoses comply?					Yes **X** / No☐/ NA☐
*2.19	Do freeing ports comply?					Yes **X** / No☐/ NA☐

Chapter 3 **Stability**

*3.1	Is stability information supplied?			Yes **X** / No☐/ NA☐
	Are requirements of Annex 7 applied?			Yes☐ / No☐/ NAX
*Annex 7 (para.4)	Stability standard applied		As per code	
	Does vessel comply with roll test?			Yes / NoX
	Freeboard	0.69m	Roll coefficient	0.8
Annex 2	Are guidance notes on board?			Yes X/ No

Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate

Chapter 4 **Machinery and Electrical Installations**

4.1	**Machinery**	
*4.1.1.1	General Requirements - comply?	Yes **X** / No☐/ NA☐
*4.1.2	Propulsion Machinery and Stern Gear - comply?	Yes **X** / No☐/ NA☐
*4.1.4	Controls and Instruments - comply?	Yes **X** / No☐/ NA☐
*4.1.5	Steering System - comply?	Yes **X** / No☐/ NA☐
4.2	**Electrical Installations**	
*4.2.1	General - comply?	Yes **X** / No☐/ NA☐
*4.2.2	D.C. Systems Up To 24 volts - comply?	Yes **X** / No☐/ NA☐
*4.2.3	A.C Systems - comply?	Yes **X** / No☐/ NA☐
4.3	**Pumping & Piping**	
*4.3.1	Fuel Oil Installations - comply?	Yes **X** / No☐/ NA☐
*4.3.2	Cooling Water Systems - comply?	Yes **X** / No☐/ NA☐
*4.3.3	Bilge Pumping Systems - comply?	Yes **X** / No☐/ NA☐
*4.3.4	Bilge Pumps - comply?	Yes **X** / No☐/ NA☐
4.4	**Anchors & Cables**	
*4.4.1	General - comply?	Yes X/ No☐
*4.4.4	Towline - comply?	Yes X/ No☐
4.5	**Fishing & Handling Equipment**	
*4.5.1	Winches, tackles and lifting gear - comply?	Yes **X** / No☐/ NA☐
*4.5.2	Running gear - comply?	Yes **X** / No☐/ NA☐

Chapter 5 **Fire Protection, Detection & Extinction**

5.1	**Fire Safety**						
#5.1.1	Machinery space capable of being closed down?					Yes **X** / No☐/ NA☐	
*5.1.2	Fire Prevention - comply?					Yes **X** / No☐/ NA☐	
*5.1.3	Cleanliness and Pollution Prevention - comply?					Yes **X** / No☐/ NA☐	
*5.1.4	Open-Flame Gas Appliances - comply?					Yes☐ / No☐/ NAX	
*5.1.5	Gas Detection - comply?					Yes☐ / No☐/ NAX	
5.2	**Fire Fighting Appliances**						
#5.2.1	Are extinguishers of an approved type					Yes X/ No☐	
#5.2.2 ¦ #5.2.5	Portable Extinguishers				Serviced Date	1/1/2015	
		*Engine room	Type	AFFF foam	Rating 13A	Nº	2
		Accom/steering	Type	Co2,Afff,Foam	Rating	Nº	4
			Fire buckets			Nº	1
#5.2.6	Remote controls for fuel tank valves	Yes X/ No		Number	2		
				Location	Wheelhouse		
#5.2.6	Are means of closing skylights, doorways etc to machinery and cargo spaces adequate?					Yes **X** / No☐/ NA☐	
•	Co2 Engine room smothering						

Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate

Chapter 6 **Protection of Crew**

6.1	**Protection of Personnel**	
*6.1.2	Bulwarks, Guard Rails and Handrails - comply?	Yes X/ No☐
*6.1.4	Surface of Working Decks - comply?	Yes X/ No☐
#6.1.5	Personal Protective Equipment - comply?	Yes X/ No☐
#6.2	**Medical Stores** - comply?	Yes X/ No☐
	Expiry date of medical stores	04/2017
***6.3**	**Securing of Heavy Items or Equipment and Fishing Gear etc** - comply?	Yes **X** / No☐/ NA☐

Chapter 7 **Life-Saving Appliances**

#7.1	Are all items of LSA of an approved type				Yes x/ No☐	
#7.2	Have relevant items of LSA been serviced				Yes x/ No☐	
#7.3	1 Lifejacket for every person on board			Yes x/ No☐	Nº:	1
‡7.4	Liferafts sufficient for 100% persons	Yes X/ No☐	Nº	1	Last Serviced	10/1/2015
	Hydrostatic Release Unit (HRU)	Yes X/ No☐	Nº	1	Exp. Date	10/1/2016
#7.5	Lifebuoys	Total Nº of Lifebuoys			2	
		Nº with 18m line			1	
		Nº with combined light & smoke signal				
#7.6	1 Personal Floatation Devices (PFD) for every person on board			Yes x/ No☐	Nº :	1
#7.8	Distress signals	6 red star or allowed alternative	Yes x/ No☐	12 parachute rockets	Yes ☐/ No☐	
#7.8	Flares Expiry date	6/2017				
*7.9	Means for Recovering Persons from the Water				Yes X/ No☐	

Chapter 8 **Manning, Training & Certification**

#8.2 *8.8	Manning - comply?	Yes X/ No☐
*8.3	Standards of Competence - comply?	Yes X/ No☐
*8.5	Operation and Maintenance of Propulsion Machinery - comply?	Yes X/ No☐
#8.6	Operation of Radio Equipment - comply?	Yes X/ No☐
#8.7	Safety Training - comply?	Yes X/ No☐
	Is there a copy of the Code of Practice on board?	Yes X/ No☐
#8.9	Musters and Drills – comply?	YesX / No☐/ NA☐
#8.10	Organisation of Working Time – comply?	Yes X/ No☐

Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate

Chapter 9 **Radio Equipment**

	Sea Area (A1 or A1 & A2)	
#9.3	Functional requirements - comply?	Yes X/ No☐
#9.4	Installation, location and control of radio equipment - comply?	Yes X/ No☐
#9.5	EPIRB/PLB correctly registered?	Yes X/ No☐
#9.5	Radio equipment to be provided for all sea areas - comply?	Yes X/ No☐
#9.6	Additional radio equipment to be provided for sea areas A1 and A2 - comply?	YesX / No☐/ NA☐
#9.7	Radio Watches - comply?	Yes ☐/ NoX
#9.8	Sources of energy - comply?	Yes X/ No☐
#9.9	Performance standards - comply?	Yes X/ No☐
#9.10	Serviceability and maintenance requirements - comply?	Yes X/ No☐
#9.11	Radio personnel - comply?	Yes X/ No☐
#9.12	Radio records - comply?	Yes☐ / No☐/ NAX

Chapter 10 **Navigation Equipment Lights, Shapes & Sound Signals**

*10.1	Navigation Equipment - comply?		Yes X/ No☐
*10.2	Are navigation lights fitted?		Yes **X** / No☐/ NA☐
#10.3	Steaming Lights - comply?		Yes **X** / No☐/ NA☐
#10.4	Fishing Lights - comply?		Yes **X** / No☐/ NA☐
#10.5	Additional Fishing Light - comply?		Yes **X** / No☐/ NA☐
#10.6	Anchor Light - comply?		Yes **X** / No☐/ NA☐
#10.7	Positions or Lights - comply?		Yes **X** / No☐/ NA☐
	Are any all-round lights obscured by mast, etc. by more than 6°?		Yes☐ / NoX/ NA☐
#10.8	Day Signals	2 Black cones with apexes together or a basket	Yes X/ No☐
		1 Black Ball	Yes X/ No☐
#10.9	Sound Signals - comply?		Yes X/ No☐
*10.10	Charts and Nautical Publications - comply?		Yes X/ No☐

Chapter 11 **Accommodation & Working Spaces**

*11.6	Toilet Facilities - comply?	Yes **X** / No☐/ NA☐
*11.7	Access and Escape Arrangements - comply?	Yes **X** / No☐/ NA☐
*11.8	Ventilation - comply?	Yes **X** / No☐/ NA☐
*11.10	Lighting - comply?	Yes **X** / No☐/ NA☐

Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate

Notes:

1. # indicates Statutory requirements
2. * indicates mandatory requirement for Code compliance
3. ‡ indicates statutory requirement for vessels ≥ 12m L_{oa} and mandatory requirement for Code compliance for vessels < 12m L_{oa}
4. Only Statutory and mandatory Code requirements are to be addressed when completing the Declaration.
5. If 'No' is answered to any question, please supply, in a separate statement, the reasons why the particular item is not complied with.
6. If a particular item is not applicable, please state the reason why.

Declaration by Authorised Person

Name of Vessel	Fishing Letters & Number	Official Number	Port of Registry
ALIZE	WD 207	GRB000B11036	Wexford

I hereby declare that on 9th Jan 2015 at New Ross I completed the survey of the Fishing Vessel Alize and that:

1. the particulars given on this form are true and correct;
2. in my judgement the vessel complies with the Code of Practice and is fit for its intended fishing method and for the sea areas in which it is intended to operate.

Dated at Cobh this 10th day of Jan 2015

Signed [redacted]

This Declaration is valid until 10th Day of Jan 2019

Company Stamp [redacted]

Declaration by Owner

I [redacted] owners of the above described vessel declare that the particulars given on this form are correct and that we have no reason to believe that the vessel is not fit for its intended fishing method or for the sea areas in which it is intended to operate.

Signature(s [redacted]

.....

If company state position held:

.....

Date:9th Jan 2015 .....

Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate

All existing vessels shall be subjected to a roll test. The roll test shall be carried out with the vessel in the "normal departure port condition".

The GM obtained from the roll test shall be at least 10% greater than the minimum metacentric height, GM_{min}, obtained from the formula:

GMmin = 0.53 + 2B(0.075 – 0.37(f/B) +0.82(f/B)2 – 0.014(B/D) – 0.032(1s/L))

Where

L	is the length of the vessel on the waterline in maximum load condition (m)
+++ +++	is the actual length of enclosed superstructure extending from side to side of the vessel (m)
B	is the extreme breadth of the vessel on the waterline in maximum load condition (m)
D	is the depth of the vessel measured vertically amidships from the base line to the top of the upper deck at side (m)
f	is the smallest freeboard measured vertically from the top of the upper deck at side to the actual waterline (m)

The formula is applicable for vessels having;

.1 f/B between 0.02 and 0.20;

.2 l_s/L smaller than 0.60;

.3 B/D between 1.75 and 2.15;

for vessels with parameters outside of the above limits the formula should be applied with special care.

L	10.5	ls/L	0.37(f/B)
Ls	0	2B	0.82(f/B)2
B	5.2	B/D	0.014(B/D)
D	2.82	f/B	0.032(Is/L)
f	0.69	$(f/B)_2$	

$0.53 + 2B[0.075 – 0.37(f/B) +0.82(f/B)^2 – 0.014(B/D) – 0.032(1s/L)]$

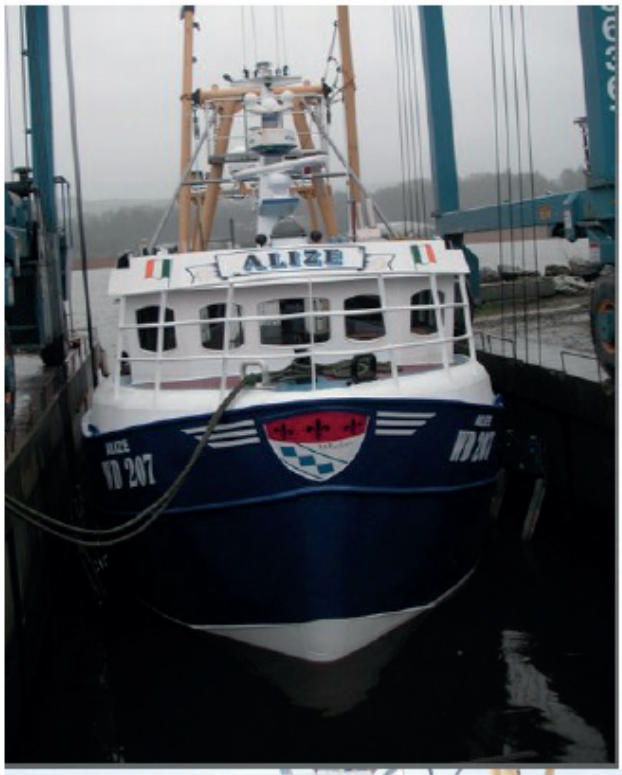
GM min	0.68	m	GMmin +10%	0.74	m

ROLL TEST

Factor	0.8			
B	5.2			
Tr	5.3	GM	0.62	M.....FAIL

STABILITY BOOK ATTAHED

Appendix 7.6 Figure No.2 – 2015 – CoP Declaration of Compliance certificate



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Revision 2 20/01/2014

Appendix 7.7 Figure No. 3 2018 – CoP Declaration of Compliance certificate

Design, Construction, Equipment and Operation of
Small Fishing Vessels of less than 15 m Length overall

Code of Practice
Declaration of Compliance

To be completed by an Authorised Person

Declarations on page v *to be signed by the Authorised Person and Owner*

Name of Vessel	Fishing Letters & Number	Official Number	Port of Registry
Alize	WD207	404649	Wexford
Overall Length (less than 15 metres)	Breadth	Depth	Date keel laid
11.61m	5.22m	2.94m	1989
Engine Make & Model			Engine Power (kW)
Cummins SW			221kW
Call Sign	Radio Operators Cert no.	No of Crew	BIM Card no.
EI7149	5762	3	6516;5086

Name, Address & Contact Number of Owner	[redacted]

Description of vessel including type of fishing vessel is engaged in
Steel decked vessel with forward wheelhouse. Beams, gantry and winch for dredging. Below deck are separate steering, hold and engine room.

Description of operational area
Area A1 & A2

Appendix 7.7 Figure No. 3 2018 – CoP Declaration of Compliance certificate

Chapter 2 Construction, Structural Strength and Weathertight Integrity

*2.1	Is hull suitable for the intended fishing method and sea areas?						Yes / No
*2.2	Construction Materials	Hull	Steel	Superstructure	Steel		
*2.3	Is structure sound, watertight & free from significant damage & corrosion?						Yes / No
*2.4	Do decks comply?						Yes / No
2.5	Number of bulkheads	Non-watertight	0	Watertight	2		
*2.6	Do bulkhead doors comply with Annex 7 (2.3.4)?						Yes / No/ NA
*2.7	Doors	Coaming height					560mm
		Are doors of sound construction and weathertight?					Yes / No/ NA
2.8	Hatchway coaming height						550mm
*2.9	Can hatches be secured weathertight?						Yes / No/ NA
*2.10	Do flush hatches comply?						Yes / No/ NA
*2.11	Do skylights comply?						Yes / No/ NA
*2.12	Do side scuttles & portlights comply?						Yes / No/ NA
*2.13	Do windows comply?						Yes / No/ NA
*2.14	Do ventilators comply?						Yes / No/ NA
2.15	Is exhaust system acceptable						Yes / No/ NA
*2.16	Do air pipes comply?						Yes / No/ NA
*2.17.2	Do sea inlets and discharges comply?						Yes / No/ NA
*2.18.3	Do valves, piping & hoses comply?						Yes / No/ NA
*2.19	Do freeing ports comply?						Yes / No/ NA

Chapter 3 Stability

*3.1	Is stability information supplied?			Yes / No
	Are requirements of Annex 7 applied?			Yes / No/ NA
*Annex 7 (para.4)	Stability standard applied	IMO Intact Stability Code		
	Does vessel comply with roll test?			Yes / No
	Freeboard	350mm	Roll coefficient	0.8
Annex 2	Are guidance notes on board?			Yes / No

Chapter 4 Machinery and Electrical Installations

4.1	**Machinery**	
*4.1.1.1	General Requirements - comply?	Yes / No/ NA
*4.1.2	Propulsion Machinery and Stern Gear - comply?	Yes / No/ NA
*4.1.4	Controls and Instruments - comply?	Yes / No/ NA
*4.1.5	Steering System - comply?	Yes / No/ NA
4.2	**Electrical Installations**	
*4.2.1	General - comply?	Yes / No/ NA
*4.2.2	D.C. Systems Up To 24 volts - comply?	Yes / No/ NA
*4.2.3	A.C Systems - comply?	Yes / No/ NA
4.3	**Pumping & Piping**	
*4.3.1	Fuel Oil Installations - comply?	Yes / No/ NA
*4.3.2	Cooling Water Systems - comply?	Yes / No/ NA
*4.3.3	Bilge Pumping Systems - comply?	Yes / No
*4.3.4	Bilge Pumps - comply?	Yes / No
4.4	**Anchors & Cables**	
*4.4.1	General - comply?	Yes / No
*4.4.4	Towline - comply?	Yes / No
4.5	**Fishing & Handling Equipment**	
*4.5.1	Winches, tackles and lifting gear - comply?	Yes / No/ NA
*4.5.2	Running gear - comply?	Yes / No/ NA

Appendix 7.7 Figure No. 3 2018 – CoP Declaration of Compliance certificate

Chapter 5 Fire Protection, Detection & Extinction

5.1	**Fire Safety**						
#5.1.1	Machinery space capable of being closed down?						Yes / No/ NA
*5.1.2	Fire Prevention - comply?						Yes / No
*5.1.3	Cleanliness and Pollution Prevention - comply?						Yes / No
*5.1.4	Open-Flame Gas Appliances - comply?						Yes / No/ NA
*5.1.5	Gas Detection - comply?						Yes / No/ NA
5.2	**Fire Fighting Appliances**						
#5.2.1	Are extinguishers of an approved type						Yes / No
#5.2.2 ⋮ #5.2.5	Portable Extinguishers			Serviced Date			04/18
		Engine room	Type Foam		Rating 21A183B	Nº	2
		Other spaces	Type Powder;CO2		Rating 21A144B; 34B	Nº	1;2
			Fire buckets			Nº	1
#5.2.6	Remote controls for fuel tank valves	Yes / No	Number	2			
			Location	In CO2 locker			
#5.2.6	Are means of closing skylights, doorways etc to machinery and cargo spaces adequate?						Yes / No/ NA

Chapter 6 Protection of Crew

6.1	**Protection of Personnel**	
*6.1.2	Bulwarks, Guard Rails and Handrails - comply?	Yes / No
*6.1.4	Surface of Working Decks - comply?	Yes / No
#6.1.5	Personal Protective Equipment - comply?	Yes / No
#6.2	**Medical Stores** - comply?	Yes / No
	Expiry date of medical stores	04/19
***6.3**	**Securing of Heavy Items of Equipment and Fishing Gear, etc.** - comply?	Yes / No/ NA

Chapter 7 Life-Saving Appliances

#7.1	Are all items of LSA of an approved type						Yes / No
#7.2	Have relevant items of LSA been serviced						Yes / No
#7.3	1 Lifejacket for every person on board					Yes / No	Nº: 3
‡7.4	Liferafts sufficient for 100% persons	Yes / No	Nº 1	Last Serviced	04/17		
	Hydrostatic Release Unit (HRU)	Yes / No	Nº 1	Exp. Date	04/19		
#7.5	Lifebuoys	Total Nº of Lifebuoys				2	
		Nº with 18m line				1	
		Nº with combined light & smoke signal				0	
#7.6	1 Personal Floatation Devices (PFD) for every person on board					Yes / No	Nº: 3
#7.8	Distress signals	6 red star or allowed alternative	Yes / No	12 parachute rockets	Yes / No		
#7.8	Flares Expiry date	06/19					
*7.9	Means for Recovering Persons from the Water						Yes / No

Chapter 8 Manning, Training & Certification

#8.2 *8.8	Manning - comply?	Yes / No
*8.3	Standards of Competence - comply?	Yes / No
*8.4	Operation and Maintenance of Propulsion Machinery - comply?	Yes / No
#8.5	Operation of Radio Equipment - comply?	Yes / No
#8.6	Safety Training - comply?	Yes / No
	Is there a copy of the Code of Practice on board?	Yes / No
#8.9	Musters and Drills – comply?	Yes / No/ NA
#8.10	Organisation of Working Time – comply?	Yes / No

Appendix 7.7 Figure No. 3 2018 – CoP Declaration of Compliance certificate

Chapter 9 Radio Equipment

	Sea Area (A1 or A1 & A2)	A1&A2
#9.3	Functional requirements - comply?	Yes / No
#9.4	Installation, location and control of radio equipment - comply?	Yes / No
#9.5	EPIRB/PLB correctly registered?	Yes / No
#9.5	Radio equipment to be provided for all sea areas - comply?	Yes / No
#9.6	Additional radio equipment to be provided for sea areas A1 and A2 - comply?	Yes / No/ NA
#9.7	Radio Watches - comply?	Yes / No
#9.8	Sources of energy - comply?	Yes / No
#9.9	Performance standards - comply?	Yes / No
#9.10	Serviceability and maintenance requirements - comply?	Yes / No
#9.11	Radio personnel - comply?	Yes / No
#9.12	Radio records - comply?	Yes / No/ NA

Chapter 10 Navigation Equipment Lights, Shapes & Sound Signals

*10.1	Navigation Equipment - comply?		Yes / No
*10.2	Are navigation lights fitted?		Yes / No/ NA
#10.3	Steaming Lights - comply?		Yes / No/ NA
#10.4	Fishing Lights - comply?		Yes / No/ NA
#10.5	Additional Fishing Light - comply?		Yes / No/ NA
#10.6	Anchor Light - comply?		Yes / No/ NA
#10.7	Positions or Lights - comply?		Yes / No/ NA
	Are any all-round lights obscured by mast, etc. by more than 6°?		Yes / No/ NA
#10.8	Day Signals	2 Black Cones with apexes together or a basket	Yes / No
		1 black ball	Yes / No
#10.9	Sound Signals - comply?		Yes / No
*10.10	Charts and Nautical Publications - comply?		Yes / No

Chapter 11 Accommodation & Working Spaces

*11.6	Toilet Facilities - comply?	Yes / No/ NA
*11.7	Access and Escape Arrangements - comply?	Yes / No/ NA
*11.8	Ventilation - comply?	Yes / No/ NA
*11.10	Lighting - comply?	Yes / No/ NA

Annex 7 New Vessel Construction

1.1	Construction Rules used	N/A
*1.6	Are relevant chapters of Code complied with?	Yes / No
*2	Construction and Structural Strength - comply?	Yes / No
*3	Weathertight Integrity - comply?	Yes / No
*4	Stability - comply?	Yes / No
*5	Machinery - comply?	Yes / No
*6	Piping Systems - comply?	Yes / No
*7	Shafting and Stern Gear - comply?	Yes / No
*8	Bilge Pumping Systems - comply?	Yes / No
*9	Steering Gear - comply?	Yes / No
*10	Electrical Systems - comply?	Yes / No
*11	Fire Safety - comply?	Yes / No
*12	Accommodation and Working Spaces - comply?	Yes / No

Appendix 7.7 Figure No. 3 2018 – CoP Declaration of Compliance certificate

Notes:

1. # indicates Statutory requirements
2. * indicates mandatory requirement for Code compliance
3. ‡ indicates statutory requirement for vessels ≥ 12m L_{oa} and mandatory requirement for Code compliance for vessels < 12m L_{oa}
4. Only Statutory and mandatory Code requirements are to be addressed when completing the Declaration.
5. If 'No' is answered to any question, please supply, in a separate statement, the reasons why the particular item is not complied with.
6. If a particular item is not applicable, please state the reason why.

Declaration by Authorised Person

Name of Vessel	Fishing Letters & Number	Official Number	Port of Registry
Alize	WD207	404649	WEXFORD

I hereby declare that on 13/04/18 at Howth I completed the survey of the Fishing Vessel Alize and that:

1. the particulars given on this form are true and correct;
2. in my judgement the vessel complies with the Code of Practice and is fit for its intended fishing method and for the sea areas in which it is intended to operate.

Dated at Howth

this 13th day of April 20 18

Signed [redacted]

This Declaration is valid until

12th day of April 20 22

Company Stamp.

Declaration by Owner

I/We [redacted]

Owner(s) of the above-described vessel declare that the particulars given on this form are correct and that we have no reason to believe that vessel is not fit for its intended fishing method or for the sea areas in which it is intended to operate.

Signature(s): [redacted]

[redacted]y, state position held:

Date 2-5-18

Revision 2 20/01/14

Appendix 7.7 Figure No. 3 2018 – CoP Declaration of Compliance certificate

13/04/18

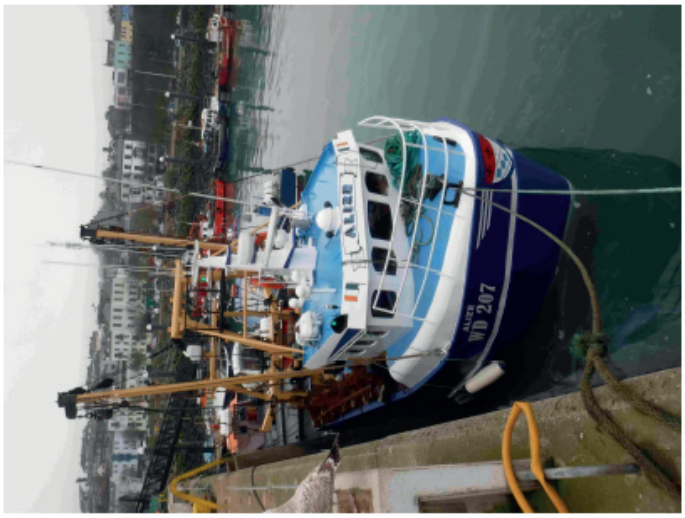
Vessel Information	
Name	Alize
LWL	10.5
BWL	5.01
BOA	5.2
freeboard	0.35
Depth	2.62
Superstructure length	0
Roll Factor	0.8

Departure Condition		
Number of readings taken		4
Time	Rolls	Roll Period
32	5	6.4
25.4	4	6.35
32.2	5	6.44
26.1	4	6.525
Average Roll Period		4.7975

Checks		Lower limit	Upper limit
f/B	0.070	OK	OK
ls/L	0.000	OK	n/a
B/D	1.777	OK	OK

GM	0.752
GMmin	0.813
GMmin +10%	0.895
PASS	Fail

See Stability booklet onboard



Appendix 7.8 Table 1 Corrected CoP DoC Roll Test Period and GM

13/04/18

Vessel Information	
Name	Alize
LWL	10.5
BWL	5.01
BOA	5.2
freeboard	0.35
Depth	2.82
Superstructure length	0
Roll Factor	0.8

Departure Condition		
Number of readings taken		4
Time	Rolls	Roll Period
32	5	6.4
25.4	4	6.35
32.2	5	6.44
26.1	4	6.525
		#DIV/0!
Average Roll Period		6.42875

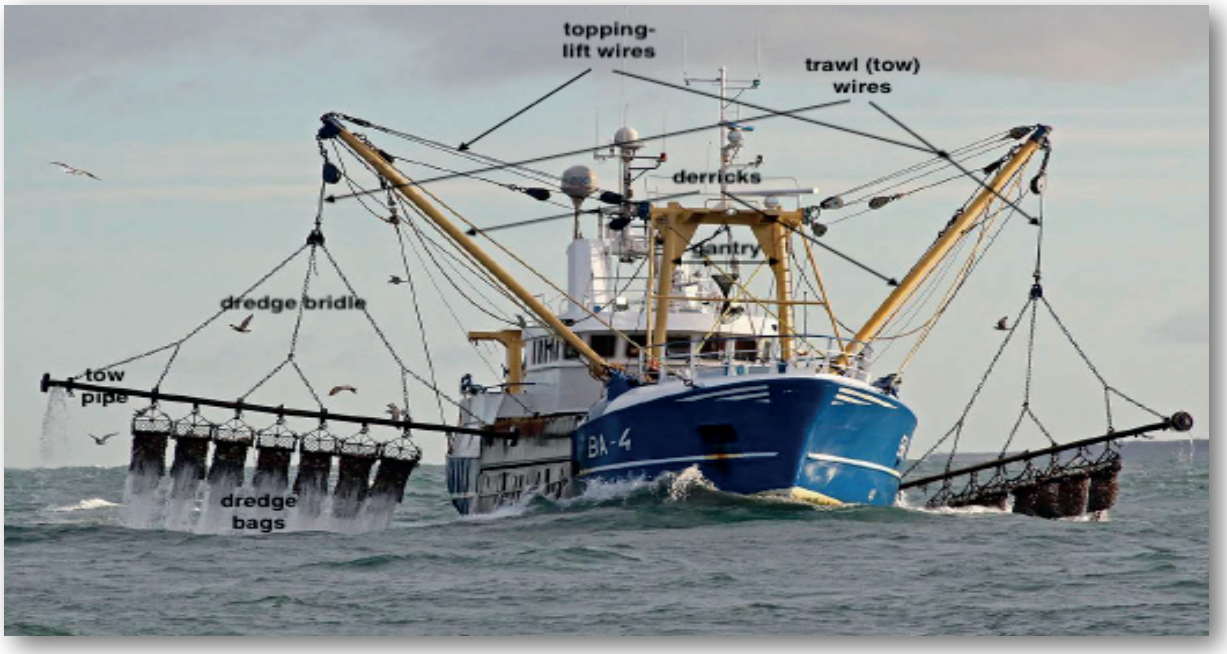
Arrival Condition		
Number of readings taken		5
Time	Rolls	Roll Period
0	4	0
0	4	0
0	4	0
0	4	0
0	4	0
Average Roll Period		0

Checks		Lower limit	Upper limit
f/B	0.070	OK	OK
ls/L	0.000	OK	n/a
B/D	1.777	OK	OK

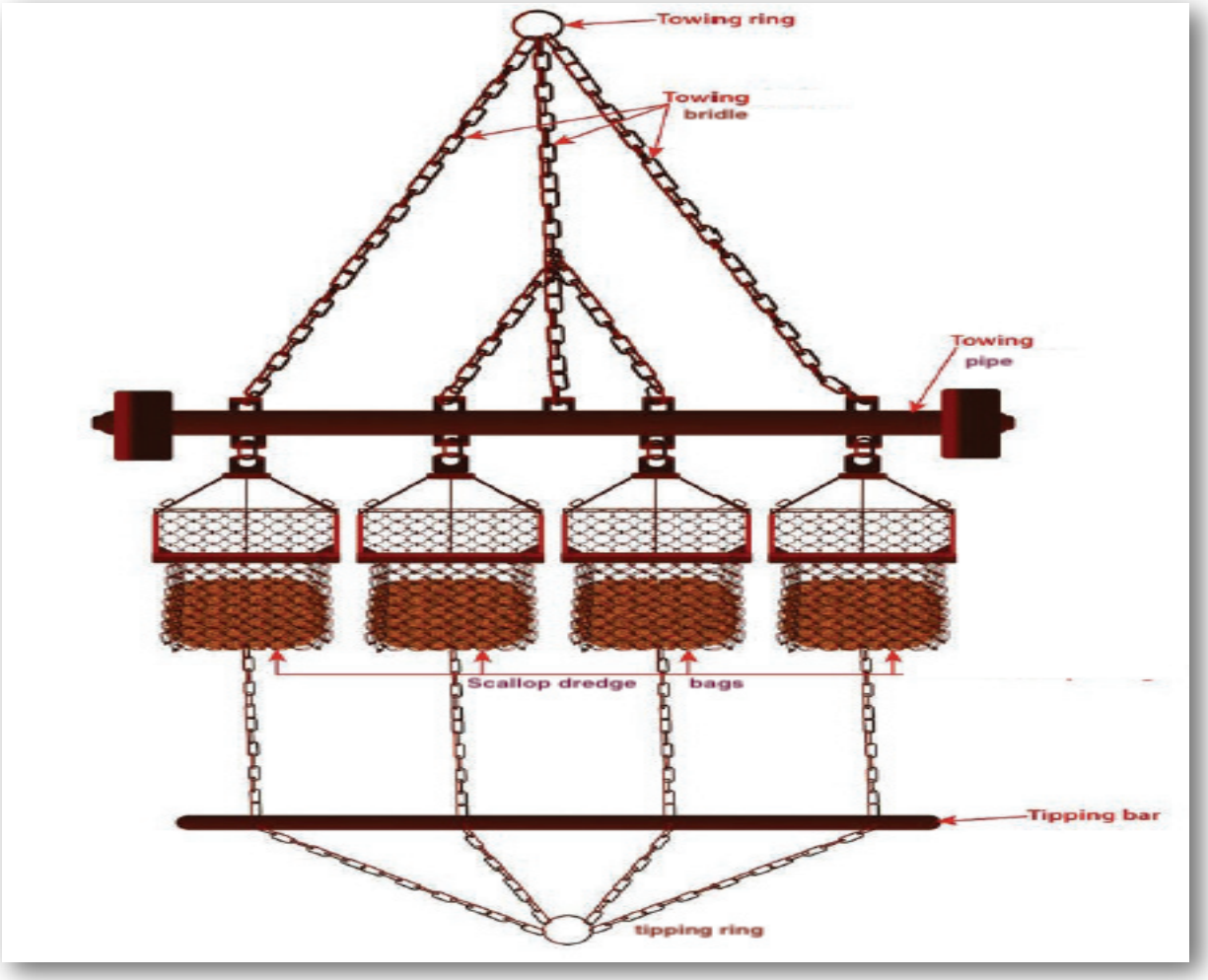
GM	0.419
GMmin	0.813
GMmin +10%	0.895
PASS	Fail

GM	#DIV/0!
GMmin	0.813
GMmin +10%	0.895
PASS	#DIV/0!

Appendix 7.9 Photograph No.4 - Typical scallop beam trawler rig

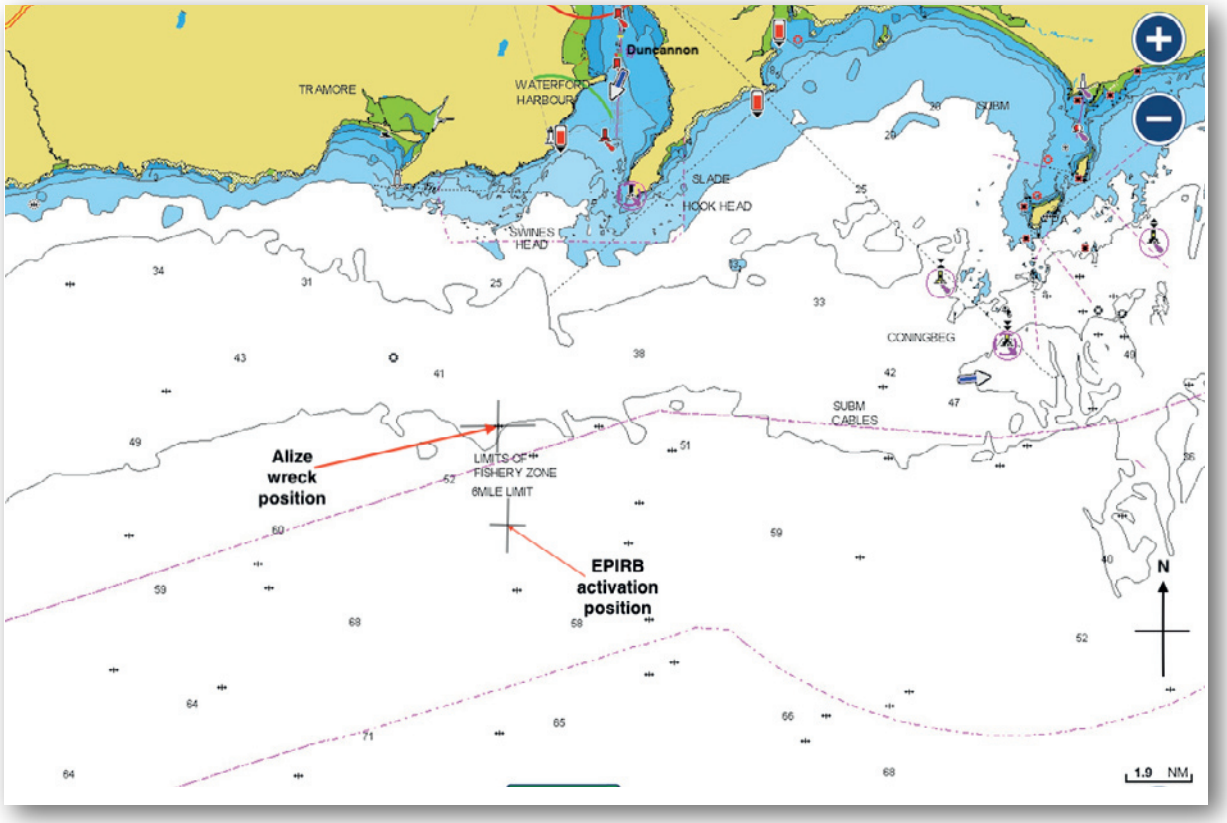


Appendix 7.10 Figure No. 4 Typical scallop dredge arrangement



Appendix 7.11 Chart No. 1 Dungarvan to Bannow Bay

Appendix 7.12 Chart No. 2 Incident area off Hook Head



Appendix 7.13 Figure No. 5 Met Éireann weather conditions report

Met Éireann
The Irish Meteorological Service
Climate Services
Glasnevin Hill
Dublin 9

Seirbhísí Aeráide
Cnoc Ghlas Naíon
Baile Átha Cliath 9

Tel: +353-1-8064260
Fax: +353-1-8064216
Email: LEGAL@MET.ie

Our Ref. **WS1730/2002_20**
Your Ref. **MCIB/12/297**

Re: Estimate of weather conditions between 20:30 on Saturday 4th January and 01:30 hours UTC on Sunday 5th January 2020 off Hook Head, County Wexford (51.9683, -7.02).

Synopsis: Ireland lies in a fresh to strong southwest airflow with a large area of high pressure of 1039 hPa centred over the Bay of Biscay.

Estimate of weather & sea state conditions*:

20:30 UTC 4th January – 01:30 UTC 5th January 2020:	
Weather:	Cloudy (~7 octas), patchy light rain or drizzle at times, with mist patches also possible.
Temperature:	8 to 10 degrees Celcius
Wind:	Southwest Beaufort force 4 to 5 (14 to 21 knots). Occasionally gusting force 6 (22 to 27 knots)
Visibility:	Occasionally good, but generally moderate to poor in any mist, rain and drizzle. At 11pm, the visibility at Tuskar Rock was reported as greater than 10 nautical miles, at Roches Point the visibility was reported as 1.9 nautical miles.
Sea State:	**Total sea-state:** Moderate (~1.5 to 2 metres) significant wave height. Mean wave direction southwest (225 to 235 degrees). Mean wave period 5 to 6 seconds. **Swell:** wave height less than 1 metre, wave period ~11 seconds, wave direction southwest to west-southwest (230 to 245 degrees) **Wind sea:** wave height ~1.5 metres, period ~5 seconds, direction southwest (225 to 235 degrees) **Maximum individual wave at M5:** 3 metre wave height, 8.1 second wave period, ~240 degrees wave direction at 9pm.
Sea Temperature:	~10.4 degrees Celsius (M2, M5)

[redacted]

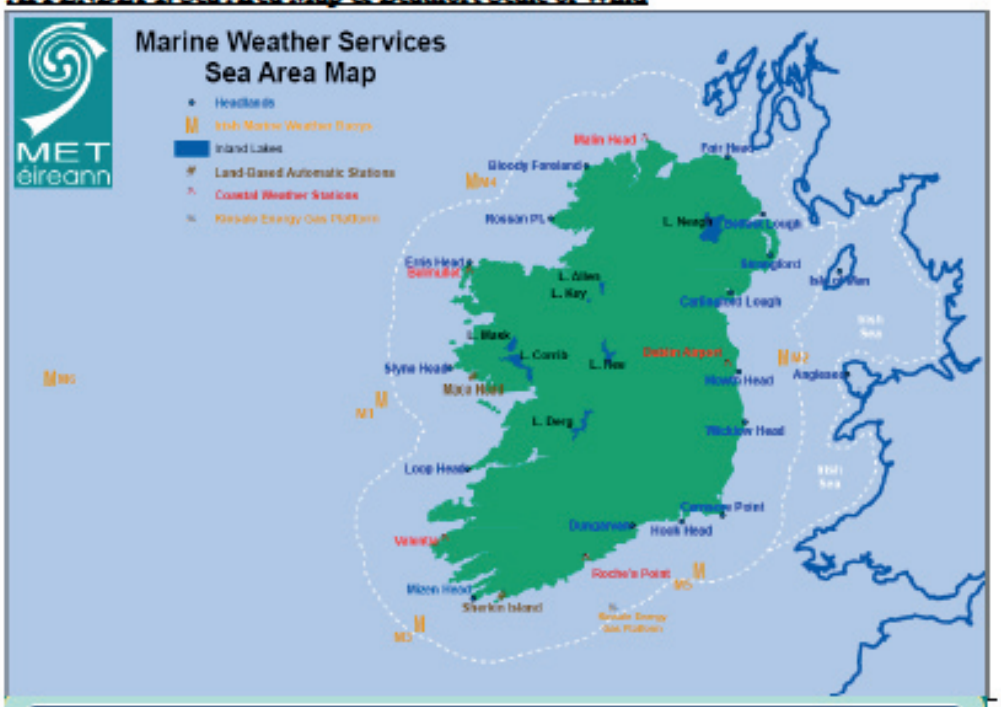
Appendix 7.13 Figure No. 5 Met Éireann weather conditions report

Met Eireann
The Irish Meteorological Service
Climate Services
Glasnevin Hill
Dublin 9

Seirbhísí Aeráide
Cnoc Ghlas Naíon
Baile Átha Cliath 9

Tel: +353-1-8064260
Fax: +353-1-8064216
Email: LEGAL@MET.ie

APPENDIX 1. Sea Area Map & Beaufort Scale of Wind



Beaufort Scale of Wind

Force	Description	Speed* knots	Speed* km/hr	Specification -sea	Wave height** (metres)
0	Calm	<1	<1	Sea like mirror	
1	Light air	1-3	1-5	Ripples	0.1 (0.1)
2	Light breeze	4-6	6-11	Small wavelets	0.2 (0.3)
3	Gentle breeze	7-10	12-19	Large wavelets, crests begin to break	0.6 (1)
4	Moderate breeze	11-16	20-28	Small waves becoming longer, frequent white horses	1 (1.5)
5	Fresh breeze	17-21	29-38	Moderate waves, many white horses, chance of spray	2 (2.5)
6	Strong breeze	22-27	39-49	Large waves, white foam crests, probably some spray	3 (4)
7	Near gale	28-33	50-61	Sea heaps up, streaks of white foam	4 (5.5)
8	Gale	34-40	62-74	Moderately high waves of greater length	5.5 (7.5)
9	Strong gale	41-47	75-88	High waves, dense streaks of foam, spray may reduce visibility	7 (10)
10	Storm	48-55	89-102	Very high waves, long overhanging crests, visibility affected	9 (12.5)
11	Violent storm	56-63	103-117	Exceptionally high waves, long white foam patches cover sea	11.5 (16)
12	Hurricane	64+	117 & over	Air filled with foam and spray, sea completely white	14 (+)

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

Appendix 7.13 Figure No. 5 Met Éireann weather conditions report

Met Éireann
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APPENDIX 2. Sea States & Visibility

Wave Heights / State of Sea:

The wave height is the vertical distance between the crest and the preceding or following trough. The table below gives a description of the wave system associated with a range of significant wave heights.

The Significant wave height is defined as the average height of the highest one-third of the waves. (It is very close to the value of wave height given when making visual observations of wave height.)

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

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

Visibility Descriptions:

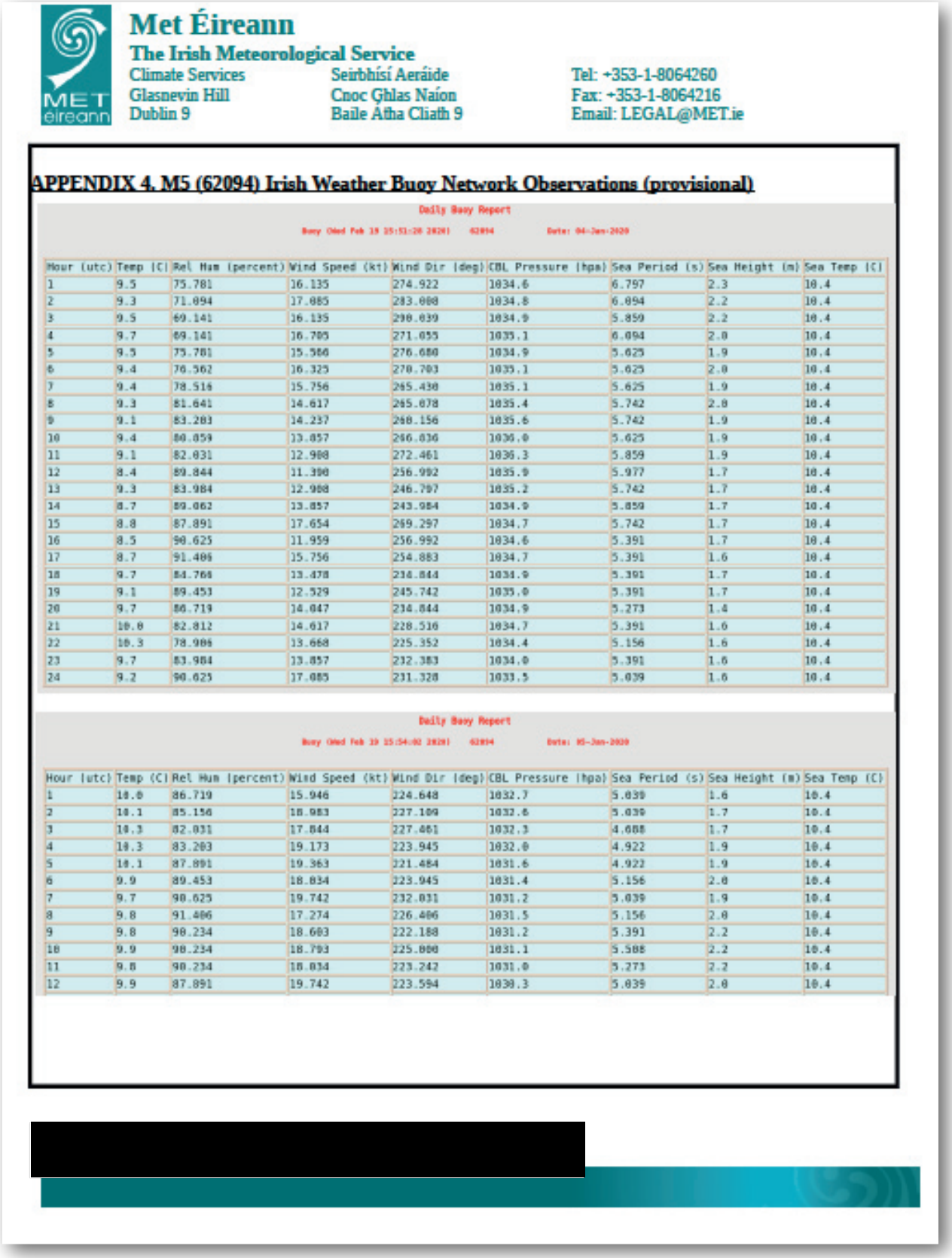
Visibility (Descriptive)	Visibility in nautical miles (kilometres)
Good	More than 5 nm (> 9 km)
Moderate	2 – 5 nm (4 – 9 km)
Poor	0.5 – 2 nm (1 – 4 km)
Fog	Less than 0.5 nm (< 1km)

Please Note:

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

[redacted]

Appendix 7.13 Figure No. 5 Met Éireann weather conditions report



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APPENDIX 4. M5 (62094) Irish Weather Buoy Network Observations (provisional)

Daily Buoy Report

Buoy Obsd Feb 19 15:51:20 2020 62094 Date: 04-Jan-2020

Hour (utc)	Temp (C)	Rel Hum (percent)	Wind Speed (kt)	Wind Dir (deg)	CBL Pressure (hpa)	Sea Period (s)	Sea Height (m)	Sea Temp (C)
1	9.5	75.781	16.135	274.922	1034.6	6.797	2.3	10.4
2	9.3	71.094	17.885	283.008	1034.8	6.094	2.2	10.4
3	9.5	69.141	16.135	290.039	1034.9	5.859	2.2	10.4
4	9.7	69.141	16.705	271.055	1035.1	6.094	2.0	10.4
5	9.5	75.781	15.586	276.680	1034.9	5.625	1.9	10.4
6	9.4	76.562	16.325	270.703	1035.1	5.625	2.0	10.4
7	9.4	78.516	15.756	265.430	1035.1	5.625	1.9	10.4
8	9.3	81.641	14.617	265.078	1035.4	5.742	2.0	10.4
9	9.1	83.203	14.237	268.156	1035.6	5.742	1.9	10.4
10	9.4	80.859	13.057	266.836	1036.0	5.625	1.9	10.4
11	9.1	82.031	12.988	272.461	1036.3	5.859	1.9	10.4
12	8.4	89.844	11.390	256.992	1035.9	5.977	1.7	10.4
13	9.3	83.984	12.988	246.797	1035.2	5.742	1.7	10.4
14	8.7	89.062	13.857	243.984	1034.9	5.859	1.7	10.4
15	8.8	87.891	17.654	269.297	1034.7	5.742	1.7	10.4
16	8.5	90.625	11.959	256.992	1034.6	5.391	1.7	10.4
17	8.7	91.406	15.756	254.883	1034.7	5.391	1.6	10.4
18	9.7	84.766	13.478	234.844	1034.9	5.391	1.7	10.4
19	9.1	89.453	12.529	245.742	1035.0	5.391	1.7	10.4
20	9.7	86.719	14.047	234.844	1034.9	5.273	1.4	10.4
21	10.0	82.812	14.617	228.516	1034.7	5.391	1.6	10.4
22	10.3	78.906	13.668	225.352	1034.4	5.156	1.6	10.4
23	9.7	83.984	13.057	232.383	1034.0	5.391	1.6	10.4
24	9.2	90.625	17.085	231.328	1033.5	5.039	1.6	10.4

Daily Buoy Report

Buoy Obsd Feb 19 15:54:02 2020 62094 Date: 05-Jan-2020

Hour (utc)	Temp (C)	Rel Hum (percent)	Wind Speed (kt)	Wind Dir (deg)	CBL Pressure (hpa)	Sea Period (s)	Sea Height (m)	Sea Temp (C)
1	10.0	86.719	15.946	224.648	1032.7	5.039	1.6	10.4
2	10.1	85.156	18.983	227.109	1032.6	5.039	1.7	10.4
3	10.3	82.031	17.844	227.461	1032.3	4.688	1.7	10.4
4	10.3	83.203	19.173	223.945	1032.0	4.922	1.9	10.4
5	10.1	87.891	19.363	221.484	1031.6	4.922	1.9	10.4
6	9.9	89.453	18.834	223.945	1031.4	5.156	2.0	10.4
7	9.7	90.625	19.742	232.031	1031.2	5.039	1.9	10.4
8	9.8	91.406	17.274	226.406	1031.5	5.156	2.0	10.4
9	9.8	90.234	18.603	222.188	1031.2	5.391	2.2	10.4
10	9.9	90.234	18.793	225.000	1031.1	5.508	2.2	10.4
11	9.8	90.234	18.034	223.242	1031.0	5.273	2.2	10.4
12	9.9	87.891	19.742	223.594	1030.3	5.039	2.0	10.4

Appendix 7.13 Figure No. 5 Met Éireann weather conditions report

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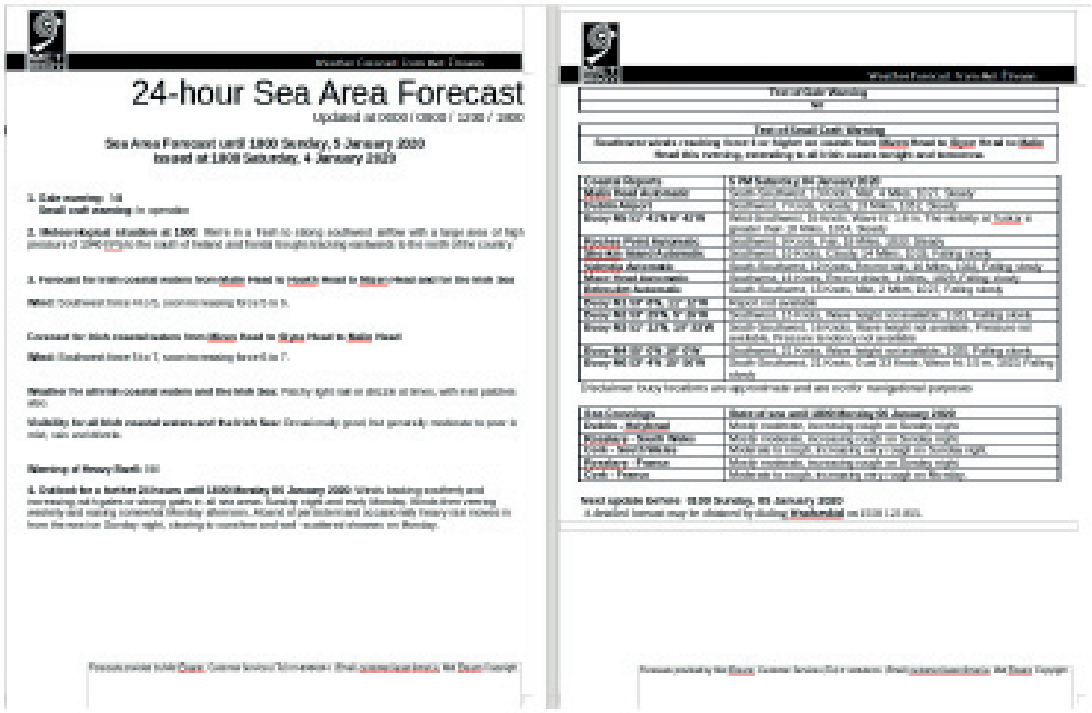
APPENDIX 6. Sea Area Forecasts



24-hour Sea Area Forecast

Updated at 0200 / 0800 / 1400 / 2000

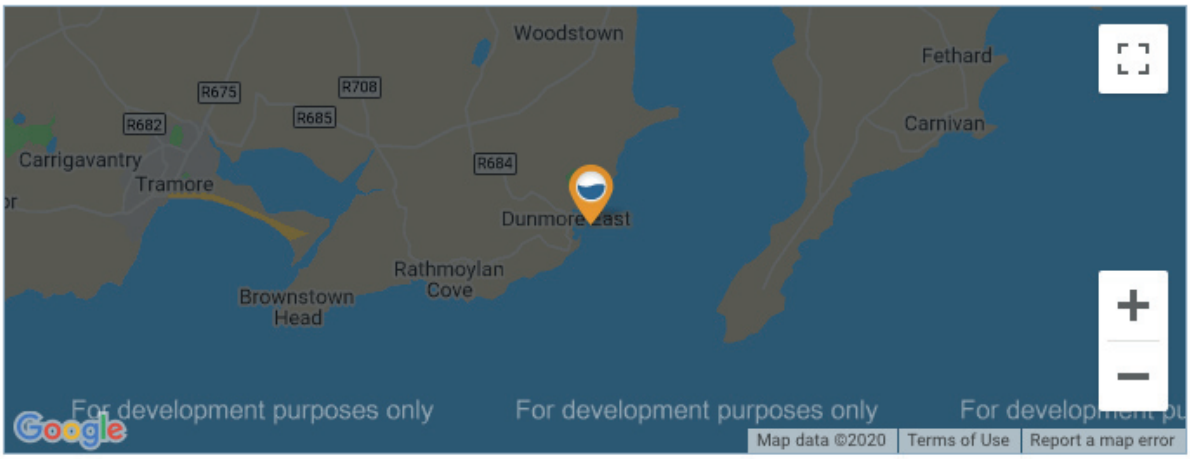
Sea Area Forecast until 1800 Sunday, 5 January 2020
Issued at 1808 Saturday, 4 January 2020

[redacted]

Appendix 7.14 Figure No. 6 Tide times for Dunmore East 4 January 2020.

Dunmore East Tide Times

Dunmore East tide times are listed below, including sunrise and sunset times, moon rise and moonset times, and the current moon phase. Simply use the tide calendar to view tide times up to 6 days in advance.



Saturday 4th January, 2020

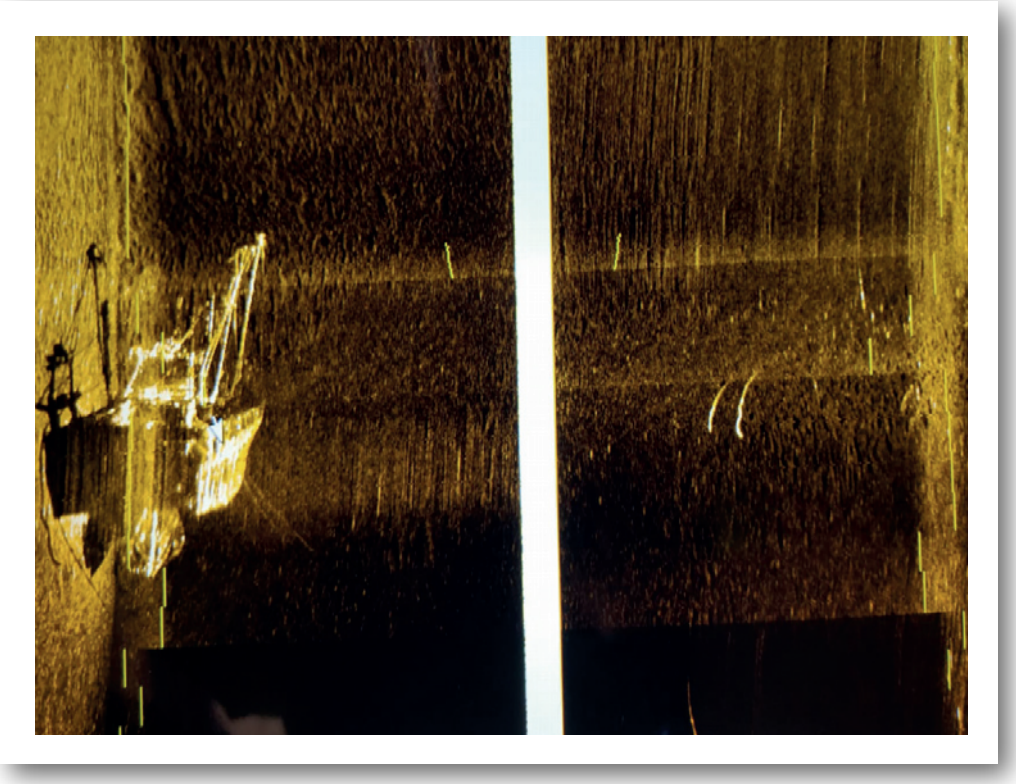
<<	October 2020					>>
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

LOW TIDE:	06:56	HEIGHT:	1.50m
HIGH TIDE:	12:49	HEIGHT:	3.40m
LOW TIDE:	19:23	HEIGHT:	1.50m

Waxing Quarter Moon

SUNRISE:	08:35	SUNSET:	16:29
MOONRISE:	13:54	MOONSET:	02:27

Appendix 7.15 Photographs No. 5 & 6 – Sonar Scan images *"FV Alize"* – Stern view and Bow view



Photograph No.5 - Sonar Scan image "*FV Alize*" - Stern view.

Photograph No.6 - Sonar Scan image *"FV Alize"* – Bow view.

Appendix 7.16 Figure No.7 – IMO Code of Safety for Fishermen and Fishing Vessels, Chapter 3

Title	CODE OF SAFETY FOR FISHERMEN AND FISHING VESSELS / PART B / CHAPTER 3

CHAPTER III

STABILITY AND ASSOCIATED SEAWORTHINESS

3.1 General

3.1.1 Vessels should be so designed and constructed that the requirements of this chapter will be satisfied in the operating conditions referred to in 3.7. Calculations of the righting lever curves should be to the satisfaction of the Competent authority.*

* Refer to the Calculation of stability curves and the Effect of free surfaces of liquids in tanks contained in paragraphs 3.6 and 3.3 respectively of the Code on Intact Stability, adopted by the Organization by resolution A.749(18), as amended, and the Code of practice concerning the accuracy of stability information for fishing vessels, adopted by the Organization by resolution A.267(VIII).

3.1.2 Wherever practicable, guidance should be provided for an approximate determination of the vesselÂ's stability by means of the rolling period test including values of rolling coefficients particular to the vessel. A suggested form for such guidance is shown at the Appendix to the Memorandum to Administrations in this respect reproduced at appendix 7 to the annex to Part A of the Code.

3.2 Stability criteria

3.2.1 The following minimum stability criteria should be applied unless the Competent authority is satisfied that operating experience justifies departure therefrom:

.1 The area under the righting lever curve (GZ curve) should not be less than 0.055 m-rad up to 30° angle of heel and not less than 0.090 m-rad up to 40° or the angle of flooding θf if this angle is less than 40°. Additionally, the area under the GZ curve between the angles of heel of 30° and 40° or between 30° and θf, if this angle is less than 40° should not be less than 0.030 m-rad. θf is the angle of heel at which openings in the hull, superstructures or deckhouses which cannot be closed watertight commence to immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open;

.2 the righting lever GZ should be at least 200 mm at an angle of heel equal to or greater than 30°;

.3 the maximum righting lever GZmax should occur at an angle of heel preferably exceeding 30° but not less than 25°; and

.4 the initial metacentric height GM0 should not be less than 350 mm for single deck vessels. In vessels with complete superstructure or vessels of 70 m in length and over, the metacentric height may be reduced to the satisfaction of the Competent authority but in no case should be less than 150 mm.

3.2.2 Where arrangements other than bilge keel are provided to limit the angles of roll, the Competent authority should be satisfied that the stability criteria given in 3.2.1 are maintained in all operating conditions.

3.2.3 Where ballast is provided to ensure compliance with 3.2.1, its nature and arrangement should be to the satisfaction of the Competent authority.

3.2.4 It should be ensured that stability characteristics of the vessel will not produce acceleration forces which could be prejudicial to the safety of the vessel and crew.

3.2.5 For a vessel with L less than 30 m for which, by reason of insufficient stability data, 3.2.1 cannot be applied, the following formula for the minimum metacentric height GMmin, in metres, for all operating conditions should be used as the criterion:*

* Refer to the Recommendation for an interim simplified stability criterion for decked fishing vessels under 30 m in length contained in paragraph 4.2.6 of the Code on Intact Stability, adopted by the Organization by resolution A.749(18), as amended.

$$GM_{\min} = 0.53 + 2B\left[0.075 - 0.37\left(\frac{f_{\min}}{B}\right) + 0.82\left(\frac{f_{\min}}{B}\right)^2 - 0.014\left(\frac{B}{D}\right) - 0.032\left(\frac{l_s}{L}\right)\right]$$

where:

L, B, D and min f , in metres, are as defined in 1.2.20, 1.2.5, 1.2.11 and 1.2.16 respectively;

and

s l = Actual length, in metres, of an enclosed superstructure, extending from side to side of the vessel, as defined in 1.2.29.

The formula is applicable for vessels having:

.1 f_{min} /B between 0.02 and 0.20;

.2 l_s /L smaller than 0.60;

.3 B/D between 1.75 and 2.15;

.4 sheer fore and aft at least equal to or exceeding the standard sheer prescribed in regulation 38(8) of the International Convention on Load Lines, 1966;

.5 height of superstructure included in the calculation not less than 1.8 m.

For vessels with parameters outside of the above limits, the formula should be applied with special care.

3.2.6 The above formula is not intended as a replacement for the basic criteria given in 3.2.1 and 3.5 but should be used only if circumstances are such that cross-curves of stability, KM curve and subsequent GZ curves are not and cannot be made available for judging a particular vesselÂ's stability.

3.2.7 The calculated value of GMmin should be compared with actual GM values of the vessel in all loading conditions. If a rolling test (see appendix 7 to the annex to Part A of the Code), an inclining experiment based on estimated displacement, or another approximate method of determining the actual GM is used, a safety margin should be added to the calculated GMmin.

3.3 Flooding of fish-holds

The angle of heel at which progressive flooding of fish-holds could occur through hatches which remain open during fishing operations and which cannot rapidly be closed should be at least 20° unless the stability criteria of 3.2.1 can be satisfied with the respective fish-holds partially or completely flooded.

3.4 Particular fishing methods

Vessels engaged in particular fishing methods where additional external forces are imposed on the vessel during fishing operations, should meet the stability criteria of 3.2.1 increased, if necessary, to the satisfaction of the Competent authority.

Appendix 7.16 Figure No.7 – IMO Code of Safety for Fishermen and Fishing Vessels, Chapter 3

3.5 Severe wind and rolling

Vessels should be able to withstand, to the satisfaction of the Competent authority, the effect of severe wind and rolling in associated sea conditions taking account of the seasonal weather conditions, the sea states in which the vessel will operate, the type of vessel and its mode of operation.*

* Refer to the Severe wind and rolling criterion (weather criterion) for fishing vessels, contained in paragraph 4.2.4 of the Code on Intact Stability adopted by the Organization by resolution A.749(18), as amended .

3.6 Water on deck

Vessels should be able to withstand, to the satisfaction of the competent authority, the effect of water on deck, taking account of the seasonal weather conditions, the sea states in which the vessel will operate, the type of vessel and its mode of operation.**

** Refer to the Guidance on a Method of calculation of the effect of water on deck, contained in recommendation 1 of attachment 3 to the Final Act of the 1993 Torremolinos Conference.

3.7 Operating conditions

3.7.1 The number and type of operating conditions to be considered should be to the satisfaction of the Competent authority and should include the following:

.1 departure for the fishing grounds with full fuel, stores, ice, fishing gear, etc.;

.2 departure from the fishing grounds with full catch;

.3 arrival at home port with full catch and 10% stores, fuel, etc.; and

.4 arrival at home port with 10% stores, fuel, etc. and a minimum catch, which should normally be 20% of full catch but may be up to 40% provided the Competent authority is satisfied that operating patterns justify such a value.

3.7.2 In addition to the specific operating conditions given in 3.7.1, the Competent authority should also be satisfied that the minimum stability criteria given in 3.2 are met under all other actual operating conditions including those which produce the lowest values of the stability parameters contained in these criteria. The Competent authority should also be satisfied that those special conditions associated with a change in the vesselÂ's mode or areas of operation which affect the stability considerations of this chapter are taken into account.

3.7.3 Concerning the conditions referred to in 3.7.1, the calculations should include the following:

.1 allowance for the weight of the wet fishing nets and tackle, etc. on deck;

.2 allowance for ice accretion, if anticipated, in accordance with 3.8;

.3 homogeneous distribution of the catch, unless this is inconsistent with practice;

.4 catch on deck, if anticipated, in operating conditions referred to in 3.7.1.2, 3.7.1.3 and 3.7.2;

.5 water ballast, if carried either in tanks which are especially provided for this purpose or in other tanks also equipped for carrying water ballast; and

.6 allowance for the free surface effect of liquids and, if applicable, catch carried.

3.8 Ice accretion

3.8.1 For vessels operating in areas where ice accretion is likely to occur the following icing allowance should be made in the stability calculations:*

* For sea areas where ice accretion may occur and modifications of the icing allowance are suggested, refer to the Guidance Relating to Ice Accretion, contained in recommendation 2 of attachment 3 to the Final Act of the 1993 Torremolinos Conference. Refer also to the Icing consideration and the Recommendation for skippers of fishing vessels on ensuring a vesselÂ's endurance in conditions of ice formation, contained in appendix 10 to the annex to Part A of the Code.

.1 30 kg/m^2 on exposed weather decks and gangways;

.2 7.5 kg/m^2 for the projected lateral area of each side of the vessel above the water plane; and

.3 the projected lateral area of discontinuous surfaces of rail, spars (except masts) and rigging of vessels having no sails and the projected lateral area of other small objects should be computed by increasing the total projected area of continuous surfaces by 5% and the static moments of this area by 10%.

3.8.2 The height of the centre of gravity of ice accretion should be calculated according to the position of corresponding parts of the decks and gangways and other continuous surfaces on which ice can accumulate.

3.8.3 Vessels intended for operation in areas where ice accretion is known to occur should be:

.1 designed to minimize the accretion of ice; and

.2 equipped with such means for removing ice as the Competent authority may require.*

* Refer to paragraph 2.4 of appendix 10 to the annex to Part A of the Code on a typical list of equipment and hand tool required for combating ice formation.

3.9 Inclining test**

** Refer to the Determination of lightship displacement and centres of gravity and the Detailed guidance for the conduct of an inclining test contained in chapter 7 and Annex 1 respectively of the Code on Intact Stability, adopted by the Organization by resolution A.749(18), as amended.

3.9.1 Every vessel should undergo an inclining test upon its completion and the actual displacement and position of the centre of gravity should be determined for the lightship condition.

3.9.2 Where alterations are made to a vessel affecting its lightship condition and the position of the centre of gravity, the vessel should, if the Competent authority considers this necessary, be re-inclined and the stability information revised.

3.9.3 The Competent authority may allow the inclining test of an individual vessel to be dispensed with, provided basic stability data are available from the inclining test of a sister ship, and it is shown to the satisfaction of the Competent authority that reliable stability information for the exempted vessel can be obtained from such basic data.

3.10 Stability information

3.10.1 Suitable stability information should be supplied to enable the skipper to assess with ease and certainty the stability of the vessel under various operating conditions.*** Such information should include specific instructions to the skipper warning him of those operating conditions which could adversely affect either the stability or the trim of the vessel. A copy of the stability information should be submitted to the Competent authority for approval.****

3.10.2 The approved stability information should be kept on board, readily accessible at all times and inspected at the periodical surveys of the vessel to ensure that it has been approved for the actual operating conditions.

*** Refer to the Guidance on stability information contained in recommendation 3 of attachment 3 to the Final Act of the 1993 Torremolinos Conference. See also the General provisions against

Appendix 7.16 Figure No.7 – IMO Code of Safety for Fishermen and Fishing Vessels, Chapter 3

capsizing and information for the master contained in chapter 2 of the Code on Intact Stability adopted by the Organization by resolution A.749(18), as amended .

**** Refer to the Code of Practice concerning the accuracy of stability information for fishing vessels, adopted by the Organization by resolution A.267(VIII).

3.10.3 Where alterations are made to a vessel affecting its stability, revised stability calculations should be prepared and submitted to the Competent authority for approval. If the Competent authority decides that the stability information must be revised, the new information should be supplied to the skipper and the superseded information removed.

3.10.4 Scales indicating the vessel's draught should be permanently marked on both sides of the stem and stern. These scales should be measured perpendicularly from a datum line which will lie along, or be a projection of, the lower extremity of the keel or other appendage. Numbers 0.1 m in the vertical plane should be marked on the scale, the lower edge of each number indicating the draught in metres. Between the numbers, lines should be marked, parallel to the datum, at intervals of 0.1 m. The skipper should be provided with information defining the position of the datum line and instructions regarding the use of observed draughts.

3.11 Portable fish-hold divisions

The catch should be properly secured against shifting which could cause dangerous trim or heel of the vessel. Recommended practice on portable fish-hold divisions is given in Annex III to this part of the Code. The scantlings of portable fish-hold divisions, if fitted, should be to the satisfaction of the Competent authority.

3.12 Bow height

The bow height should be sufficient, to the satisfaction of the Competent authority, to prevent the excessive shipping of water and should be determined taking account of the seasonal weather conditions, the sea states in which the vessel will operate, the type of vessel and its mode of operation.

3.13 Maximum permissible operating draught

3.13.1 A maximum permissible operating draught should be approved by the Competent authority and should be such that, in the associated operating condition, the stability criteria of this chapter and the provisions of chapters II and VI as appropriate are satisfied.

3.13.2 The maximum permissible operating draught should be marked on each side of the vessel. Working deck should be marked by working deck line. The location of the maximum permissible operating draught mark and the working deck line should be indicated on one of the safety certificates for the vessel.

3.14 Subdivision and damage stability

Vessels of 100 m in length and over, where the total number of persons carried is 100 or more, should be capable, to the satisfaction of the Competent authority, of remaining afloat with positive stability, after the flooding of any one compartment assumed damaged, having regard to the type of vessel, the intended service and area of operation.*

* Refer to the Guidance on subdivision and damage stability calculation, contained in recommendation 5 of attachment 3 to the Final Act of the 1993 Torremolinos Conference.

Appendix 7.17 Figure No.8 *"FV Alize"* Stability Information Booklet, Condition 6 'Departure Grounds'

vi Condition 6: Depart grounds; 20% Consumables; 20% Catch

Item	Weight	LCG	LMom	VCG	VMom	TCG	FSM
Fuel Tank Port	0.495	4.758	2.36	1.651	0.82	-1.760	0.094
Fuel Tank Stbd	0.495	4.758	2.36	1.651	0.82	1.760	0.094
Water Tank Fwd Port	0.164	0.067	0.01	2.275	0.37	-1.952	0.023
Water Tank Fwd Stbd	0.164	0.067	0.01	2.275	0.37	1.952	0.023
Water Tank Aft Port	0.000	--	--	--	--	--	0.000
Water Tank Aft Stbd	0.000	--	--	--	--	--	0.000
Hyd Tank	0.476	6.188	2.95	2.611	1.24	-1.687	0.032
Crew	0.300	4.000	1.20	4.400	1.32	0.000	0.000
Dredges	3.000	2.750	8.25	4.550	13.65	0.000	0.000
Ice	0.500	0.914	0.46	2.560	1.28	0.000	0.000
Catch	0.600	2.750	1.65	2.240	1.34	0.000	0.000
Stores & Gear	0.100	4.000	0.40	4.000	0.40	0.000	0.000
Deadweight	**6.295**	**3.120**	**19.64**	**3.435**	**21.62**	**-0.128**	**0.267**
Lightship	**51.707**	**3.964**	**204.97**	**2.793**	**144.41**	**0.000**	**0.000**
Displacement	**58.001**	**3.872**	**224.61**	**2.863**	**166.03**	**-0.014**	**0.267**

Draught	Aft	2.817 metres
	Mid	2.764 metres
	Fwd	2.711 metres
Trim Between Marks		0.106 metres by the stern

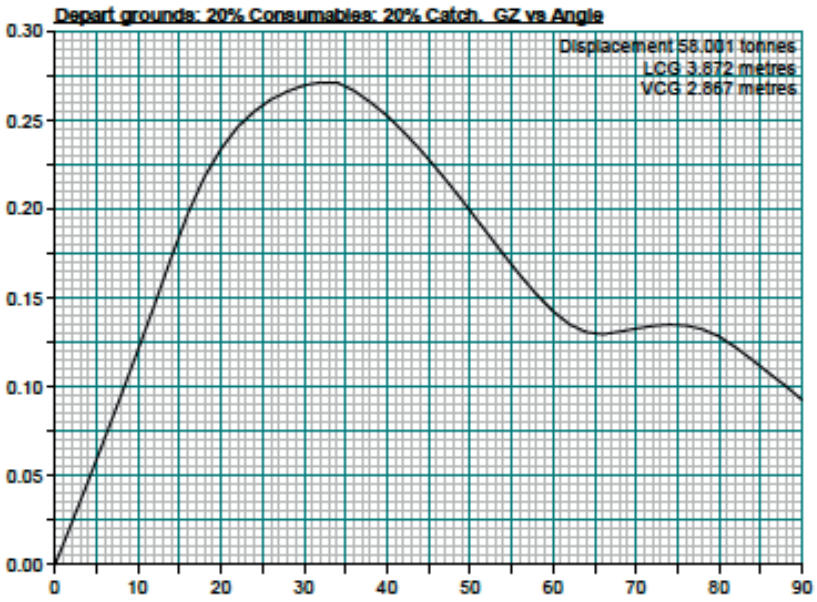
GM Solid	0.677 metres
GM Fluid	0.673 metres
Effective VCG	2.867 metres

Moulded Displacement	57.529 tonnes
Waterline at LCF referred to hull definition datum	2.771 metres
LCF referred to hull definition datum	3.417 metres
Heel Angle	0.00 degrees to starboard

25

Appendix 7.17 Figure No.8 *"FV Alize"* Stability Information Booklet, Condition 6 'Departure Grounds'

Heel Angle degrees	Righting GZ metres	Lever KN metres	Waterline metres	Trim metres	VCB metres	GZ Curve Area metres.rad
0.0	0.000	0.000	2.802	0.106	2.034	0.000
10.0	0.121	0.619	2.755	0.108	2.058	0.010
20.0	0.234	1.215	2.617	0.108	2.124	0.042
30.0	0.270	1.703	2.450	0.200	2.204	0.087
40.0	0.252	2.095	2.261	0.442	2.288	0.133
50.0	0.199	2.396	2.038	0.772	2.373	0.173
60.0	0.143	2.626	1.760	1.121	2.473	0.203
70.0	0.133	2.827	1.408	1.415	2.630	0.226
80.0	0.128	2.952	1.016	1.669	2.805	0.249
90.0	0.093	2.960	0.633	1.987	2.960	0.269



No.	Criteria	Actual	Requirement	Pass/Fail
1	The area under the GZ curve from 0.0 degrees to 30 degrees	0.087 m.rad	0.066 m.rad	pass
2	The area under the GZ curve from 0.0 degrees to 40.0 degrees	0.134 m.rad	0.108 m.rad	pass
3	The area under the GZ curve from 30.0 degrees to 40.0 degrees	0.046 m.rad	0.036 m.rad	pass
4	The maximum value of GZ occurs at	32.7 degrees	25 degrees	pass
5	The value of GZ at an angle of heel of 32.7 degrees	0.272 metres	0.24 metres	pass
6	The value of the upright GM	0.673 metres	0.42 metres	pass

26

Appendix 7.18 Figure No.9 *"FV Alize"* - Stability Condition 8.2.

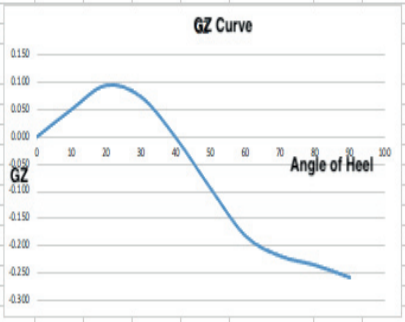
Condition 8.2: Depart grounds 20% consumables, 37% Catch

Item	Weight	LCG	LMom	VCG	VMom	TCG	T Mom	FSM
Fuel tank Port	0.495	4.758	2.355	1.651	0.817	-1.682	-0.833	0.094
Fuel tank Stbd	0.495	4.758	2.355	1.651	0.817	1.682	0.833	0.094
Water Tank Fwd Port	0.164	0.067	0.011	2.275	0.373	-1.952	-0.320	0.023
Water Tank Fwd Stbd	0.164	0.067	0.011	2.275	0.373	1.952	0.320	0.023
Water Tank Aft Port	0.000		0.000		0.000		0.000	0.000
Water Tank Aft Stbd	0.000		0.000		0.000		0.000	0.000
Hyd Tank	0.476	6.188	2.945	2.611	1.243	-1.687	-0.803	0.032
Crew	0.300	4.000	1.200	4.400	1.320	0.000	0.000	0.000
Port Dredge	1.750	2.750	4.813	11.250	19.688	-2.600	-4.550	0.000
Stbd Dredge	1.750	2.750	4.813	11.250	19.688	2.600	4.550	0.000
Ice	0.500	0.914	0.457	2.560	1.280	0.000	0.000	0.000
Catch	1.100	2.750	3.025	2.240	2.464	0.000	0.000	0.000
Stores	0.100	4.000	0.400	4.000	0.400	0.000	0.000	0.000
			0.000		0.000	0.000	0.000	0.000
Deadweight	7.294	3.069	22.385	6.644	48.463	-0.110	-0.803	0.266
Lightship	51.707	3.964	204.970	2.793	144.410	0.000	0.000	0.000
Displacement	59.001	3.853	227.355	3.269	192.873	-0.014	-0.803	0.266

Length of Derrick 6.700 m

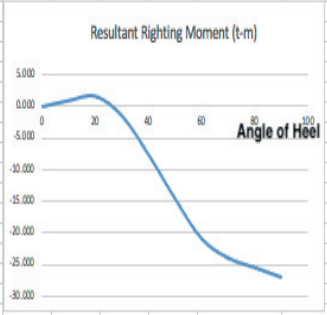
Trim 0.106 m by the stern

GM Solid	0.269
FSC	0.005
GM Fluid	0.265
Effective VCG	3.273



Heel Angle degrees	Radians	KN	GZ	Righting moment (GZ x W)		Capsizing moment due to unsecured dredge (dredge arm x weight x sin(angle of heel)		Resultant righting moment	
0	0.000	0.000	0.000	0.000	t-m	0.000	t-m	0.000	t-m
10	0.175	0.619	0.051	2.983	t-m	2.036	t-m	0.947	t-m
20	0.349	1.215	0.095	5.629	t-m	4.010	t-m	1.619	t-m
30	0.524	1.711	0.074	4.381	t-m	5.863	t-m	-1.481	t-m
40	0.698	2.103	-0.001	-0.068	t-m	7.537	t-m	-7.605	t-m
50	0.873	2.413	-0.095	-5.583	t-m	8.982	t-m	-14.565	t-m
60	1.047	2.653	-0.182	-10.733	t-m	10.154	t-m	-20.887	t-m
70	1.222	2.857	-0.219	-12.925	t-m	11.018	t-m	-23.943	t-m
80	1.396	2.988	-0.236	-13.909	t-m	11.547	t-m	-25.456	t-m
90	1.571	3.015	-0.258	-15.251	t-m	11.725	t-m	-26.976	t-m

No	Criteria		Actual	Requiremen	Pass = 1 /Fail = 0
1	The area under the GZ curve from 0 degrees to 30 degrees		0.034	0.066	0
2	The area under the GZ curve from 0 degrees to 40 degrees		0.040	0.108	0
3	The area under the GZ curve from 0.0 degrees to 40 degrees		0.007	0.036	0
4	The Maximum value of GZ occurs at	= degrees	23.0	25.000	0
5	The value of GZ at Max angle of heel		0.100	0.240	0
6	The value of the upright GM		0.265	0.420	0



Appendix 7.19 Figure No.10 *"FV Alize"* - Stability Condition 8.1

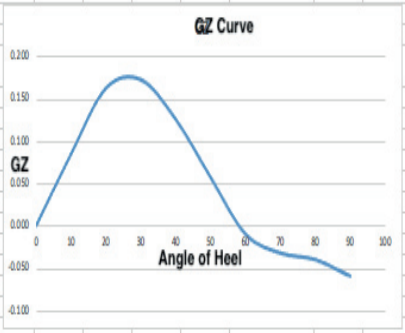
Condition 8.1: Depart grounds 20% consumables, 37% Catch

Item	Weight	LCG	LMom	VCG	VMom	TCG	T Mom	FSM
Fuel tank Port	0.495	4.758	2.355	1.651	0.817	-1.682	-0.833	0.094
Fuel tank Stbd	0.495	4.758	2.355	1.651	0.817	1.682	0.833	0.094
Water Tank Fwd Port	0.164	0.067	0.011	2.275	0.373	-1.952	-0.320	0.023
Water Tank Fwd Stbd	0.164	0.067	0.011	2.275	0.373	1.952	0.320	0.023
Water Tank Aft Port	0.000		0.000		0.000		0.000	0.000
Water Tank Aft Stbd	0.000		0.000		0.000		0.000	0.000
Hyd Tank	0.476	6.188	2.945	2.611	1.243	-1.687	-0.803	0.032
Crew	0.300	4.000	1.200	4.400	1.320	0.000	0.000	0.000
Port Dredge	1.750	2.750	4.813	11.250	19.688	-2.600	-4.550	0.000
Stbd Dredge	1.750	2.750	4.813	4.550	7.963	2.600	4.550	0.000
Ice	0.500	0.914	0.457	2.560	1.280	0.000	0.000	0.000
Catch	1.100	2.750	3.025	2.240	2.464	0.000	0.000	0.000
Stores	0.100	4.000	0.400	4.000	0.400	0.000	0.000	0.000
			0.000		0.000	0.000	0.000	0.000
Deadweight	7.294	3.069	22.385	5.037	36.738	-0.110	-0.803	0.266
Lightship	51.707	3.964	204.970	2.793	144.410	0.000	0.000	0.000
Displacement	59.001	3.853	227.355	3.070	181.148	-0.014	-0.803	0.266

Length of Derrick 6.700 m

Trim 0.106 m by the stern

GM Solid	0.468
FSC	0.005
GM Fluid	0.463
Effective VCG	3.075

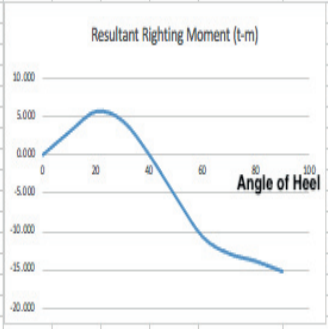


Heel Angle degrees	Radians	KN	GZ	Righting moment (GZ x W)		Capsizing moment due to unsecured dredge (dredge arm x weight x sin(angle of heel)		Resultant righting moment	
0	0.000	0.000	0.000	0.000	t-m	0.000	t-m	0.000	t-m
10	0.175	0.619	0.085	5.019	t-m	2.036	t-m	2.983	t-m
20	0.349	1.215	0.163	9.639	t-m	4.010	t-m	5.629	t-m
30	0.524	1.711	0.174	10.244	t-m	5.863	t-m	4.381	t-m
40	0.698	2.103	0.127	7.469	t-m	7.537	t-m	-0.068	t-m
50	0.873	2.413	0.058	3.399	t-m	8.982	t-m	-5.583	t-m
60	1.047	2.653	-0.010	-0.579	t-m	10.154	t-m	-10.733	t-m
70	1.222	2.857	-0.032	-1.907	t-m	11.018	t-m	-12.925	t-m
80	1.396	2.988	-0.040	-2.362	t-m	11.547	t-m	-13.909	t-m
90	1.571	3.015	-0.060	-3.526	t-m	11.725	t-m	-15.251	t-m

IMO criteria

No	Criteria	Actual	Requiremen	Pass = 1 /Fail = 0
1	The area under the GZ curve from 0 degrees to 30 degrees	0.060	0.066	0
2	The area under the GZ curve from 0 degrees to 40 degrees	0.087	0.108	0
3	The area under the GZ curve from 0.0 degrees to 40 degrees	0.026	0.036	0
4	The Maximum value of GZ occurs at = degrees	28.0	25.000	1
5	The value of GZ at Max angle of heel	0.180	0.240	0
6	The value of the upright GM	0.463	0.420	1

Text



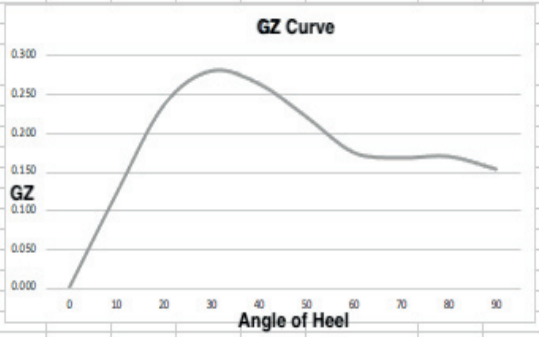
Appendix 7.20 Figure No.11 *"FV Alize"* - Stability Condition 8.0

Condition 8: Depart grounds 20% consumables, 37% Catch

Item	Weight	LCG	LMom	VCG	VMom	TCG	T Mom	FSM
Fuel tank Port	0.495	4.758	2.355	1.651	0.817	-1.760	-0.871	0.094
Fuel tank Stbd	0.495	4.758	2.355	1.651	0.817	1.760	0.871	0.094
Water Tank Fwd Port	0.164	0.067	0.011	2.275	0.373	-1.952	-0.320	0.023
Water Tank Fwd Stbd	0.164	0.067	0.011	2.275	0.373	1.952	0.320	0.023
Water Tank Aft Port	0.000		0.000		0.000		0.000	0.000
Water Tank Aft Stbd	0.000		0.000		0.000		0.000	0.000
Hyd Tank	0.476	6.188	2.945	2.611	1.243	-1.687	-0.803	0.032
Crew	0.300	4.000	1.200	4.400	1.320	0.000	0.000	0.000
Port Dredge	1.500	2.750	4.125	4.550	6.825	-2.600	-3.900	0.000
Stbd Dredge	1.500	2.750	4.125	4.550	6.825	2.600	3.900	0.000
Ice	0.500	0.914	0.457	2.560	1.280	0.000	0.000	0.000
Catch	1.100	2.750	3.025	2.240	2.464	0.000	0.000	0.000
Stores	0.100	4.000	0.400	4.000	0.400	0.000	0.000	0.000
			0.000		0.000	0.000	0.000	0.000
Deadweight	6.794	3.092	21.010	3.347	22.738	-0.118	-0.803	0.266
Lightship	51.707	3.964	204.970	2.793	144.410	0.000	0.000	0.000
Displacement	58.501	3.863	225.980	2.857	167.148	-0.014	-0.803	0.266

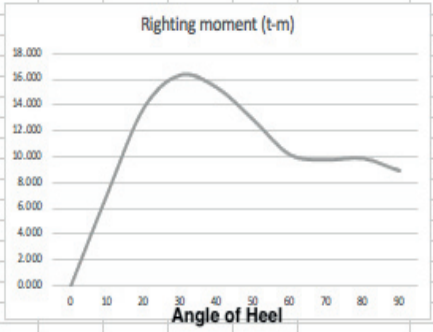
Trim	0.106 m by the stern
GM Solid	0.681
FSC	0.005
GM Fluid	0.676
Effective VCG	2.862

Heel Angle degrees	Radians	KN	GZ	Righting moment (GZ x W)	
0	0.000	0.000	0.000	0.000	t-m
10	0.175	0.619	0.122	7.141	t-m
20	0.349	1.215	0.236	13.820	t-m
30	0.524	1.711	0.280	16.388	t-m
40	0.698	2.103	0.264	15.416	t-m
50	0.873	2.413	0.221	12.917	t-m
60	1.047	2.653	0.175	10.219	t-m
70	1.222	2.857	0.168	9.820	t-m
80	1.396	2.988	0.170	9.931	t-m
90	1.571	3.015	0.153	8.967	t-m



IMO criteria

No	Criteria	Actual	Requiremen	Pass = 1 /Fail = 0
1	The area under the GZ curve from 0 degrees to 30 degrees	0.089	0.066	1
2	The area under the GZ curve from 0 degrees to 40 degrees	0.136	0.108	1
3	The area under the GZ curve from 0.0 degrees to 40 degrees	0.048	0.036	1
4	The Maximum value of GZ occurs at = degrees	33.0	25.000	1
5	The value of GZ at Max angle of heel	0.280	0.240	1
6	The value of the upright GM	0.676	0.420	1



SECTION 36 PROCESS

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

It is a requirement under Section 36 that:

(1) Before publishing a report, the Board shall send a draft of the report or sections of the draft report to any person who, in its opinion, is likely to be adversely affected by the publishing of the report or sections or, if that person be deceased, then such person as appears to the Board best to represent that person's interest.

(2) A person to whom the Board sends a draft in accordance with subsection (1) may, within a period of 28 days commencing on the date on which the draft is sent to the person, or such further period not exceeding 28 days, as the Board in its absolute discretion thinks fit, submit to the Board in writing his or her observations on the draft.

(3) A person to whom a draft has been sent in accordance with subsection (1) may apply to the Board for an extension, in accordance with subsection (2), of the period in which to submit his or her observations on the draft.

(4) Observations submitted to the Board in accordance with subsection (2) shall be included in an appendix to the published report, unless the person submitting the observations requests in writing that the observations be not published.

(5) Where observations are submitted to the Board in accordance with subsection (2), the Board may, at its discretion -

(a) alter the draft before publication or decide not to do so, or

(b) include in the published report such comments on the observations as it thinks fit.'

The Board reviews and considers all observations received whether published or not published in the final report. When the Board considers an observation requires amendments to the report that is stated beside the relevant observation. When the Board is satisfied that the report has adequately addressed the issue in the observation, then the observation is 'Noted' without comment or amendment. The Board may make further amendments or observations in light of the responses under Section 36. 'Noted' does not mean that the Board either agrees or disagrees with the observation.

Response(s) received following circulation of the draft report are included in the following section.

8. SECTION 36 - CORRESPONDENCE RECEIVED

Note: The names and contact details of the individual respondents have been obscured for privacy reasons.

Correspondence 8.1 Bord Iascaigh Mhara and MCIB response

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www.bim.ie

[redacted]
Chairperson
Marine Casualty Investigation Board
Leeson Lane
D02 TR60

19th February 2021

Report into a fatal incident involving a fishing vessel 'Alize' near Hook Head, Co Wexford, 5 Jan 2020

Dear [redacted]

Thank you for your correspondence of 29th January. BIM welcomes the opportunity to respond to the draft MCIB report regarding the sinking of the FV Alize and tragic loss of both crew members in January 2020.

BIM currently offers a broad range of training courses for the Irish fishing and aquaculture industries, delivered from the National Fisheries Colleges in both Greencastle, Co Donegal and Castletownbere, Co Cork, as well as Coastal Training Units operating on the East and West coast. From these facilities we provide courses ranging from Skipper Full Certificate of Competency to Basic Safety Training, and a range of ancillary training in Radio, Engineering, Passenger Boat Operation, Fire-Fighting and Medical First Aid.

This training is required to meet the statutory requirements of the Department of Transport under the Merchant Shipping Act, in line with the examination directions of the Marine Survey Office (MSO). The course provision is externally audited by the MSO. BIM operates its training programmes to ISO 9001; 2015.

BIM welcomes the recommendation of the MCIB that stability training should be further developed in the Irish fishing industry. We have previously outlined our views on the critical role of stability awareness to safety review groups (Leech et al). BIM is of the view that the establishment of stability awareness training should be on a statutory basis. We currently include elements of stability awareness in our programmes, including our Basic Safety Training and more advanced courses, in excess of any statutory requirement for such training.

BIM welcomes the opportunity to work with the Department of Transport and industry in the development and delivery of revised stability awareness training. BIM believes it is appropriate that these training programmes provide a graduated level of stability awareness to the various segments within the fleet, from skipper to deckhand.

We look forward to progressing these matters to support a safe and professional Irish seafood industry.

Yours sincerely

[redacted]

[redacted]
Bord Iascaigh Mhara

MCIB RESPONSE:
Noted.

Correspondence 8.2 M & J Fish and MCIB response

[redacted]

T/A. M & J Fish

[redacted]

[redacted]

Date 24/02/2021

Private & Confidential

[redacted]

Secrtariat

Marine Casualty Investigation Board

Leeson Lane

D02 TR0

Your Ref: MCIB/12/297

Re: Draft Report into Fatal Incident Involving the fishing vessel "Alize" hear Hook Head, Co. Wexford 5 January 2020

Dear Sir

I refer to your draft report sent with your covering letter of 29 January 2021. I am grateful to you for inviting my comments on this report as I feel there are a number of factors stated within the report that are either inaccurate and/or misleading.

I set out below my observations with reference to the section numbers adopted by you in your Draft Report:

Section 2: Factual Information

Section 2.3

The report fails to make it clear that a stability book is not a legal requirement for a vessel of this length. This point should be made clear at the outset of the report and thereafter in the report where the stability book is referred to.

Section 2.3.1

MCIB RESPONSE: Noted.

Correspondence 8.2 M & J Fish and MCIB response

The report states that there is "evidence that the dredges weighing a total of 3000kgs were not on board during the inclining experiment." The report should express the basis for this assertion rather than a mere reference to unidentified "evidence."

Section 2.4.1

Section 2.4. refers to the 2015 CoP 'DoC.' The 2015 CoP however was replaced by the 2018 CoP. This was the operative CoP at the time the Vessel sank. Assertions are made in relation to the 2015 test which create a prejudicial impression. Given therefore that the 2015 CoP had no application at the time of the sinking the references to the 2015 CoP is this section and throughout the report should be removed.

Section 2.4.2

Whilst the report note that the maximum number of crew on board is stated to be 3. 3 is the maximum number for insurance purposes. The report should also note that the 2018 CoP refers two BIM numbers only.

Section 2.4.3

A reference is included in this section to the UK's Maritime Coastguard Agency (MCA) Marine Guidance Note – MGN4 27 (F). This is no longer an active guidance note and therefore I am of the view the reference to it is misleading and should be removed.

Section 2.5

The report fails to note that the crew member was also a qualified Skipper for fishing vessels up to 15 metres. This should be included.

Section 2.11

The report fails to accurately report that the investigator was informed that each crew member was provided with his own Personal Flotation Device (PFD) and each PFD was supplied with a crotch strap and spray hood. The report should note that it was up to the crew member to ensure that he used the crotch strap and spray hood.

It is not clear from this section who reported that the PFD on the crewmember rescued from the sea was worn incorrectly and the source of this information should be properly identified. Given full equipment was provided the report should make it clear it is not known why the crew member chose not to wear the crotch strap or spray hood.

It should be noted that the investigator was informed by family members that Personal Locator Beacons (PLB's) were assigned to each crew member. The report however fails to note this.

In addition to the above records of the supply of PFD's and PLB's were not sought by the investigator but could have been provided. Instead this section as currently worded gives rise to an incorrect and prejudicial implication such equipment was not provided by the owner of the vessel.

The Liferaft was attached at all times to the wheelhouse roof and its presence is noted in the CoP certificate for 2018. As explained to the investigator it appears the hydrostatic mechanism had been activated. The report however fails to refer to this again giving rise to an incorrect and prejudicial implication that the Liferaft was not present.

Section 3 Narrative

Section 3.3 and repeated at section 4.1.3.2

MCIB RESPONSE: Noted.

Correspondence 8.2 M & J Fish and MCIB response

The report states in section 3.3 that ideally there would be two crew to secure the clips on the port and starboard derricks. There is however no narrative/factual basis to support this statement. As was explained to the investigator it was normal for this operation to only ever be carried out by one member of crew (even if there was an additional member of crew onboard) as the distance between the port and starboard derrick clips is minimal and the operation takes no more than a few seconds to complete. There is however no reference in the narrative of section 3.3 to tis fact.

In addition, none of the family members stated that the procedure of clipping was necessarily quick "**due to a recognition of the vulnerability of the vessel's stability at this juncture**." It was stated by my family members that it was a quick operation undertaken normally by one crew member only. This statement has **not** therefore been made by a family member as suggested. It should be deleted from this section and also at section 4.1.3.1.

Section 3.7

There is no evidence that the crew were likely to have been fatigued and in fact this is most unlikely. The report fails to refer to the fact this was an extremely short fishing trip and the crew would have had at least an hours rest every three hours. This section should be amended.

Section 4 Analysis

Section 4.1 and 4.1.2.1

The report states that the side scan sonar images show the vessel's starboard derrick in it's housed position and therefore it can be reasonably deduced the vessel foundered while the vessel was hauling or had just finished hauling. However the sonar images show the vessel was lying on her port side and simply the starboard derrick is lying consistent with an upright position. It is as equally likely that the starboard derrick would be upright as the vessel rolled onto her port side. Therefore the deduction made by the investigator cannot reasonably deduced when there is a perfectly plausible other reason for the starboard derrick's position on the seabed and this section should be amended to reflect this.

Section: Evidence collected indicates

b. The conclusion drawn in this section has no basis.

It is stated in this section that "*if the vessel's stability **had been** within approved stability criteria, adverse weather and/or sea conditions would not normally be a casual factor to a sinking vessel.*"

This wrongly suggests the Vessel was not within approved stability criteria. The Vessel however was in compliance with all stability requirements as confirmed in the 2018 CoP certificate. This statement therefore is entirely wrong and needs to be amended.

This section also states that "the stability of the vessel during hauling has been found to be significantly reduced..." The basis for this finding is not set out anywhere within the report. It was not reported to the investigator by family members and therefore appears to be an assertion that is made without any basis. It should be deleted.

d. It is not understood how the report can conclude it is potentially likely that the vessel many have suffered catastrophic damage in circumstances where it has concluded in the preceding paragraph that the vessel was well maintained and had only recently undergone a major refit. This section also is entirely at odds and in contrast to the opposite conclusion reached on exactly the same point at section 4.1.2 and 4.1.2.2. This section should be reworded.

e. As stated above in section b there is no evidence at all to support the bald assertion that the stability of the vessel during hauling was found to be significantly reduced.

MCIB RESPONSE: Noted.

Correspondence 8.2 M & J Fish and MCIB response

Paragraph 2 Page 18

There is no reason to assume the crew were tired, quite the contrary – see comment in relation to 3.7 above.

Section 4.1.3.2 and section 4.1.3.9

References to the 2015 CoP should be deleted – see above.

The 2018 CoP provide for a maximum crew for insurance purposes of three. The report fails to state that there is no minimum statutory manning requirement for vessels this length and that it was normal for this size of vessel to be manned safely by two crewmen only.

References to the vessel being shorthanded are incorrect as a matter of law and should be removed from the report throughout as they create a prejudicial implication. The vessel was only normally manned by two crew members and the CoP certificates thereby provide for two BIM numbers only (see section 2.4.2 above).

Securing the dredges as has been explained is virtually simultaneous, the distance between the two on deck being minimal. The time lapse between securing the port dredge and the starboard would be negligible. The reference to a time lapse is misleading.

Section 4.1.3.7

It is noted in section 2.2 that a stability booklet was prepared for the vessel by a naval architect (albeit not required as a matter of law). Whilst section 4.1.3.7 as currently drafted makes reference to it not often being possible for a naval architect to effect an analysis for small vessels, it fails to note that unusually an analysis was done for this vessel at the owner's expense and unusually a stability book was prepared. This section should clearly state this as currently drafted it incorrectly implies no analysis was done.

Section 4.1.3.9

See section 4.1.3.2 and 2.4.2. The vessel was not shorthanded by one crew member. This statement should be deleted.

Section 4.2

The references to STCW qualification are not relevant to fishing vessels of this length and therefore should be removed. Whilst the crew might not have specific stability training in fishing crew training, this section fails to acknowledge that both crewmen were very experienced on this and other vessels and therefore had significant practical education of working with the equipment and vessel. To suggest the crew would have no knowledge of any changing stability issues during fishing and hauling is not true. The crew had significant sea experience and would be entirely familiar with the capabilities of the vessel. This section should be amended to reflect the practical education of the crew.

Section 5 Conclusions

Section 5.1

There is no evidence that the vessel sank while hauling its trawl dredges. This is only a possible scenario and should not be stated in the conclusions as a fact. The section should be rephrased to state that this is likely only.

Section 5.2

MCIB RESPONSE: Noted.

Correspondence 8.2 M & J Fish and MCIB response

The crew member rescued from the sea was wearing a PFD life jacket. There was no evidence that the equipment provided was "damaged" and this conclusion is entirely inconsistent with section 2.11. The reference to "damaged" should be removed.

In addition it should be made very clear as to whom it is stated did not comply with S.I. 586 / 2001. As stated above in relation to section 2.11 the owner provided fully compliant PFDs and that they were maintained and certified in date in accordance with the S.I. Notably records were not sought in this regard during the investigation.

The crew were fully trained in the function and use of this and the other safety equipment on board

Section 5.3

The Vessel was no undermanned – see comments on section 4.1.3.9, 4.1.3.2 and 2.4.2 above. As stated above there is no statutory minimum manning requirement. The maximum number of crew to be carried on the "Alize" was three persons but the vessel was of a size that could be manned safely by two people and this is common practice for vessels of this size in the industry. In respect of the "Alize" it was nearly always operated by two crew only.

This conclusion should therefore be amended or deleted as it clearly infers a misleading and prejudicial criticism of the operation of the vessel in circumstances where legally none can be made.

Section 5.4

There is no requirement for the skipper or crew for a vessel this size to have formal stability training. As stated above however the conclusion that the "pronounced transient reduction in the stability of the vessel when hauling and docking the derricks was unrealised by the crew" fails to take into account the years of experience that both crew members had of this type of fishing and the practical education they had of working with this equipment. To state that they would not be aware of the changing conditions of stability during fishing and hauling is simply not true. While not having formal education in stability the crew from their at sea experience would have been well aware of the capabilities of the vessel in this respect.

MCIB RESPONSE: Noted.

Section 5.5

Although there is no requirement for a vessel in this category to have documented maintenance plans for the lifting gear on board it can easily be deduced that the lifting gear was well maintained from the owner's records of invoices for such.

In summary, there are a number of conclusions made within the report which have no basis. This incident was a horrendous tragedy for my family resulting in the loss of my son from which my family will never recover. The other crewmen was a personal friend and long term employee. It is essential that the report is accurate in all respects and is as fair as possible in circumstances where this report will be in the public domain.

I look forward to hearing from you in due course.

Yours faithfully

[redacted]

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