

**REPORT INTO THE SINKING OF
THE IRISH REGISTERED
FISHING VESSEL “PAULA”
ON 24TH JANUARY 2005**

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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	PAGE
1. SYNOPSIS	4
2. FACTUAL INFORMATION	5
3. EVENTS PRIOR TO THE INCIDENT	7
4. THE INCIDENT	8
5. EVENTS FOLLOWING THE INCIDENT	9
6. CONCLUSIONS	11
7. RECOMMENDATIONS	13
8. LIST OF APPENDICES	14
9. LIST OF CORRESPONDENCE RECEIVED	29

1. SYNOPSIS

- 1.1 Fishing Vessel “Paula” arrived in the Norwegian Port of Selje, Maloy with a crew of 11 on the evening of 23rd January 2005 to discharge her catch of 270 tonnes of mackerel.
- 1.2 Prior to commencing discharge of cargo routine maintenance was carried out on the vessels sea water system on the morning of the 24th January 2005.
- 1.3 During this maintenance operation seawater entered the engine room through the port seawater suction strainer.
- 1.4 Efforts to halt the ingress of water proved unsuccessful and the engine room and adjacent spaces flooded causing the vessel to partially sink alongside the quay.
- 1.5 All persons escaped safely to the quayside without injury. There was minimal pollution caused.

2. FACTUAL INFORMATION

2.1 Particulars of the “Paula”

Vessel Name:	“Paula”
Built:	1994 Eidsvik Skipsbyggeri, AS, Norway.
Owner:	Doyle Fishing Company Ltd Roshine Road, Killybegs, Co. Donegal
Length (Overall):	59.20 Meters
Registered Length:	52.27 Metres
Registered Breadth:	12.00 Metres
Registered Depth:	8.00 Meters
Gross Tonnage:	1302
Register Tonnage:	498
Port of Registry:	Dublin
Official Number:	403060
Call Sign:	EI 4242
Fishing Number:	D 165

2.2 General Description

The “Paula” is a large steel pelagic trawler (See General Arrangement drawing appendix 8.2) with wheelhouse and superstructure aft on top of her machinery space and nine Refrigerated Seawater tanks (RSW) three abreast and numbered from the foremost tank.

- 2.2.1 Her hull and machinery were classed by Det Norske Veritas DNV +1A1 Fishing Vessel and she had been last surveyed at Cork in August 2004. This survey had included the inspection of her shipside valves.
- 2.2.2 The vessel held an Irish Certificate of Compliance for Fishing Vessels greater than 24m that was issued on the 3rd of December 2004 and valid until the 30th of September 2008.
- 2.2.3 The vessel had a stability book, approved by the Marine Survey Office in July 1996 and was loaded in accordance with this book at the time of the incident.

2.3 Main Machinery

- 2.3.1 The “Paula” was fitted with a Caterpillar 3612 TA rated at 3460 kW at 900 RPM, driving a 3600mm controllable pitch (CP) propeller at approximately 175 RPM through a Volda ACG 86/75 Gearbox. This engine had been fitted in 2000. The Gearbox also provided a power take off (PTO) for a shaft alternator rated at 1,600kVA.

2.4 Auxiliary Machinery

- 2.4.1 In addition to the shaft alternator noted above the vessel has three auxiliary engine driven alternators. One Caterpillar 3508 rated at 760 kW, one Caterpillar 3412 rated at 467 kW and one Caterpillar 3306 rated at 184 kW. The two larger auxiliaries were situated in the main engine room and the smaller 'emergency' set forward. The vessel had separators, pumps, and compressors and associated machinery.
- 2.4.2 Her pumps included two bilge/water ballast pumps, each with capacity 50 m³/hour one bilge water separator 1 tonne/h - 15 p.p.m, one bilge ejector forward 10 m³/hour, and one bilge ejector aft 10 m³/hour.

The vessel had a comprehensive fish handling plant for loading, stowage and discharge ashore of fish. Her RSW system had a large refrigeration plant located on the 2nd deck and included three 400 m³/Hour RSW circulation pumps. Sea Water to supply both the cooling arrangements for the machinery and the RSW for cargo cooling was drawn from a sea water main running across the engine room with hull connections port and starboard as shown in appendix 8.3 The sea water system on the port side had butterfly (disc) type valves operated through a gearbox.

2.5 Manning

- 2.5.1 The "Paula" had a crew of eleven onboard at the time of the incident, this consisted of a skipper, two engineers, an apprentice engineer, six deck crew and a cook.
- 2.5.2 The vessel did not hold and had not made an application for an Irish Minimum Safe Manning Document (MSMD) Being in excess of 500 G.T. Such a document should have been carried.
- 2.5.3 The manning at the time of the incident was not in accordance with the provisions of the Fishing Vessel (Certification of Deck Officers and Engineer Officers) Regulations 1988 (S.I. No. 289 of 1988) as amended.

3. EVENTS PRIOR TO THE INCIDENT

- 3.1 The “Paula” arrived in Domstein fish factory berth, Selje Norway (060 02,6 N 005 20,4 E) at 19.00 hours (All times UTC) 23rd of January 2005.
- 3.2 She had a catch of approximately 270 tonnes of mackerel carried in three of her nine Refrigerated Sea Water (RSW) Tanks. RSW Tank 2 centre, RSW Tanks 3 port and starboard. Fuel was transferred from her forward deep tanks shortly after arrival.
- 3.3 Discharge was planned to commence the following morning at 06.30 hours.
- 3.4 The five crewmembers that were to be involved in the discharge operation were on duty at approximately 06.00 hours. They had commenced pumping water from RSW Tank 2 centre to RSW Tank 1 centre (See diagram intact state at appendix 8.6.1).
- 3.5 Prior to commencing discharge the second engineer entered the engine room to carry out routine checks/procedures on the auxiliary machinery.
- 3.6 One of these checks was to change over the main seawater suction. This was a routine operation to allow main sea suction strainers to be cleaned.
- 3.7 The second engineer opened and closed nine valves on the main sea water system in order to change over from port to starboard seawater suction.
- 3.8 Once the change over operation was completed the second engineer then proceeded to undertake the routine maintenance operation of cleaning the off-line port side suction strainer.

4. THE INCIDENT

- 4.1 The nuts securing the top lid of the port suction strainer were slackened and removed and the lid was prised open.
- 4.2 Almost immediately the lid was blown clear of the suction strainer housing body by sea water pressure, striking the underside of the platform above the seawater strainer housing and landing on the outboard side of the housing on top of the port main shell valve.
- 4.3 Seawater continued to enter the engine room at substantial pressure and flow rate from the open port sea suction strainer housing.
- 4.4 The second engineer immediately checked the valve inboard of the sea suction strainer, which appeared to be in the closed position.
- 4.5 He then proceeded across the engine room to the starboard sea chest and shut the starboard outboard shipside seawater valve. This action did not reduce the large inflow of water into the engine room.
- 4.6 The second engineer then left the engine room to summon assistance; on the stairway leading from the engine room he met the apprentice engineer who had come down to the engine room to check on the cause of an unanswered alarm.
- 4.7 It is highly probable that this alarm was the engine room bilge high level alarm, the apprentice engineer and crew members who were in the mess room report the alarm had been sounding for two or three minutes.
- 4.8 The apprentice engineer reported that when he looked into the main engine area of the engine room the water level was above the deck plate.
- 4.9 The second engineer, while going to the chief engineers cabin, met a crewmember and informed him of the situation. This crewmember made his way to the wheelhouse and sounded the general alarm.

5. EVENTS AFTER THE INCIDENT

- 5.1 The second engineer quickly informed the chief engineer of the flooding incident and the actions he had taken. The chief and second engineers went down to the engine room. At this time the water level was stated to be 1.5 meters in the engine room.
- 5.2 The chief engineer decided to don sub aqua diving equipment in order to enter the engine room and attempt to stop the ingress of water.
- 5.3 The skipper having been awoken by the general alarm checked that all crew were mustered and called for assistance from the factory office ashore.
- 5.4 The crew split into three groups:
 - 5.4.1 One group moved through the ship and shut watertight doors and started the emergency power supply. As they made their way from the forward side of the ship down the port side passage beside the RSW tanks, water had begun to flow up the passage way and they were unable to shut the door (See the diagram in appendix 8.7).
 - 5.4.2 A second group of crewmembers started to open the aft hatch marked on the plan (shown in appendix 8.7). The purpose of this was to allow pumps to be lowered into the engine room. As the hatch could only be opened internally this was done before the rising water level made the task impossible.
 - 5.4.3 A third group assisted the chief engineer in donning his sub aqua gear and assisting him in the engine room.
- 5.5 The chief engineer entered the engine room where the water level had now risen to above the main engine. He dived down to the port side sea strainer housing but was unable to get close enough to move the housing lid from the port outboard valve where it lay and operate the port outboard ship side valve. This was due to the confined space where the valve and strainer housing are located. (See photograph at appendix 8.4.1).
- 5.6 The chief engineer reported the force of water entering the engine room was sufficient to force his diving mask from his face. The chief engineer left the engine room and at this point the skipper decided to evacuate all remaining crew to safety ashore.
 - 5.6.1 The timing of events are somewhat unclear but in little over 30 minutes from the flooding starting the “Paula” was abandoned. The vessel eventually settled in a partially submerged condition, the aft part of the “Paula” being completely submerged and the vessel was listed over to port

EVENTS AFTER THE INCIDENT

and lay against the quay wall. Diagrams in appendix 8.6.5 and 8.6.7 and photographs in appendix 8.1 show the final condition of the “Paula”. Diagrams in appendix 8.6.1 to 8.6.7 show the progress of the flooding and the affect of the flooding in various spaces.

- 5.8 Local emergency services including Fire department, police, harbour authorities and a rescue boat arrived shortly after 07.00 hours. A small sheen of oil was observed and an oil pollution boom was placed around the vessel.
- 5.9 At the following high tide that day further flooding occurred through the hatch that had been opened to allow pumps to be placed in the engine room before the vessel was abandoned.
- 5.10 A salvage team was assembled but it was decided that due to the precarious position the vessel was lying at, no attempt could be made to enter the vessel or its machinery space until the “Paula” was secured.
- 5.11 A floating crane arrived the following day the 25th of January the “Paula” was secured and salvage divers entered the flooded machinery space of the vessel.
- 5.12 The divers were unable to access the area adjacent to the port sea water suction strainer and had to remove the steps shown in photograph appendix 8.4.1 the salvage diver reported that the suction strainer cover was lying onto the butterfly valve outboard of the port main seawater suction strainer and was 3 turns open.
 - 5.12.1 The diver closed this valve and replaced the suction strainer cover, pumps were then used to pump out the flooded compartments and the vessel refloated.
- 5.13 Salvage and insurance teams boarded the vessel. Extensive water damage had occurred to machinery and electrics. The vessel had flooded up to the forecastle deck.
- 5.14 The “Paula” was towed to a separate discharge facility and the cargo which had become tainted discharged, the vessel was then towed to Eidsvik Skipsbyggeri shipyard where she underwent repairs for 10 months before re-entering service in December 2005.

6. CONCLUSIONS

- 6.1 The primary cause of the accident was the inability of those onboard to stop or reduce a rapid ingress of sea water into the engine room through the open top cover of the portside main sea water suction strainer housing.
- 6.2 This ingress was caused by the port outboard shipside valve not being in the fully closed position before the housing cover was removed.
- 6.3 A statement by the salvage diver states that he found the valve-operating handle three turns open. The normal travel on the valve-operating wheel from the fully open to fully closed position is nine turns.

When the valve was examined after the “Paula” was raised it was found to be slightly stiff 2 turns from fully closed. However as the valve had been operated by the salvage diver and other persons before this time it is not possible to draw firm conclusions regarding its condition at the time of the incident.

The sealing faces of both the valve disc and body showed no sign of any material having being trapped in the valve causing its failure to shut completely.

- 6.4 The flow characteristics for this type and size of valve indicate that at three turns or approximately 30% open the inflow would be almost 5 % of full flow rate. Given the stated arrival drafts of the ship of over 7 metres aft an inflow of approximately 1,000 m³/hour (1700 litres/minute) of seawater would have occurred.
- 6.5 A significant contributory factor was the location of the outboard valve and housing under a stair in the port forward corner of the engine room. This had several effects:
 - 6.5.1 The engineer operating the valve-operating wheel was unable to see the position indicator fitted to the side of the valve-operating gearbox from the position where he operated the valve. See photograph appendix 8.5.4.
 - 6.5.2 The position indicator itself was difficult to read as shown in photograph, appendix 8.4.2. The indicator having been marked in blue marker by ships staff to assist in checking its position. The position indicator reading was subsequently checked against the actual valve position and found to be accurate.
 - 6.5.3 Access to the area was restricted in terms of space; the salvage divers had to remove the stair to get into this area in order to close the valve and replace the strainer cover. With near freezing seawater entering at considerable pressure this task would have been virtually impossible for ship’s crew. See photograph, appendix 8.4.1.

CONCLUSIONS

- 6.6 Another significant contributory factor was the fact that in spite of the seawater strainer housing being fitted with a drain plug at the bottom of the housing this was not slackened back or removed to check for pressure inside the housing before the cover was removed. Inspection of this plug indicated they had not been removed for some time and the ships engineering staff stated it had not been part of the normal procedure removing the strainer from its housing to do so. See photograph at appendix 8.5.3.

The stated practice was to slacken back the four nuts that held the filter cover in place and prise the cover slightly of the strainer body to ensure that there was no pressure before the cover was removed.

- 6.6.2 Given that the strainer body cover had a reasonable lip it is unclear how much the cover could be raised as there is little room to 'back off' the securing nuts see photograph appendix 8.5.2.
- 6.7 The port seawater strainer housing body was subsequently found to be cracked in way of a repair to a previous crack. This however had no effect on the flooding.
- 6.8 The manning of the "Paula" at the time of the incident while not in accordance with statutory provisions as noted in paragraph 2.5.3, was not a contributory factor in the incident.
- 6.9 The actions of the skipper and crew showed the effectiveness of drills regularly carried out onboard.
- 6.10 Notwithstanding the factors outlined above the flooding occurred during a routine maintenance operation carried out every two to three weeks by the same staff over a ten year period. No evidence was found of judgement being impaired due to alcohol, drugs or fatigue. It can only be concluded that a moments lack of concentration along with the factors outlined in 6.5 caused the outboard valve not to be fully closed.
- 6.11 The combined capacity of all the bilge and ballast pumps fitted to the "Paula" were insufficient to deal with the inflow of water.
- 6.12 The effect of the portside RSW passage door being open as shown in appendix 8.6.6 and 8.6.7 did not change the outcome of this incident as the "Paula" would have grounded by flooding of the engine room, RSW room and accommodation alone as shown in appendix 8.6.5.

7. RECOMMENDATIONS

The MCIB Board recommends that:

- 7.1 The accessibility of shipside valves be reviewed regularly, to ensure that they are easily operated at all times but especially during a flooding situation.
- 7.2 The bilge pumping capacity for Fishing vessel machinery spaces should be reviewed regularly to ensure there is adequate capacity, especially in cases where large capacity seawater piping is fitted.
- 7.3 Where possible the seawater supply for RSW systems should be taken from a separate source than that used for machinery space seawater requirements.
- 7.4 Appropriate Marine Notices should issue regarding the above.

8. LIST OF APPENDICES

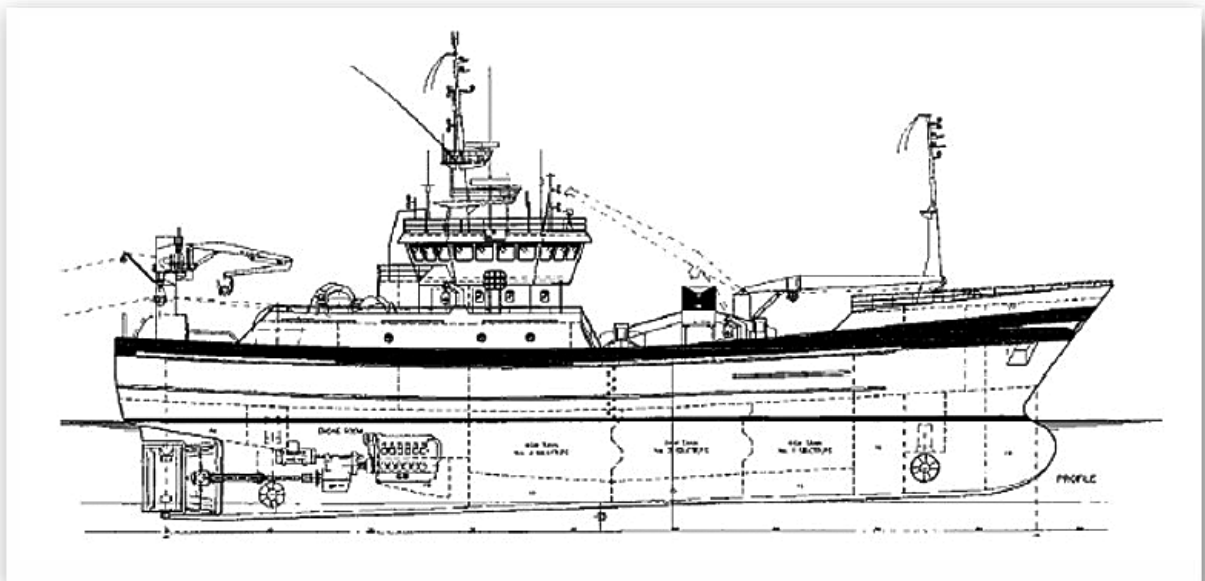
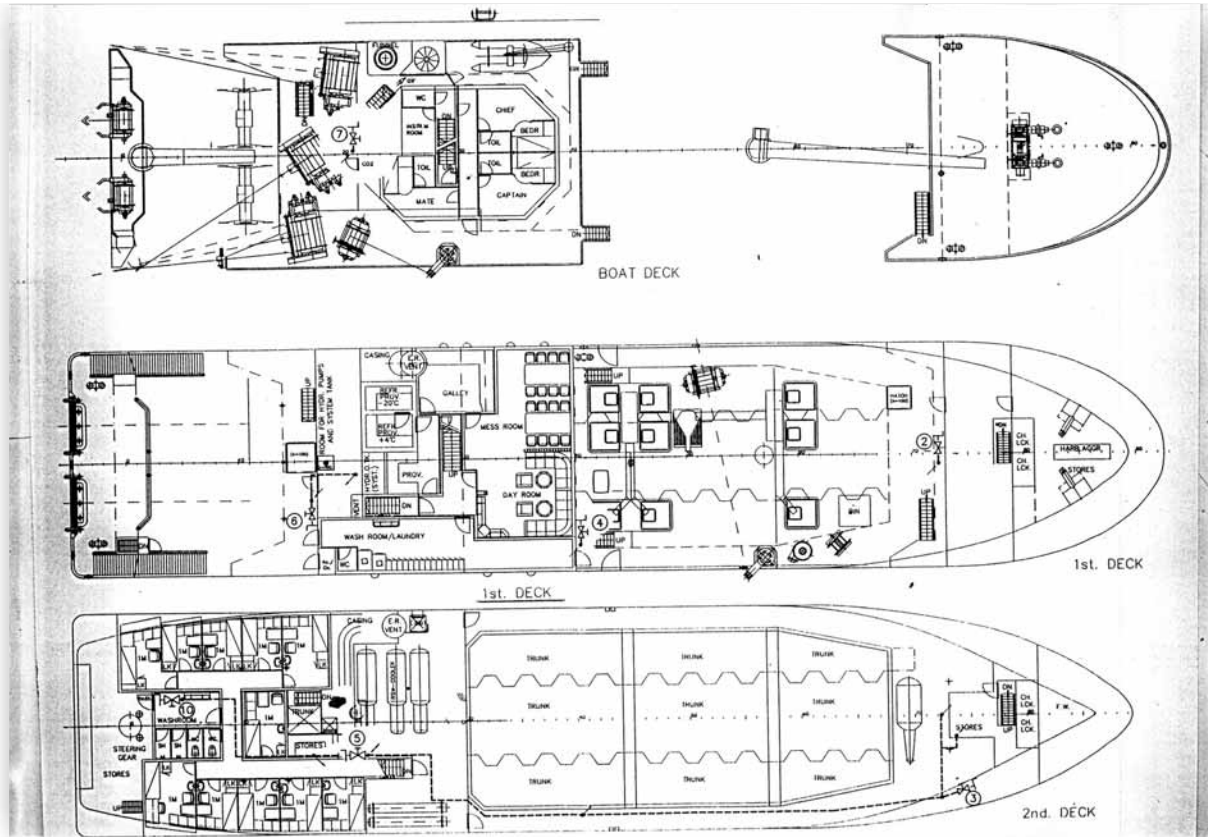
- 8.1 Photographs of “Paula” partly submerged
- 8.2 General Arrangement plans of the “Paula”
- 8.3 Arrangement of the main Seawater system
- 8.4.1 Photograph of general area of port valve chest
- 8.4.2 Photograph of valve position indicator
- 8.5.1 Photograph of suction strainer cover
- 8.5.2 Photograph of suction strainer nuts
- 8.5.3 Photograph of suction strainer body drain
- 8.5.4 Photograph of suction strainer body
- 8.6.1 Diagram intact state
- 8.6.2 Diagram with engine room flooded
- 8.6.3 Diagram with engine room and RSW room flooded
- 8.6.4 Diagram with engine room, RSW room and accommodation flooded
- 8.6.5 Diagram of grounding in condition 8.6.4
- 8.6.6 Diagram of engine room, RSW room, accommodation and side passage flooded
- 8.6.7 Diagram of grounding in condition 8.6.6
- 8.7 Diagram showing water entry points

Appendix 8.1 Photographs of “Paula” partly submerged

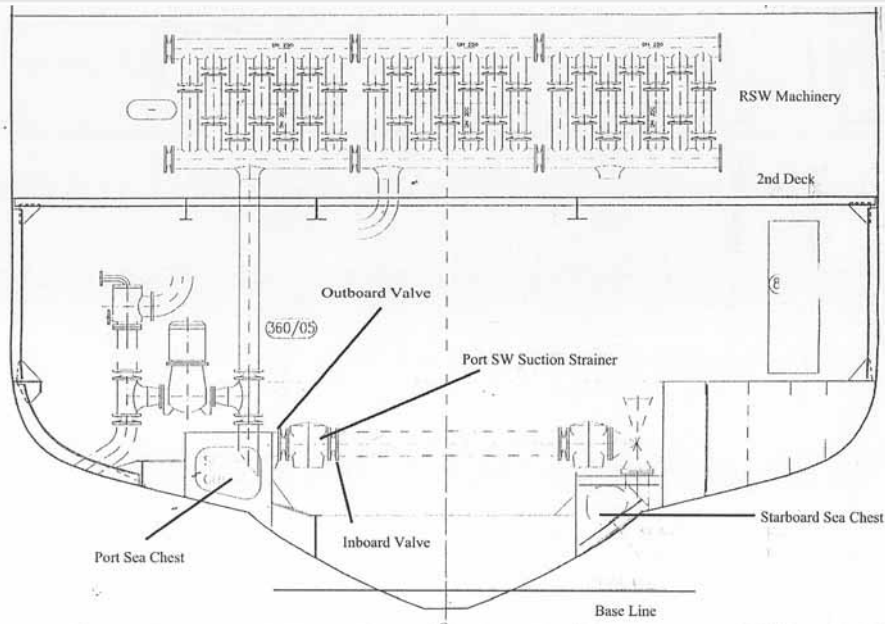


APPENDIX 8.2

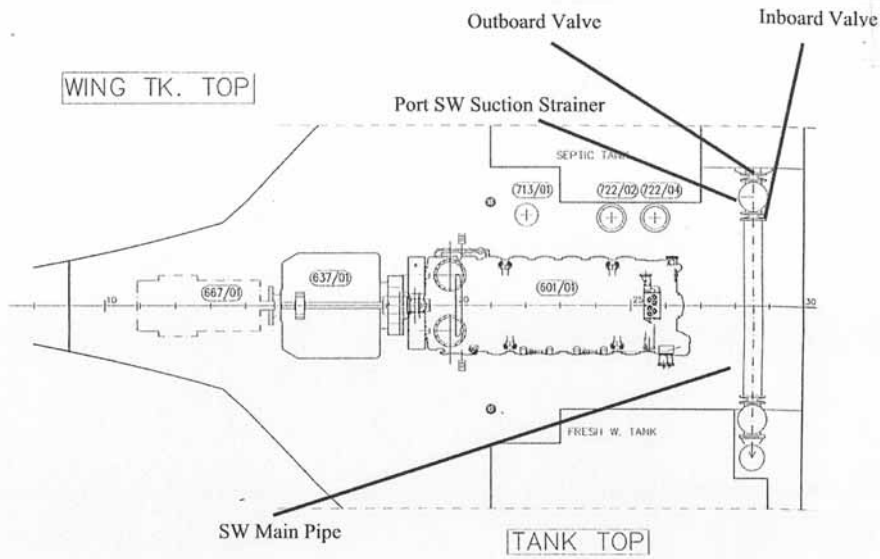
Appendix 8.2 General Arrangement plans of the “Paula”



Appendix 8.3 Arrangement of the main Seawater system



Cross section at Frame 29
Looking Forward



Tank top Level of Machinery Space

8.3 Arrangement of the main Seawater system

APPENDIX 8.4

Appendix 8.4.1 Photograph of general area of port valve chest



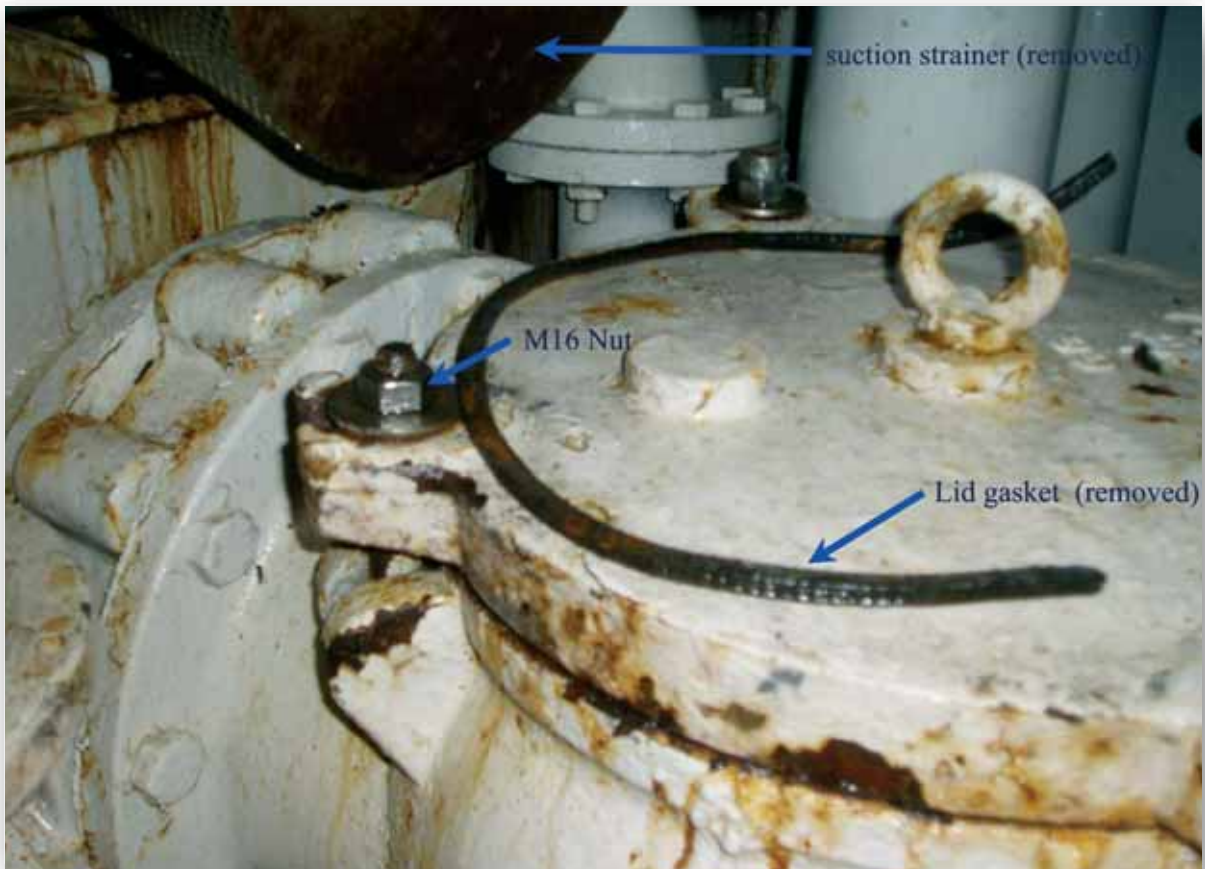
Photographs courtesy of the RNLI at Padstow.

Appendix 8.4.2 Photograph of valve position indicator

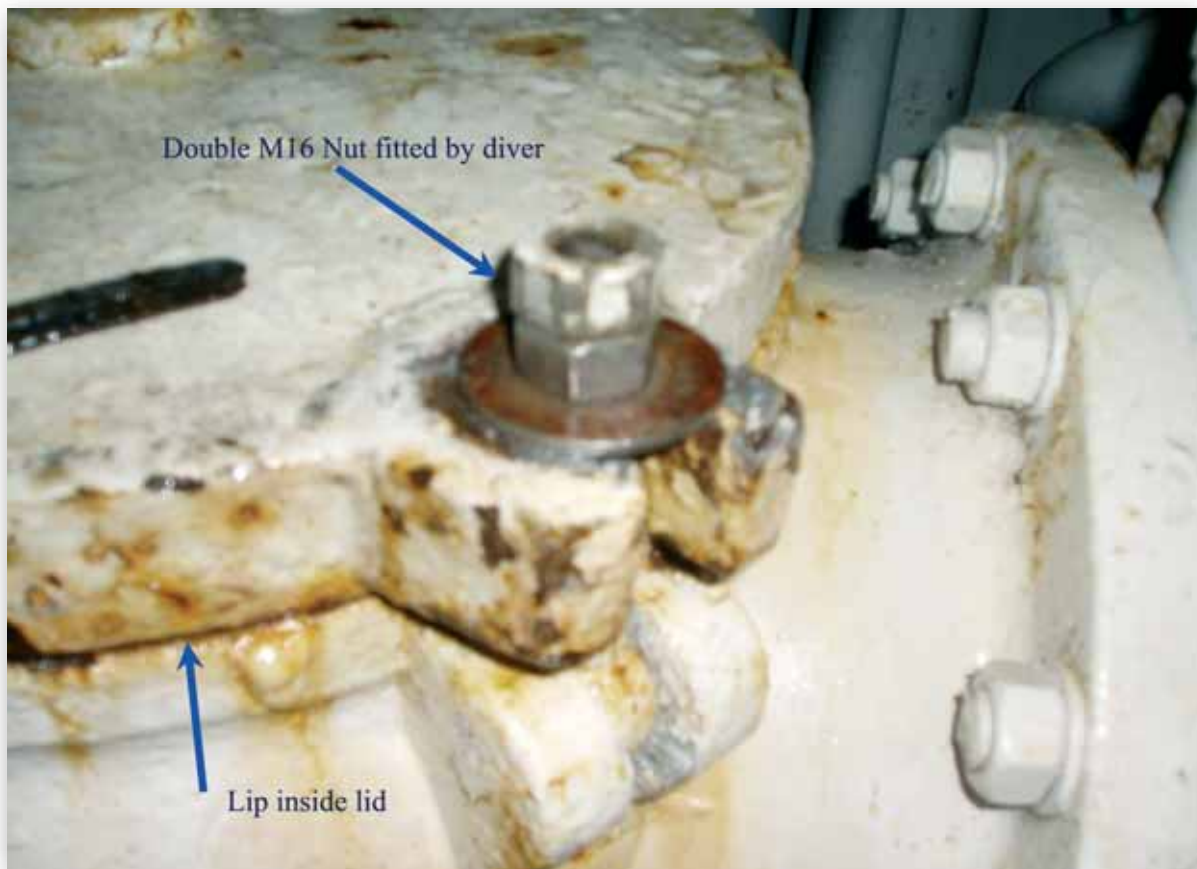


APPENDIX 8.5

Appendix 8.5.1 Photograph of suction strainer cover

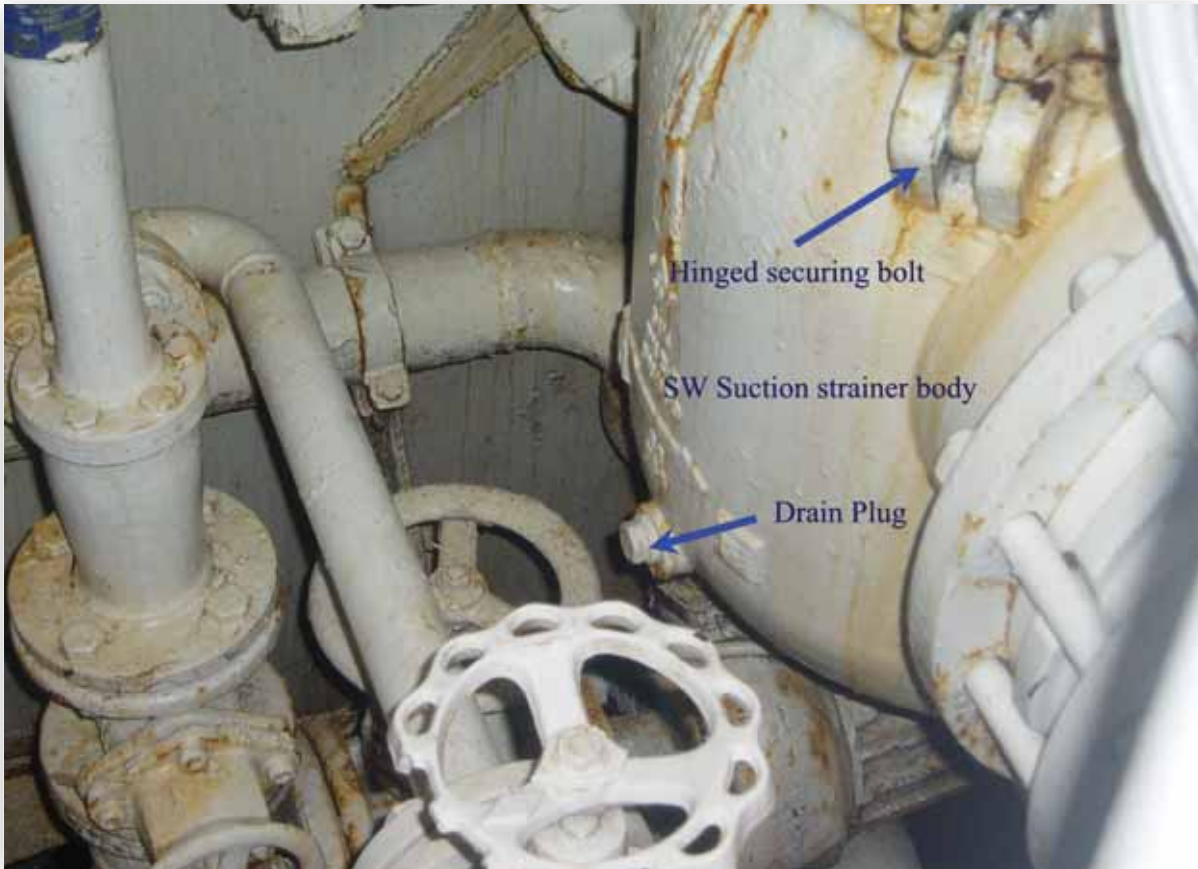


Appendix 8.5.2 Photograph of suction strainer nuts



APPENDIX 8.5

Appendix 8.5.3 Photograph of suction strainer body drain

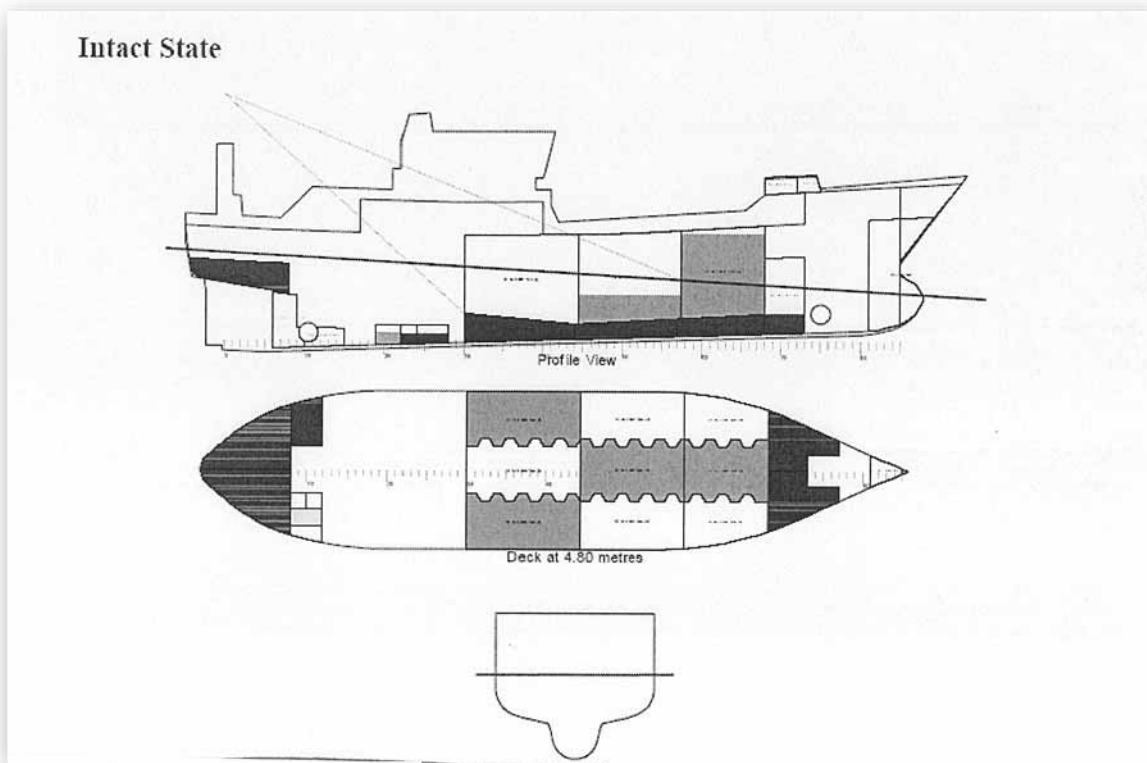


Appendix 8.5.4 Photograph of suction strainer body

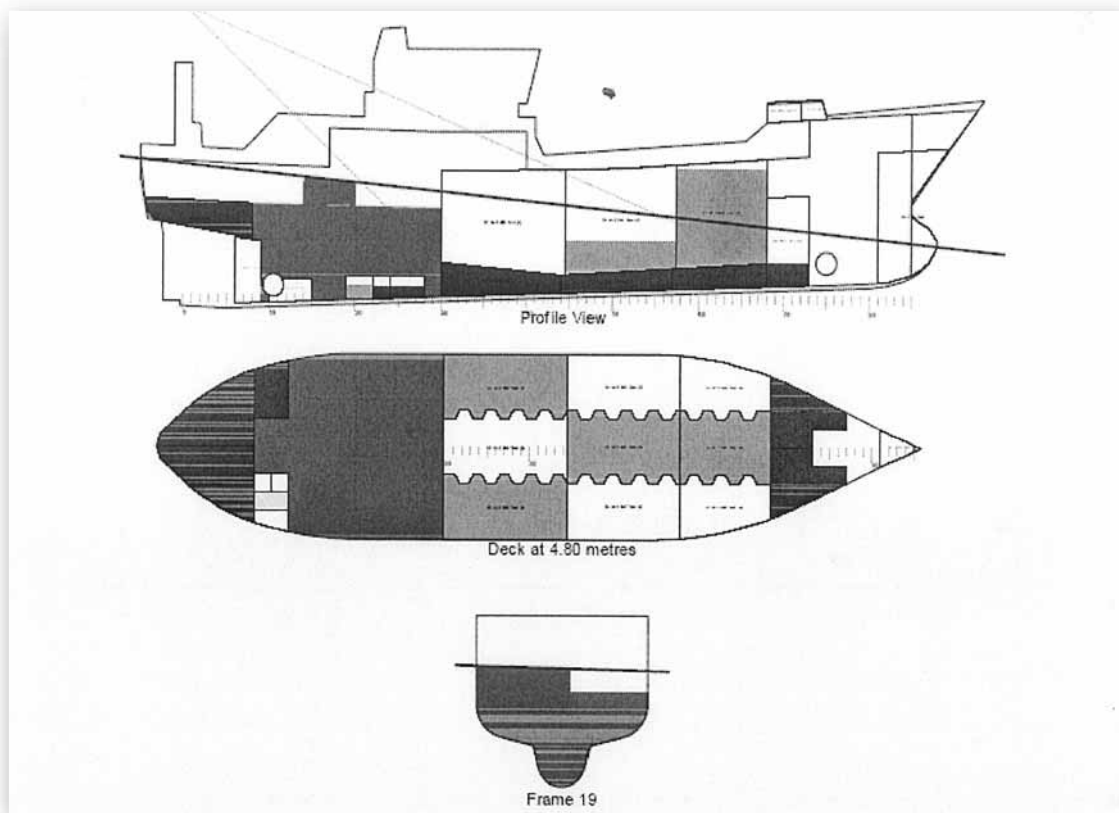


APPENDIX 8.6

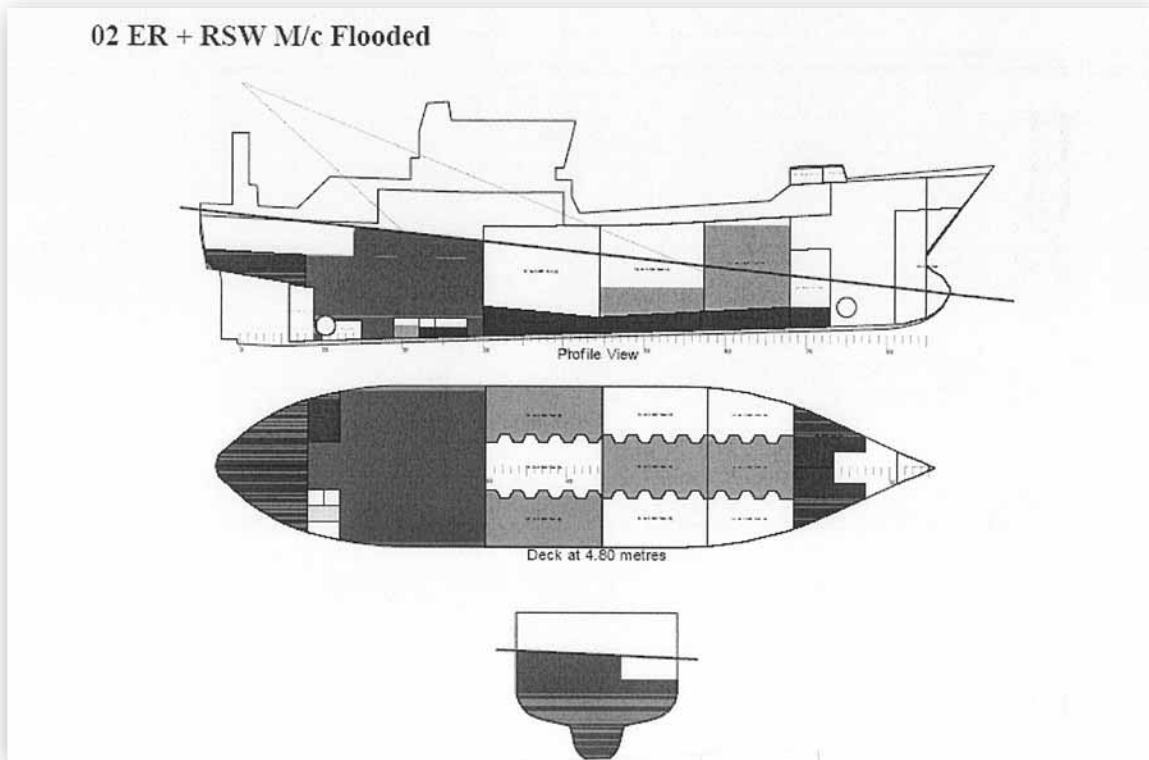
Appendix 8.6.1 Diagram intact state



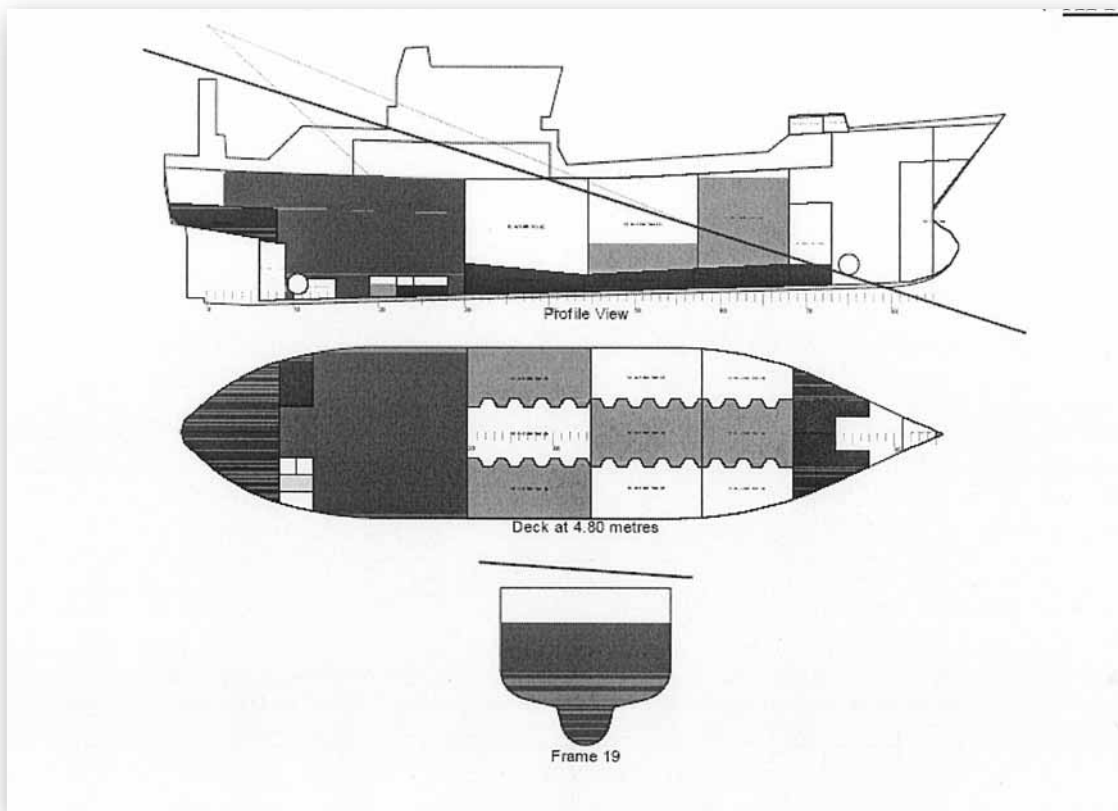
Appendix 8.6.2 Diagram with engine room flooded



Appendix 8.6.3 Diagram with engine room and RSW room flooded

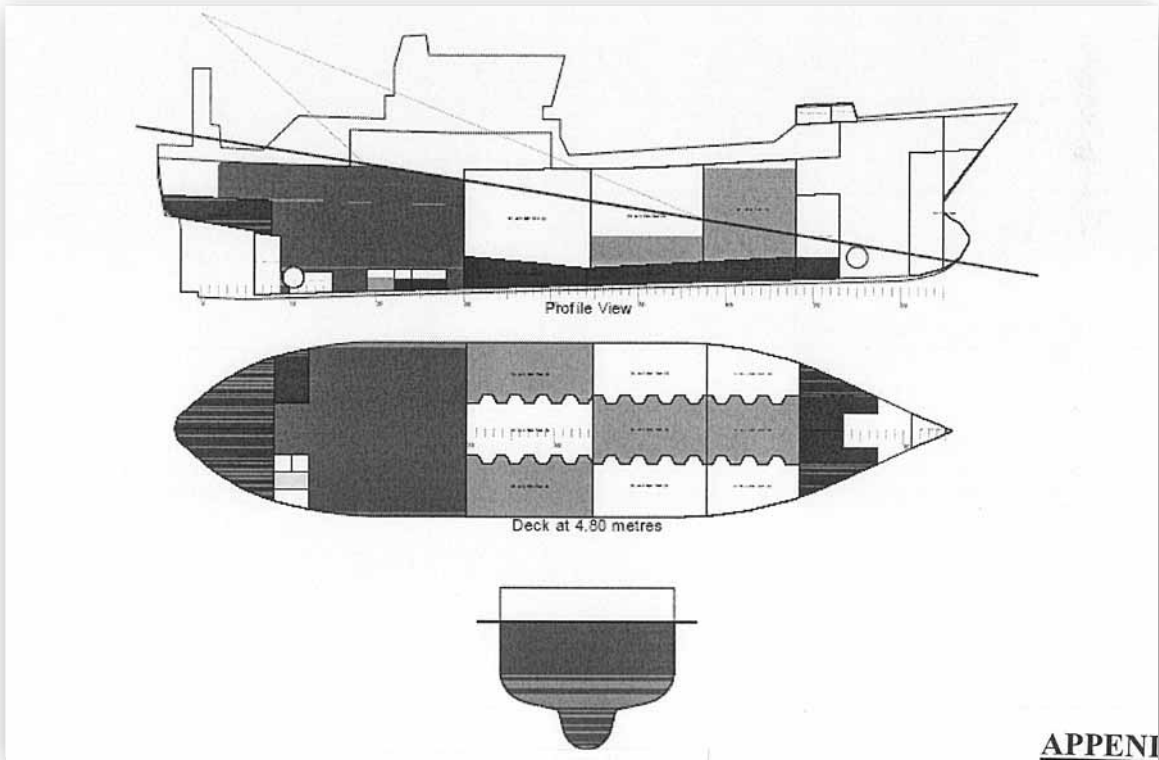


Appendix 8.6.4 Diagram with engine room, RSW room and accommodation flooded

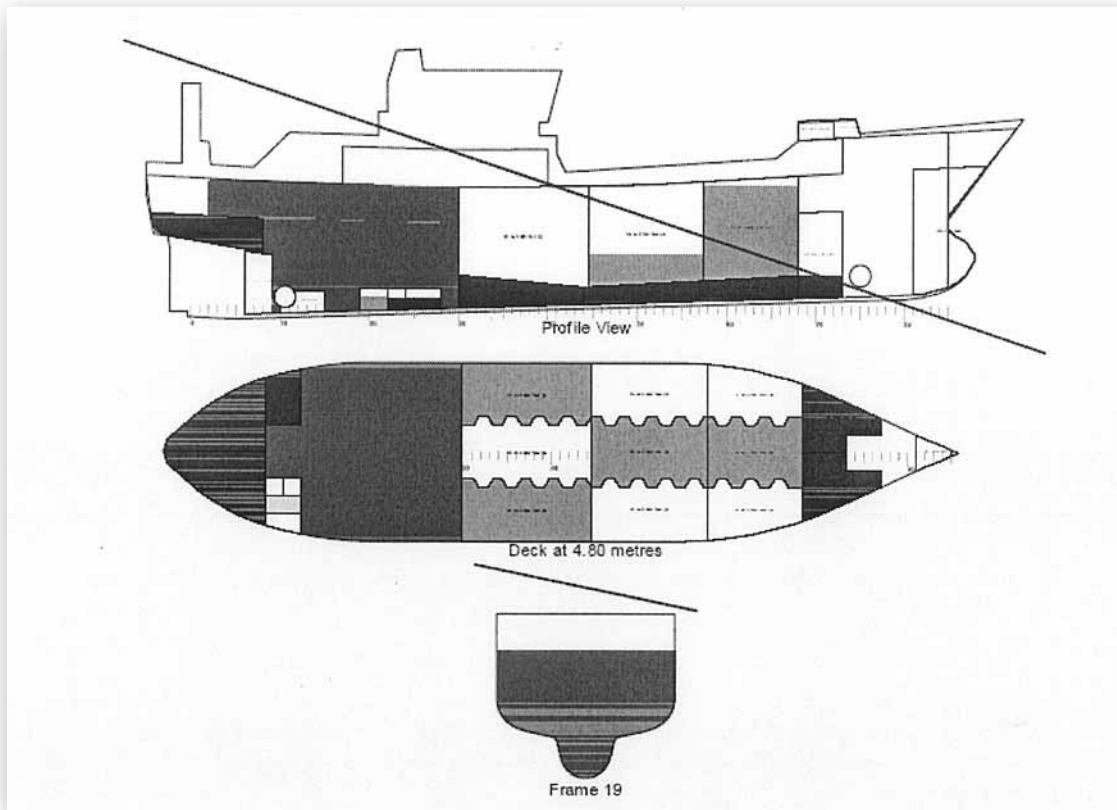


APPENDIX 8.6

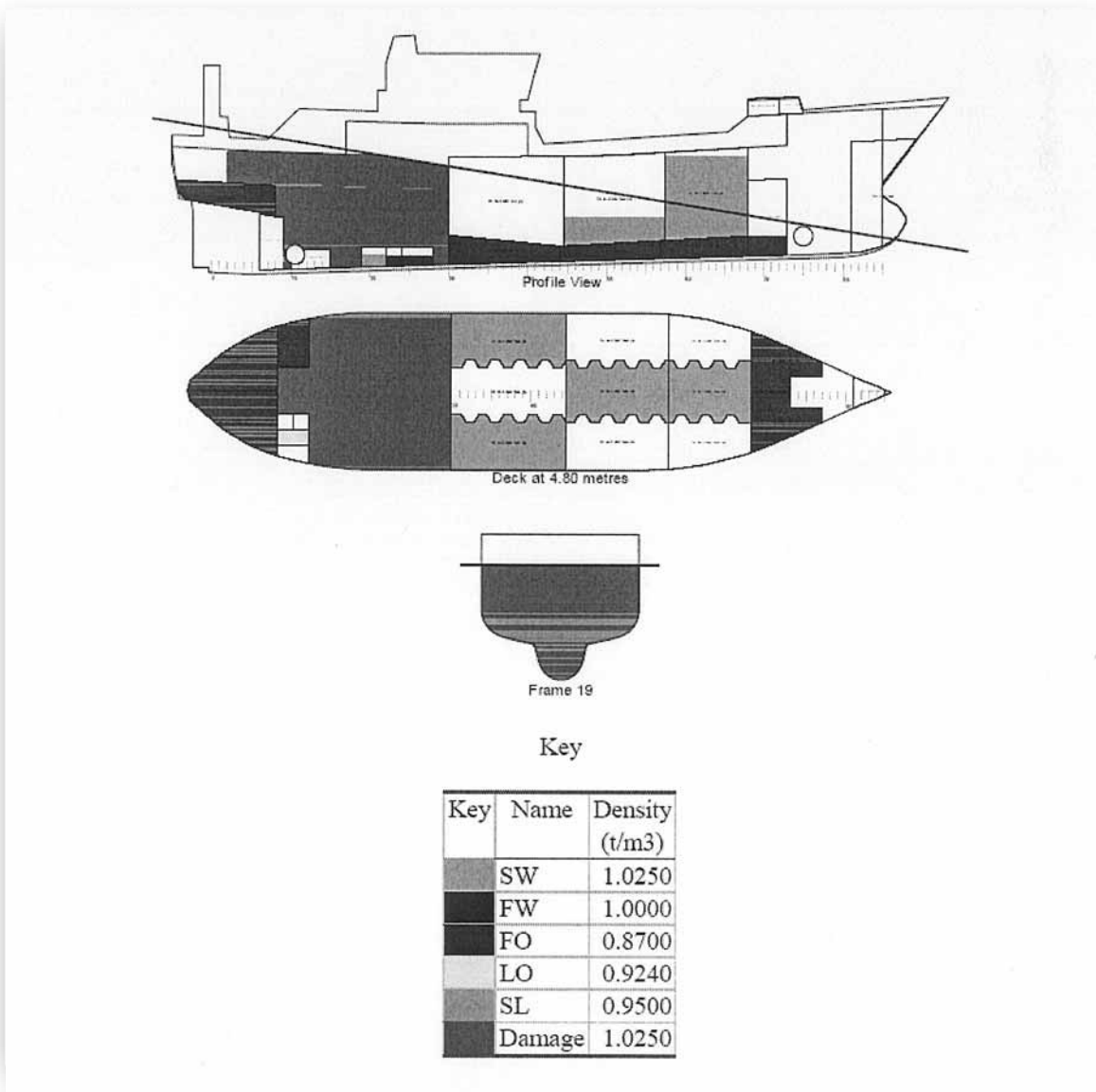
Appendix 8.6.5 Diagram of grounding in condition 8.6.4



Appendix 8.6.6 Diagram of engine room, RSW room, accommodation and side passage flooded

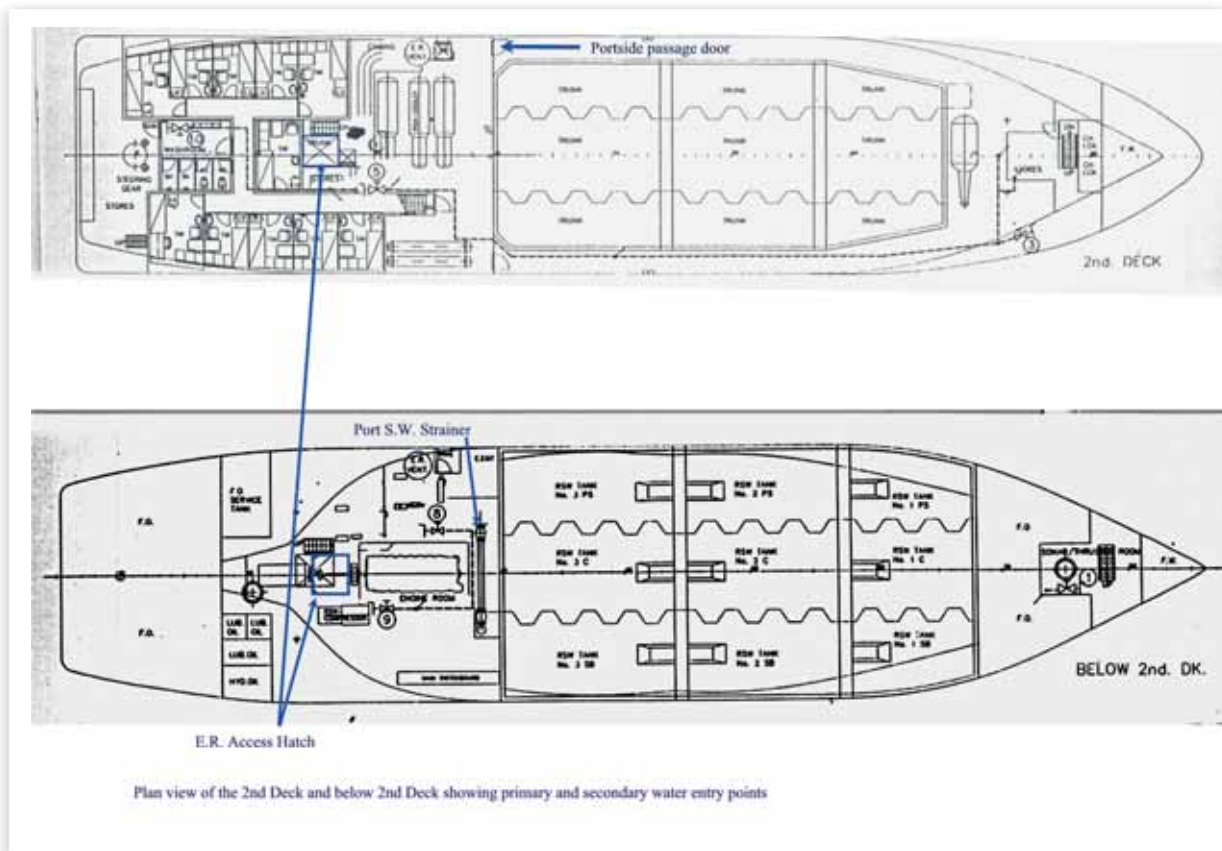


Appendix 8.6.7 Diagram of grounding in condition 8.6.6



APPENDIX 8.7

Appendix 8.7 Diagram showing water entry points



9. LIST OF CORRESPONDENCE RECEIVED

Correspondent	Page No.
D.P. Barry & Co. solicitors	30
MCIB Response	31

9. CORESPONDENCE RECEIVED

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F.A.O. Ms. Bridie Cullinane, Secretary

Our Ref: K/2051B/DB

Your Ref:

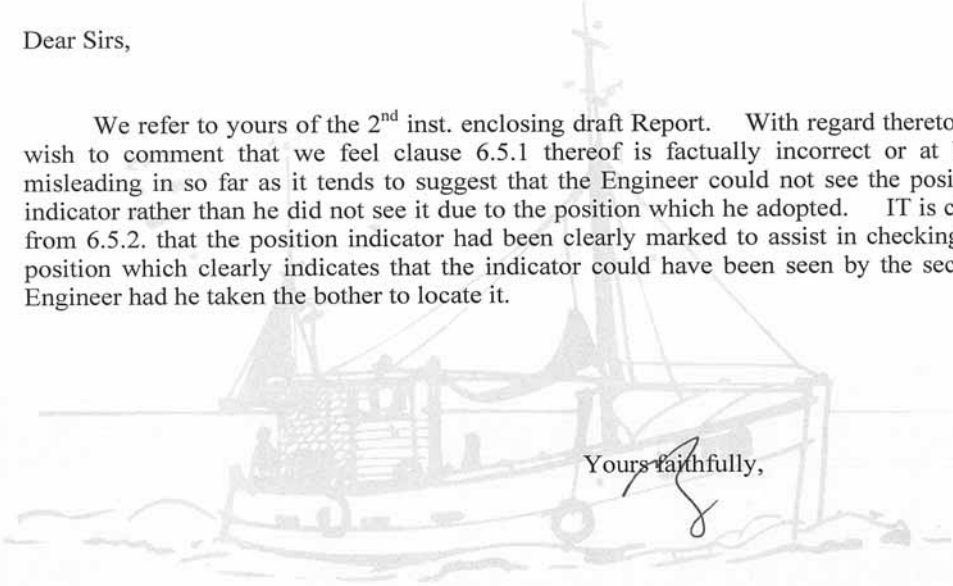
Date: 29th August 2006

Re: Draft Report into the sinking of the Irish Registered Fishing
Vessel "Paula" on 24th of January 2005.

Dear Sirs,

We refer to yours of the 2nd inst. enclosing draft Report. With regard thereto we wish to comment that we feel clause 6.5.1 thereof is factually incorrect or at best misleading in so far as it tends to suggest that the Engineer could not see the position indicator rather than he did not see it due to the position which he adopted. IT is clear from 6.5.2. that the position indicator had been clearly marked to assist in checking its position which clearly indicates that the indicator could have been seen by the second Engineer had he taken the bother to locate it.

Yours faithfully,



9. CORESPONDENCE RECEIVED

MCIB RESPONSE TO LETTER FROM D.P. BARRY & CO.
SOLICITORS ON 29th AUGUST 2006.

The Board stands over its' position in this matter as set out in the report.

