MCIB
Marine Casualty Investigation Board

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REPORT ON THE CAPSIZE OF THE FISHING VESSEL *"FV QUO VADIS"* ROSSLARE HARBOUR, CO. WEXFORD ON 11th FEBRUARY 2015

REPORT NO. MCIB/244
(No.10 OF 2015)

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

Report MCIB/244 published by The Marine Casualty Investigation Board.
Printed 8th December 2015.

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1. SUMMARY

On the 11th February 2015, the Irish fishing vessel *"FV Quo Vadis"* departed from Rosslare Harbour with three crew on-board. Just after 07.00 hrs the vessel began dredging for razor clams close to Rosslare Harbour. At approximately 12.00 hrs, at the end of a dredge run, it was noticed that the dredge was heavier than normal and the possibility of fouling on a wire or rope was suspected. When the dredge was hoisted to the surface it contained a large boulder. The vessel was significantly trimmed by the stern and the Skipper came aft from the wheelhouse to assess the situation. The vessel rolled on a swell and instantly capsized throwing the three crewmen into the water under the vessel. They swam free from under the vessel which then sank rapidly. Rosslare Harbour Lifeboat station observed the incident and raised the alarm. Two fishing vessels in the vicinity rendered assistance to the crew in the water and they were then brought ashore by the Lifeboat service. The *"FV Quo Vadis"* was subsequently raised and salvaged on the 13th February 2015.

(Note: All times are UTC)

2. FACTUAL INFORMATION

2.1 General particulars of vessel

Vessel's Name:	*"FV Quo Vadis"*.
Vessel Type:	Fishing vessel under 15 metres (m).
Fishing Method(s):	Razor clam dredging.
Port of Registry:	Dundalk.
Registration Letters:	DK 132.
Length OA:	9.97 m.
Length LWL:	9.67 m.
Beam:	3.78 m.
Depth:	1.42 m top of deck from base line.
Freeboard (min):	0.3 m.
Hull Material:	Steel.
Year of Build:	1989.
Engine /power:	Ford Mermaid / 55Kw.
Hydraulic winch:	Lifting capacity 1.25 tonnes.
Winch wires:	16 mm steel.
Displacement of vessel:	18.2 tonnes (Estimated from crane dynometer).

2.2 General description of the vessel

Steel half decked vessel with wheelhouse and accommodation forward. Winches aft of the wheelhouse. A steel dredge is suspended from behind the transom on a gantry. Lifting gantry and table on the aft deck. Dredge dimensions 0.8 m high x 1.04 m wide and 1.75 m long. Water jet delivery system, with the delivery line on the port side and the by-pass on the starboard side. The vessel had bilge keels of a combined area of 1.5 square metres (See Appendix 7.1 – *"FV Quo Vadis"* after salvage on the 13th February 2015).

The vessel complied with the Code of Practice for the Design, Construction and Operation of Small Fishing Vessels of less than 15 m Length Overall on the 30th

August 2014. The vessel's stability was assessed under the code and was deemed satisfactory. A new float free EPIRB was fitted and mounted on the main mast.

2.3 S.I. No. 290 of 2013 Fisheries Natural Declaration No. 3 of 2014 (Wexford Razor Clam Fishery)

This S.I. limits the hours of fishing for razor clams from 07.00 hrs to 19.00 hrs. The S.I. also requires that the bar spacing on the dredge must not be less than 10 mm. The permitted area of fishing is stipulated and the vessel was fishing at the southern end of this area, close to Rosslare Harbour.

2.4 Crew & Qualifications

Owner /Skipper: Irish National.

Owned the vessel for one year and another vessel for four to five years.

Second Hand Skippers Certificate.

GMDSS Restricted Operators Certificate.

BIM Safety Certificates.

Crew No 2: Irish National - BIM Sea Survival Certificate.

Crew No 3: Irish National - BIM Sea Survival Certificate.

2.5 Voyage Particulars & Location

Inshore fishing voyage from Rosslare, Co Wexford.

Vessel departed on the morning of 11th February 2015
(See Appendix 7.2 Location of Incident).

2.6 Marine Incident Information

Type: Serious Incident.

Date: 11th February 2015.

Time: 12.13 hrs UTC.

Position: 52° 15.66'N, 006° 20.04'W.

Charted Depth: 9.5 m.

Weather:	Wind S3 (See Appendix 7.3 – Met Éireann Weather Report).
	Visibility – good.
	Sea state - calm to 0.1 m.
Tide:	High Water 09.33 hrs.
	Low Water 15.33 hrs.
Ship Operation:	Razor clam dredging.
Vessel factors:	Water on deck leading to rapid capsize and sinking.
Consequences:	Loss of vessel.

2.7 Shore Authority involvement and emergency response

- Rosslare Harbour Lifeboat
- MRCC Dublin
- Helicopter R117 based in Waterford.

3. NARRATIVE

3.1 The *"FV Quo Vadis"* departed Rosslare Harbour at 06.50 hrs and commenced fishing at approximately 07.10 hrs. The normal operation was to proceed down tide at about a quarter of a knot towing the steel dredge cage behind the vessel. After about five minutes of dredging the cage would be hauled to the surface and landed on a steel table on the aft deck of the vessel. The cage would then be opened and the catch removed for sorting and packing into boxes.

3.2 When the dredge is being towed the tow points are on the top of the gunwale aft, about 0.6 m above the deck level. When the dredge just breaks the surface it is suspended from the gantry and the point of suspension is about 2 m above the deck level (See Appendix 7.4 – Photograph No. 1).

3.3 By 12.00 hrs five boxes had been filled, box weight of 32 kg, giving total deck load of 160 kg.

3.4 At approximately 12.00 hrs the dredge was hauled up, there was a strain on the hauling gear. When the dredge appeared the crew alerted the Skipper that there was a large boulder in the dredge. The Skipper left the wheelhouse and came aft to assess the situation. The vessel was down by the stern and the water was entering the aft freeing ports; there was an estimated 15 to 20 centimetres of water along the transom bulwark.

3.5 The vessel rolled on a swell and capsized tipping all three crew members into the water. The three crew surfaced underneath the capsized vessel and they swam down under the side rails to surface in open water. None of the crew were wearing Personal Flotation Devices (PFDs).

3.6 Two fishing vessels nearby came and assisted the crew. One of them transmitted a MAYDAY message on VHF Channel 16 using the distressed vessel's name. Two of the crew were picked up from the water by one of the assisting vessels.

3.7 The capsize of the vessel had been observed from Rosslare Lifeboat Station, about a quarter of a mile away, and the alarm was raised. The Lifeboat boarding boat rescued the third member of the crew and collected the remaining two crewmembers from the assisting fishing vessel before proceeding ashore. The R117 SAR helicopter based in Waterford was also alerted and came on-scene.

3.8 After the sinking the liferaft and EPIRB both floated to the surface and the EPIRB activated and a distress signal was received by UKMCC KINLOSS. The Rosslare Harbour Lifeboat recovered the EPIRB and liferaft and other debris and marked the wreck site with a marker buoy to assist in future salvage.

3.9 At 12.50 hrs, R117 observed some pollution and debris at the scene of the incident.

3.10 On the 13th February 2015 the *"FV Quo Vadis"* and the dredge were salvaged and brought ashore. The boulder was still jammed in the dredge (See Appendix 7.4 – Photograph No. 2).

3.11 The Photographic Survey, taken by a dive team, before salvage showed a boulder in the dredge on top of the catch of razor shells (See Appendix 7.4 – Photographs Nos. 3 & 4).

3.12 The boulder was subsequently weighed using a crane dynometer and was approximately 750 kg. Approximate weight calculated by measurement confirms this figure.

3.13 The power of the winch was enough to lift 400 kg of dredge plus 40 kg of catch and 750 kg of boulder. At this stage the vessel trimmed to more than 0.3 m by the stern due to the weight of the boulder. This caused water to come onto the deck aft. Therefore the estimated depression of the stern was about 0.45 m (45 centimetres).

3.14 The vessel remained upright until rolled by a wave from which the vessel did not recover and it capsized.

4. ANALYSIS

4.1 General

4.1.1 When the crew heaved the dredge up, more than normal weight on the winch and wires was observed. As the dredge broke the surface, a large boulder was observed in the dredge. At this stage the vessel was still upright. Water was observed entering the aft freeing ports on to deck; this caused the vessel to roll and a small swell wave caused the vessel to capsize. The crew swam out from under the vessel and were rescued. The capsize was observed from the shore, and a very quick emergency response was put into action. The vessel sank a short time later.

4.1.2 The method of fishing using a water jet in front of the dredge results in no sand or silt in the dredge. Each run with the dredge results in total weight of about 40 kg with about 6 kg of razor shell harvested. The remainder of the weight is waste and below size shells. In the Skipper's experience very few stones of any size are picked up and in his experience the largest was approximately the size of a man's fist.

4.1.3 The size of the boulder picked up in the dredge was not anticipated as the vessel always fished on a sandy bottom. The vessel was close to the breakwater at Rosslare Harbour. There was a possibility that the boulder was washed off the breakwater and pulled offshore. There had recently been some dredging work in the vicinity of the harbour and this may have uncovered the boulder.

4.1.4 Due to the nature of dragging a dredge along the bottom there is always a risk of the dredge becoming snagged or picking up a heavy weight. The consequences of this event can be severe for a vessel and its crew. This type of fishing operation could be considered high risk.

4.1.5 There were no controls in place to prevent the winch lifting a weight that would endanger the vessel. The maximum power required to carry out the fishing operation was in the region of 0.5 tonnes. The winch was capable of lifting 1.25 tonnes. The winch wires had a breaking strain of 7.5 tonnes (Safe Working Load (SWL) of 5.5 tonnes).

4.1.6 The dredge mouth had no protection fitted to restrict ingress of large objects. Restricting the dredge mouth with vertical bars would prevent large objects lodging in the dredge, however it would still be possible for the dredge to foul on an obstruction or to fill with a large weight of smaller stones.

4.2 The vessel's stability

4.2.1 As part of the vessels compliance with the Code of Practice for fishing vessels of 15 m and under, the vessels metacentric height (GM) was estimated by a roll test. The least GM obtained was 0.7135 m (71.35 centimetres). The vessel had been inspected on the 30th August 2014 and a Declaration of Compliance issued which

included a stability test (See Appendix 7.5 - Assessment of stability and angle of heel). With the existing depth, beam and free board it can be shown that the deck edge would be immersed at 10° of heel (See Appendix 7.5 Assessment of stability – Calculation 2).

4.2.2 The extra weight on the vessel imposed by the boulder, the weight of water on the aft deck and the free surface effect of that water would all cause a change in the centre of gravity of the vessel and a reduction in the metacentric height. The estimated GM when these reductions are made is 0.092 m (9.2 centimetres) (See Appendix 7.5 Assessment of Stability – Calculation 1). It should be noted that the effect of the free surface of water had the greatest reduction of almost 45 centimetres. Although the vessel still had a small positive GM this is only effective at small angles of heel (less than 10°). Once the vessel heels more than 10° and/or trims excessively then other factors affect the stability. When the vessel rolled with the swell the water on deck flowed to one side causing the vessel to heel over. The estimated angle of heel due to the weight of water on one side was almost 14°, which means the deck edge was immersed allowing more water on deck (See Appendix 7.5 Assessment of Stability – Calculation 2).

4.2.3 The witnesses report that the vessel rolled to a swell and never recovered but continued to roll over until inverted. The resulting movements of weight to one side and the momentum gained resulted in a heeling moment greater than the vessel's residual stability and the vessel capsized.

4.3 Emergency response to incident

4.3.1 The float free EPIRB activated and was responded to in 13 minutes by UKMCC KINLOSS.

4.3.2 The prompt response of the RNLI Lifeboat Crew contributed to the safe recovery of the three crewmen.

4.3.3 *"FV Quo Vadis"* did not have time to release a MAYDAY call, but one was received by MRCC Dublin. Two other fishing vessels came to the assistance of the *"FV Quo Vadis"* and it is assumed one of these sent a MAYDAY message. The correct procedure is to send a MAYDAY RELAY message using the casualty's name.

4.4 The wearing of Personal Flotation Devices

4.4.1 S.I. No. 586/2001 - Fishing Vessel (Personal Flotation Devices) Regulations, 2001 requires

(a) "Every fishing vessel shall carry a suitable personal flotation device for every person on board. The personal flotation device shall be worn at all times by the crew of the fishing vessel, when on the exposed deck of the vessel, or, in the case of open undecked vessels, on board the vessel, whether at sea, in harbour or coming to and from moorings".

(b) “The Skipper of a fishing vessel shall take all reasonable steps to ensure that all crew members wear a personal flotation device when on deck of the vessel, or, in the case of open undecked vessels, on board the vessel, whether at sea, in harbour or coming to and from moorings”.

5. CONCLUSIONS

5.1 The vessel lifted a weight which caused, excessive trim, loss of freeboard and loss of metacentric height which resulted in water on deck. The free surface effect of this water added to being rolled by a wave caused the vessel to capsize suddenly.

5.2 The dredge mouth had not been fitted with protection bars to prevent ingress of large objects.

5.3 There was no restriction on the power of the winch which enabled the vessel to lift such a heavy and dangerous load.

5.4 The roll test does not give sufficient information on a vessel's stability, this vessel passed the test but had insufficient freeboard to prevent the deck edge immersing under load.

5.5 The problems with small fishing vessel stability are not confined to the Irish Fleet. International research has been done and the consensus is growing that only a full inclining test can establish a vessels dynamic stability. Once it has been assessed from this test then operating procedures can be written for the vessel to ensure the vessels stability is not exceeded.

5.6 This type of incident is predictable. The stability characteristics for a vessel can be obtained by an inclining experiment. Once known, the vessels ability to resist heeling and trimming moments can be calculated and steps can be taken to ensure the vessel stability is not compromised by any loading condition or fishing operation.

5.7 The nature of fishing used by this vessel carries a high risk of fouling of the gear and/or picking up heavy weights in the dredge and the imposition of large heeling moments.

5.8 The crew did not comply with S.I. No. 586/2001 – Fishing Vessel (Personal Flotation Devices) Regulations 2001.

6. SAFETY RECOMMENDATIONS

6.1 The MCIB recommends that consideration be given to the stability standards for small fishing vessels and supports Actions 9 to 13 in the Maritime Safety Strategy published by the Irish Maritime Administration of the Department of Transport, Tourism and Sport in April 2015 in this regard.

6.2 Bord Iascaigh Mhara (BIM) should provide stability awareness training for operators and crew of vessels less than 24m, with a focus on vessels less than 15m.

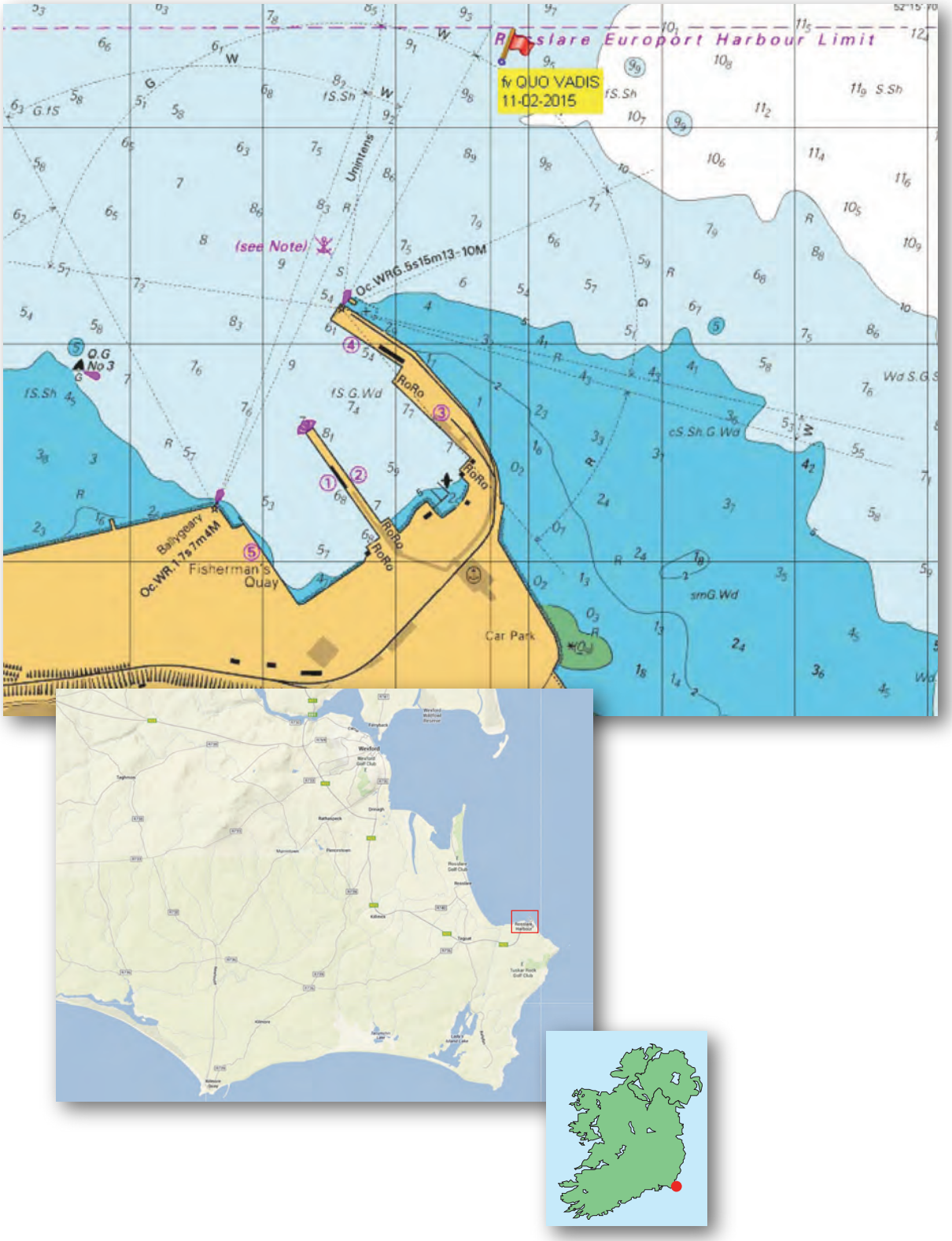
6.3 The Minister for Transport, Tourism and Sport should consider amending the Code of Practice for the Design, Construction and Operation of Small Fishing Vessels of less than 15 m Length Overall to include requirements to restrict the mouth of dredges by the installation of bars or limiters to prevent ingress of large objects.

6.4 All crews are reminded of the legal obligation to wear personal flotation devices when on deck of a fishing vessel in accordance with the legal requirements.

7. APPENDICES

Appendix 7.1 Photograph of *"FV Quo Vadis"* after salvage on 13th February 2015.

Appendix 7.2 Location of incident.



Appendix 7.3 Met Éireann Weather Report.

MET ÉIREANN
The Irish Meteorological Service

Glasnevin Hill, Dublin 9, Ireland.
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www.met.ie
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Marine Casualty Investigation Board
Leeson Lane
Dublin 2

Marine Casualty Investigation Board
23 FEB 2015
Bord Imscrúdú Tasimí Muirí

19/2/2015

Our Ref. WS 3018/2_15781
Your Ref. MCIB/12/244

Re: Estimate of weather conditions in the sea area off Rosslare Harbour at 52° 15.66'N 6° 20.04'W, on the 11th February 2015 between 6 and 18 hours.

[redacted]

Please find enclosed the above report.

Yours sincerely,

[redacted]

[redacted]

Appendix 7.3 Met Éireann Weather Report.

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The Irish Meteorological Service

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E-mail: met.eireann@met.ie

19/2/2015

Our Ref. **WS 3018/2_15781**
Your Ref. **MCIB/12/244**

Estimate of weather conditions in the sea area off Rosslare Harbour at 52° 15.66'N 6° 20.04'W, on the 11th February 2015 between 6 and 18 hours

General Situation
At the time there was a large area of High Pressure over Europe with a ridge over Ireland.

Details
06-12 hours
Winds: Light Force 2 to 4, mainly from a southerly direction.
Weather: Cloudy, mostly dry, some mist
Visibility: good but moderate in any mist.
Seastate: Slight, from a south or south-easterly direction

12-18 hours
Winds: Light and variable in direction, Force 1 – 3
Weather: mostly cloudy and misty
Visibility: moderate in any mist otherwise it was good,
Seastate: Slight from a south to south-east direction.

[redacted]

[redacted]
Met Eireann

Appendix 7.3 Met Éireann Weather Report.

MET ÉIREANN
The Irish Meteorological Service

Glasnevin Hill, Dublin 9, Ireland. Cnoc Ghlas Naíon Baile Átha Cliath 9, Éire. Tel: +353-1-806 4200 Fax: +353-1-806 4247 www.met.ie E-mail: met.eireann@met.ie

Appendix

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 (1
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.

Wave Heights / State of Sea

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

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

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

Visibility Descriptions of visibility mean the following:

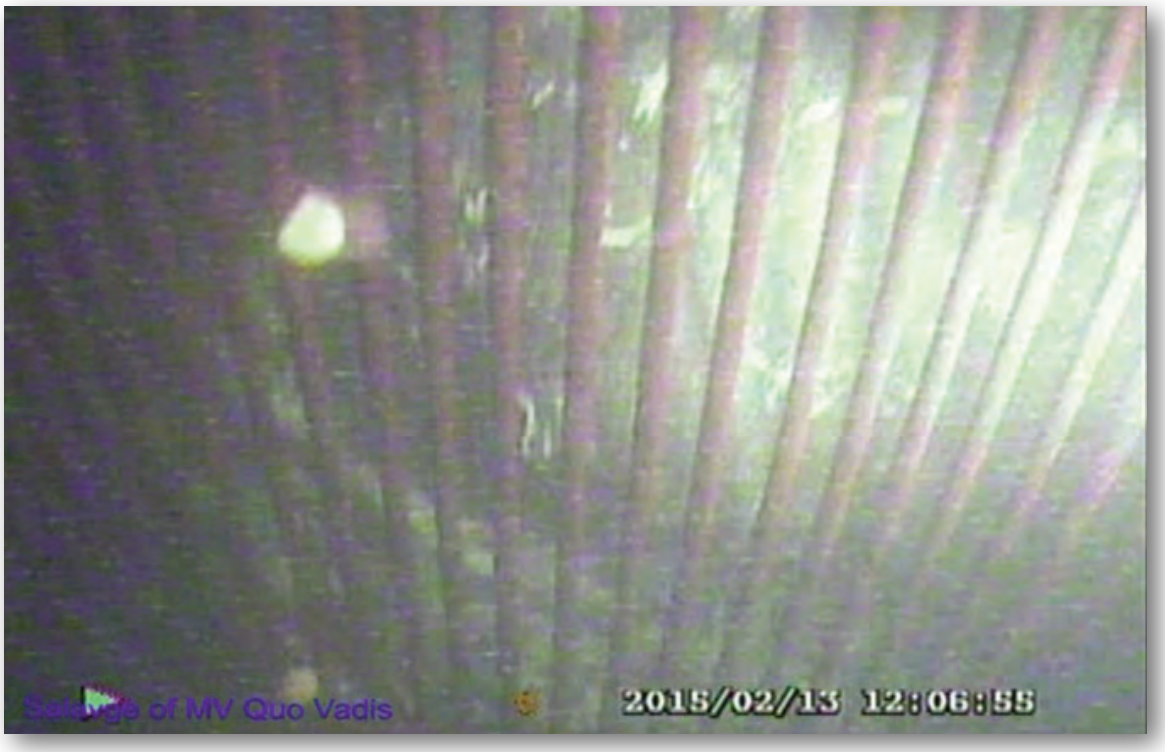
Visibility (Descriptive)	Visibility in nautical miles (kilometres)
Good	More than 5 nm (> 9 km)
Moderate	2 – 5 nm (4 – 9 km)
Poor	0.5 – 2 nm (1 – 4 km)
Fog	Less than 0.5 nm (< 1km)

Appendix 7.4 Photographs.

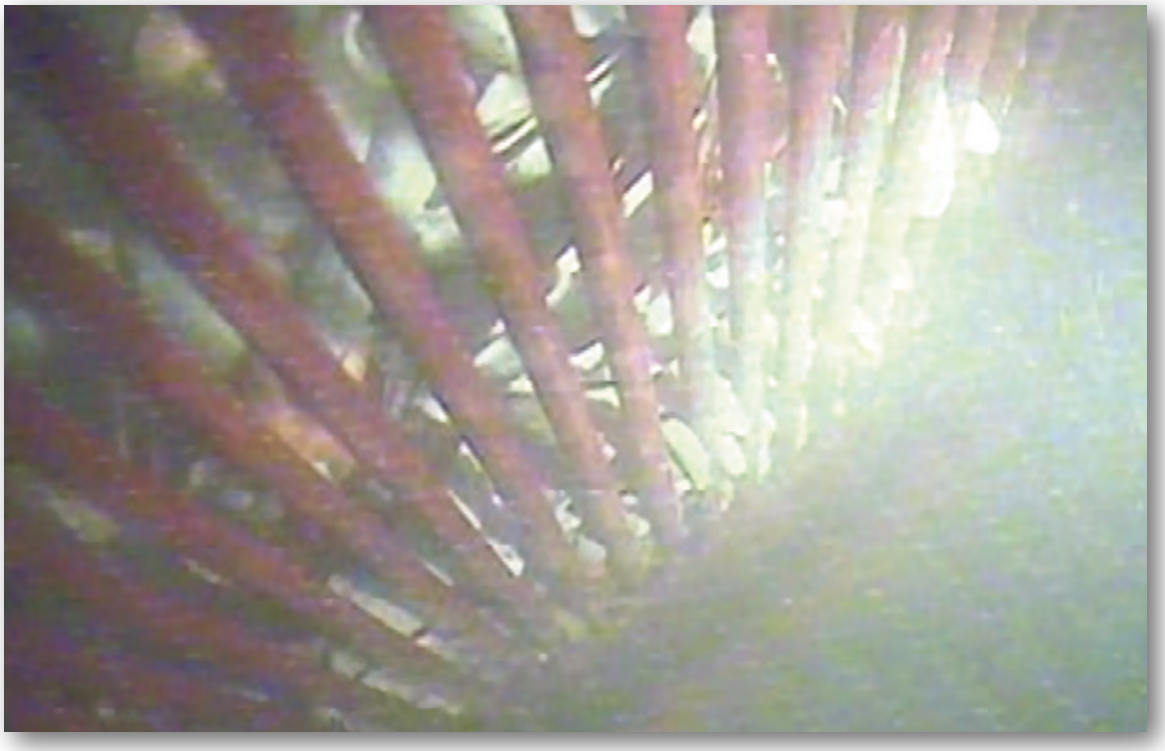
Photograph No. 1 – A similar dredge lifting arrangement on another vessel

Photograph No. 2 - large boulder jammed in dredge

Appendix 7.4 Photographs.



Photograph No. 3 - Showing exposed rock when the river is at a low level



Photograph No. 4 – Underwater photo of catch of razor shells under the boulder

Appendix 7.5 *"FV Quo Vadis"* – Assessment of stability and angle of heel.

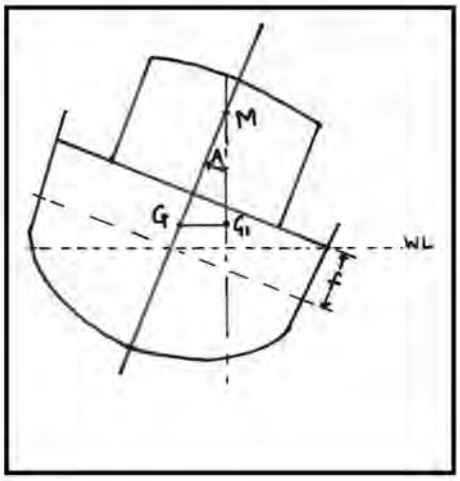
LOA	9.97	m	VESSEL WEIGHT	18,500	Kg
LWL	9.67	m	DREDGE WEIGHT	400	Kg
BEAM (B)	3.78	m	CATCH WEIGHT	40	Kg
DEPTH (D)	1.42	m	BOULDER WEIGHT	750	Kg
FREEBOARD (f)	0.3	m	Load on deck	160	Kg
Min GM by roll test	0.7135	m	Displacement of vessel (W)	19,100	Kg
			(vessel+ load +dredge)	19.1 tonnes	
Estimated weight of sea water on deck = 0.581 tonnes					

CALCULATION 1

Estimation for loss of GM due to boulder, catch and weight of water.						
Movement of centre of gravity G to G1 due to addition of weight (w) over a distance (d)						
GG1 = w x VCG(w)/ (W+w)						
item	Disp W	Weight w	VCG w	W+w	GG1 (m)	Cms
GG1 for addition of boulder + catch	19.100	0.79	3.2	19.890	0.1271	12.71
GG1 for addition of water on deck	19.100	0.581	1.420	19.681	0.0419	4.19
Loss of GM due to added weights					0.1690	16.90
Free Surface Moment (i)	length	B	B cube	FSM (i)		
(l x B cubed)/ 12	1.9	3.78	54.01015	8.551607		
loss of GM due to FS					0.4489	44.89
i/ Volume of vessel						
Total loss of GM					**0.6179**	**61.79**
Risidual GM					**0.0921**	**9.21**

CALCULATION 2

Angle at which deck edge is immersed A		
Tan A = f/ 0.5B	0.177515	
angle A	0.175685	
	10.07	**Degrees**
Angle of heel due to water on side deck		
GG1 = w x dist m / W	0.0488	
Cot Angle of heel = GM/ GG1		
	4.032787	
	0.243065	
	13.93	**Degrees**



8. 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

P.O. Box No. 12
Crofton Road
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Bord Iascaigh Mhara
Irish Sea Fisheries Board

Marine Casualty Investigation Board
7 - SEP 2015
Bord Imscrúdú Tasimí Muirí

August 28, 2015

[redacted]
Secretariat
MCIB - Marine Casualty Investigation Board
Leeson Lane
DUBLIN 2

[redacted]

Thank you for your letter dated August 26th and the MCIB Draft Report of the Investigation "FV Quo Vadis" off Rosslare, Co Wexford on February 11th, 2015.

Having considered the matters raised, BIM does not wish to make any comments or observations in respect of this case.

Yours sincerely

[redacted]

MCIB RESPONSE:
The MCIB notes the contents of this response.

Seafood Development Centre (SDC), Clonakilty, Co. Cork
National Fisheries College, Greencastle, Co. Donegal
Regional Fisheries Centre, Castletownbere, Co. Cork

Offices:
Clonakilty, Co. Cork
Killybegs, Co. Donegal
New Docks, Galway

Correspondence 8.2 Skipper of *"FV Quo Vadis"* and MCIB response

To whom it may concern,

5.5 and 5.7 he implies there was a problem with the boats stability (this type of incident is predictable)
I have been fishing for 35years on a number of different boats and I have been skipper on most. I would never have feared the stability of the Quo Vadis. But under the circumstances of what happened and how quick it happened I would not like to see it again. that's why we have put bars across the front of the dredge to prevent stones from getting in. the surveyor for the insurance pointed out if you put a million euro in the middle of the rock I picked up and asked the boats to go and get it, it would never be picked up that's how unlucky I was. 5.2 is something no other boat has done its an idea I had and I have done with the other boat I have. 5.8 the nature of the fishing is completely different to what he suggest, there is a very low risk of heavy weight and fouling in something. I have fished a scallop boat for 15 years and at least once a week was fouled and fast in heavy weights. I have been fishing razors for seven years and this is the third weight I have got, the last two been dumped wire from bigger fishing boats. His wording predictable is incorrect and insulting the Quo Vadis had been fishing razors for seven or eight years without incident. The best prevention to this type of freak accident is bars in the mouth of the dredge. If the weight is not picked up it wouldn't become a problem.

[redacted]

[redacted]

Marine Casualty Investigation Board
11 SEP 2015
Bord Imscrúdú Tasimí Muirí

MCIB RESPONSE:
The MCIB notes this response and agrees that placing bars across the mouth of the dredge would have prevented the incident. Please see recommendation 6.3 of this report.