Report on the investigation of the

foundering of the fishing vessel

Blue Sinata

in Weymouth Bay

on 8 September 2005

with the loss of one life

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Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2005 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."

NOTE

This report is not written with liability in mind and is not intended to be used in court for the purpose of litigation. It endeavours to identify and analyse the relevant safety issues pertaining to the specific accident, and to make recommendations aimed at preventing similar accidents in the future.

CONTENTS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

BST	-	British summer time (UTC + 1 hour)
°C	-	Degrees Celsius
DEFRA	-	Department for Environment Food and Rural Affairs
DSC	-	Digital selective calling
GPS	-	Global positioning system
GRP	-	Glass reinforced plastic
kg	-	kilogramme
kW	-	kilowatt
LPG	-	Liquid petroleum gas
MCA	-	Maritime and Coastguard Agency
m	-	metre
mm	-	millimetre
RNLI	-	Royal National Lifeboat Institution
SAR	-	Search and rescue
SCUBA	-	Self contained underwater breathing apparatus
UTC	-	Universal co-ordinated time
VHF	-	Very high frequency

SYNOPSIS

At 1205BST on 8 September 2005, while operating in Weymouth Bay, the skipper of the fishing vessel *Blue Sinata* made a request for lifeboat assistance on VHF Channel 16. The position he gave was imprecise. Shortly after this call, the vessel sank. Portland Coastguard responded and tasked various search and rescue units. Two of those on board *Blue Sinata* managed to clear the sinking vessel and were safely recovered but the third, the skipper, went down with his boat and was drowned.

The vessel was recovered by MAIB in order to find the cause of sinking. Damage was found on the vessel's starboard quarter that allowed water to enter the hull under conditions of limited freeboard. At the time of her loss, the vessel was operating with greater than normal weights on deck, in the form of water tanks to hold live catch. This weight reduced the freeboard sufficiently to allow flooding through the damaged area of hull.

It is not certain when the hull damage occurred. Because protective rubber matting largely covered the area of damage, it was obscured to the casual observer and might have been present for some time, becoming critical only when freeboard was reduced by extra weight.

Apart from the skipper, the vessel carried two others (a man and a woman) who are considered to have had the status of passengers. Although *Blue Sinata* normally operated, and had been inspected, under the Maritime and Coastguard Agency's (MCA) Code of Practice for the Safety of Small Fishing Vessels, on the day of her loss she was on charter to perform tasks that were not usual for a commercial fishing vessel: to catch undersized fish under a dispensation from the Department for Environment Food and Rural Affairs (DEFRA). The carriage of passengers and the service provided indicate the vessel should have been operating under the MCA's Code of Practice for the Safety of Small Workboats and Pilot boats (workboat code).

The workboat code demands significantly higher standards of construction, inspection, maintenance and operation. Had *Blue Sinata* met the standards of the workboat code, there is every likelihood she would not have foundered. Had she still done so, the workboat code requirements for better watertight integrity, increased pumping capacity, and a liferaft, would have increased the crew's chances of surviving the event.

The Department for Environment Food and Rural Affairs is recommended to require, with any application for a dispensation to catch undersized fish, the submission of evidence that any vessel named in such a dispensation has safety certification as required by the MCA.

The MCA is recommended to advise The Department for Environment Food and Rural Affairs of the safety certification that would be acceptable for a vessel catching undersized fish under a dispensation issued by them.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *BLUE SINATA* AND ACCIDENT

Vessel details

Registered owner	:	Privately owned
Manager & skipper	:	Mr E Franklin
Port letters and number	:	WH 703
Flag	:	UK
Type	:	Fishing vessel
Built	:	1980 at Hamble, Hampshire
Classification society	:	Nil
Construction	:	GRP
Length overall	:	9.45m
Gross tonnage	:	5.6
Engine power and/or type	:	88.77kW
Service speed	:	N/K
Other relevant info	:	Operating as stern trawler

Accident details

Time and date	:	1205 BST 8 September 2005
Location of incident	:	50° 36.537’N 002° 22.275’ W. Weymouth Bay
Persons on board	:	Three
Injuries/fatalities	:	One fatality
Damage	:	Total loss

1.2 NARRATIVE

All times are BST (UTC + 1 hour)

At about 0915 on 8 September 2005 the skipper of *Blue Sinata* manoeuvred his vessel clear of her berth in Weymouth Inner Harbour and proceeded under Town Bridge towards the harbour entrance. With him was a companion who was on board for a day's outing.

The vessel and skipper had been chartered for the day to catch small fish for display purposes. Already on board was a trawl net and a small rectangular tank for sorting catch. Before clearing the harbour, the vessel stopped at the North Pier to collect the charterer's representative and two circular tanks for the stowage of the catch.

At about 0930, shortly after clearing the harbour entrance, the net was shot over the stern and the skipper set an easterly course for a tow across Weymouth Bay. The two circular tanks were positioned just aft of the engine casing on deck. Once the nets were shot, these tanks were filled with water using two electric pumps immersed in the sea at the stern. Each pump had a discharge hose passing through the port side freeing port leading to one of the tanks.

The pumps discharged continuously into these tanks, which then overflowed through holes about 600mm from their bottoms into buckets and then onto the deck.

The first tow lasted for 45 minutes. The net was then hauled to the surface and the catch recovered from the net's cod end. The rectangular tank, positioned at the stern, was used to sort the catch which was then put in one of the large circular tanks or small buckets depending on species.

About 40 minutes was spent sorting the catch before the net was shot again, at around 1100. The second tow was also in an easterly direction, parallel to the northern shore of Weymouth Bay.

The tow was uneventful until approximately 1130, when it was noticed that there were several centimetres of standing water on the starboard side of the deck, and water was coming on deck through the starboard freeing port in the stern.

The skipper's attention was drawn to this water, but he gave no sign of being concerned and told the others not to worry. The tow continued until 1145, as intended, when the skipper began to haul in the gear.

Hauling continued for about 5 minutes, until the trawl doors were hanging from their chains on the stern gantry. The amount of water on deck had, by this stage, become substantial and the skipper released the clutches on the winch, allowing the fishing gear to return to the seabed.

After removing the GRP cover over the small well at the stern, the skipper remarked that there was water below deck. He then pulled inboard one of the electric pumps being used to top up the tanks, and placed it in the well. The discharge from this pump was then directed over the stern of the vessel.

The depth of water on deck was increasing, and bailing was attempted using buckets. While the two passengers bailed, the skipper went to the wheelhouse and made a call on VHF Channel 16, stating his vessel was taking in water and requesting the attendance of a lifeboat. The position he quoted was 'off White Nothe', but did not include latitude and longitude. This call was timed at 1205. Portland Coastguard responded, broadcast a PanPan at 1208 and alerted air and surface search and rescue (SAR) units.

Bailing appeared to be achieving little, and the level of water had reached the top of the bulwark at the stern. One person went to the wheelhouse to join the skipper who, having raised the alarm, was collecting lifejackets from the cabin. One lifejacket was passed out on deck, by which stage the stern was completely submerged.

Before any more lifejackets could be collected, the vessel rolled to starboard and her stern completely submerged, leaving only the bows above the surface. The skipper appeared to be still in the wheelhouse or cabin, but the other two managed to swim clear. The vessel sank shortly afterwards, without the skipper reappearing.

The two people in the water held onto the single lifejacket, and the man discarded his boots to aid flotation. The woman was wearing lightweight clothing and, largely because of her greater confidence in water, had less trouble staying afloat.

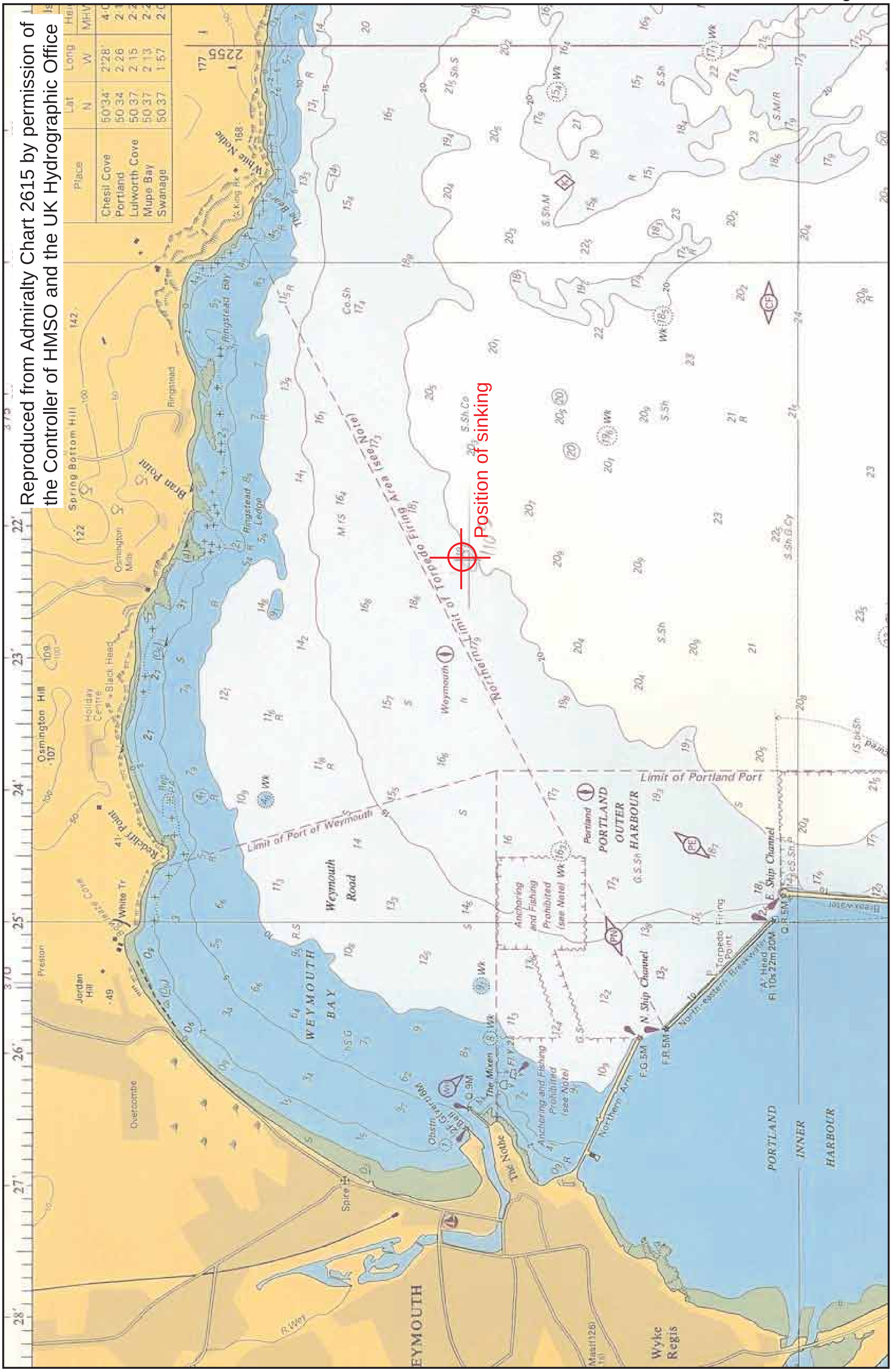
Holding the lifejacket, these two remained in the water for about 45 minutes. After hearing the maroon alerting the lifeboat crew, they realised the skipper's VHF call had been received. They later noticed a rescue helicopter and RNLI lifeboat pass to the north of them, heading for the White Nothe area from their bases in Portland and Weymouth to the west. They were found by the helicopter on its second pass. The helicopter began winching them from the sea at 1253, later transferring them to hospital where they were treated for mild hypothermia.

A number of local vessels also joined the search. However, it was concluded that *Blue Sinata*'s skipper was most likely still on his vessel and the Coastguard accepted an offer of assistance from a local SCUBA diver operating in the area.

Using diesel oil and surface debris as indicators of position, this diver found and identified the wreck of *Blue Sinata* in 21m of water in position 50° 36.537'N 002° 22.275' W **(Figure 1)**. Having found the skipper lodged between the wheelhouse and winch of the vessel, the diver recovered his body to the surface.

Search and rescue operations were terminated at 1430.

Figure 1



Reproduced from Admiralty Chart 2615 by permission of the Controller of HMSO and the UK Hydrographic Office
Position of sinking
WEYMOUTH BAY
Weymouth Road
Limit of Port of Weymouth
Northern Limit of Torpedo Firing Area (see Note)
Limit of Portland Port
PORTLAND OUTER HARBOUR
PORTLAND INNER HARBOUR
N. Ship Channel
E. Ship Channel
North-eastern Breakwater
Northern Arm
The Nothe
The Mixen
Redcliff Point
Bran Point
Ringstead Bay
Ringstead Ledge
White Nothe
Osmington Hill
Spring Bottom Hill
Black Head
Jordan Hill
Preston
Overcombe
Wyke Regis
Chesil Cove
Portland
Lulworth Cove
Mupe Bay
Swanage

1.3 ENVIRONMENTAL CONDITIONS

At the time the vessel foundered, the wind was from the south-south-west, force 4. The sea had a slight swell and visibility was 6 miles with 6/8 cloud cover. The air and sea surface temperatures were both 18°C.

1.4 GENERAL ARRANGEMENT OF VESSEL

Blue Sinata was constructed of GRP. The single rudder was mounted outboard on the transom stern, its lower end being supported by a skeg which extended aft from the keel. Steering was by wheel from the wheelhouse, using a cable system.

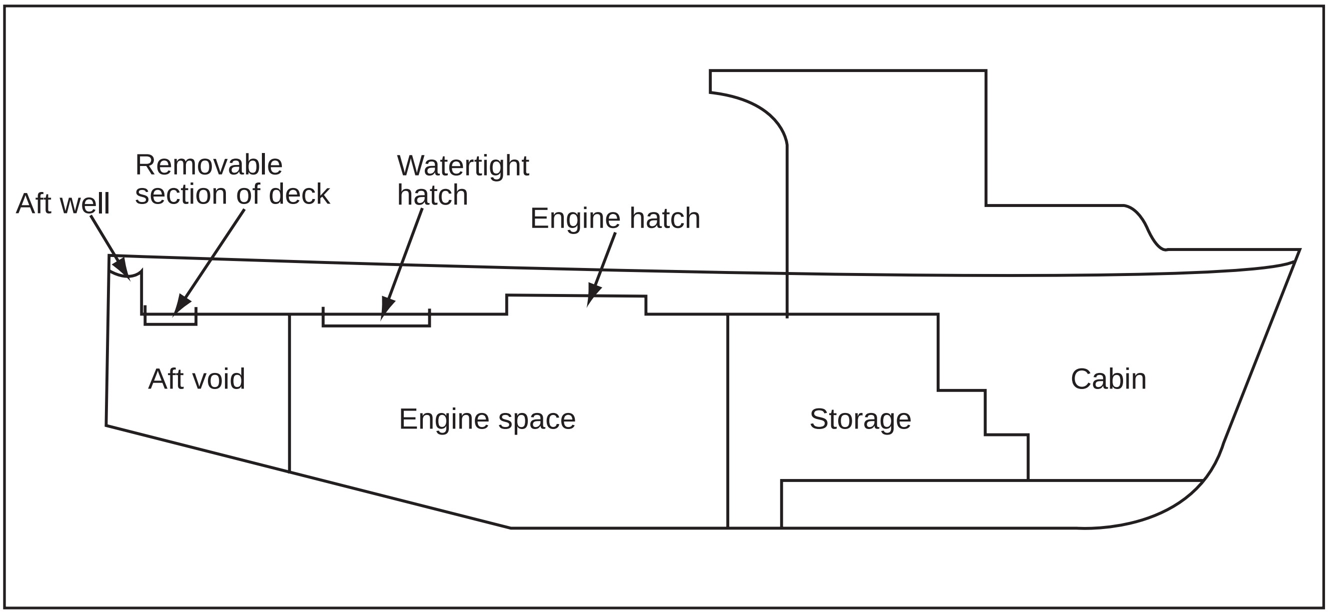
The hull was divided into four significant spaces: forward cabin; under-wheelhouse storage space; engine space and aft void **(Figure 2)**.

Two bulkheads were moulded into the hull; one just aft of the wheelhouse, between the engine space and under-wheelhouse storage area, and a second about 900mm forward of the stern which formed the aft void. Neither bulkhead was watertight due to various penetrations.

Also moulded into the hull, within the engine space, were two fuel tanks, one either side. Each had an outlet cock, with a cross-connection between. Tank filling connections were set into the deck each side, fitted with flush, screwed covers and plugs. Each tank also had a goose-neck type air vent, leading above deck and set against the respective bulwark.

A GRP moulding formed the top of the cabin structure forward, having an escape hatch in its roof. This hatch could not be secured closed. Aft of the cabin was the wheelhouse, constructed of GRP and wood. An open working deck extended from the wheelhouse to the stern.

Figure 2



General Arrangement

The plywood deck was bonded into the hull around its edges and covered with a layer of GRP.   Layers of rubber sheeting covered most of the deck to provide a non-slip working surface. The bulwarks extended 600mm above the deck. Two freeing-ports, each 260mm wide by 55mm high, were cut in the bulwarks at the stern **(Figure 3)**.

In the centre of the aft deck were two hatches. The largest was a 1650mm x 920mm rectangular cover over the engine space. This cover had no securing arrangements, was not weathertight and was kept in place on its 300mm coaming by gravity. On the port side of the coaming were three penetrations: one for a deck wash hose, one for a bilge pump discharge hose, and a third with no apparent connection to any system **(Figure 4)**.

Just aft of the engine hatch was a flush, aluminium, 600mm diameter watertight hatch **(Figure 5)**. This hinged at its aft edge and gave access to the space aft of the engine and the vessel's only seawater inlet valves. There was no bulkhead between this area and the engine space.

One sea inlet valve was a 90° stop cock connected to a flexible pipe leading towards the forward end of the engine, where its open end lay on the deck. The other sea inlet was fitted with a wheel operated gate valve and supplied seawater, again via flexible pipes, to the engine's cooling system. There were no other underwater skin fittings on the hull of the vessel.

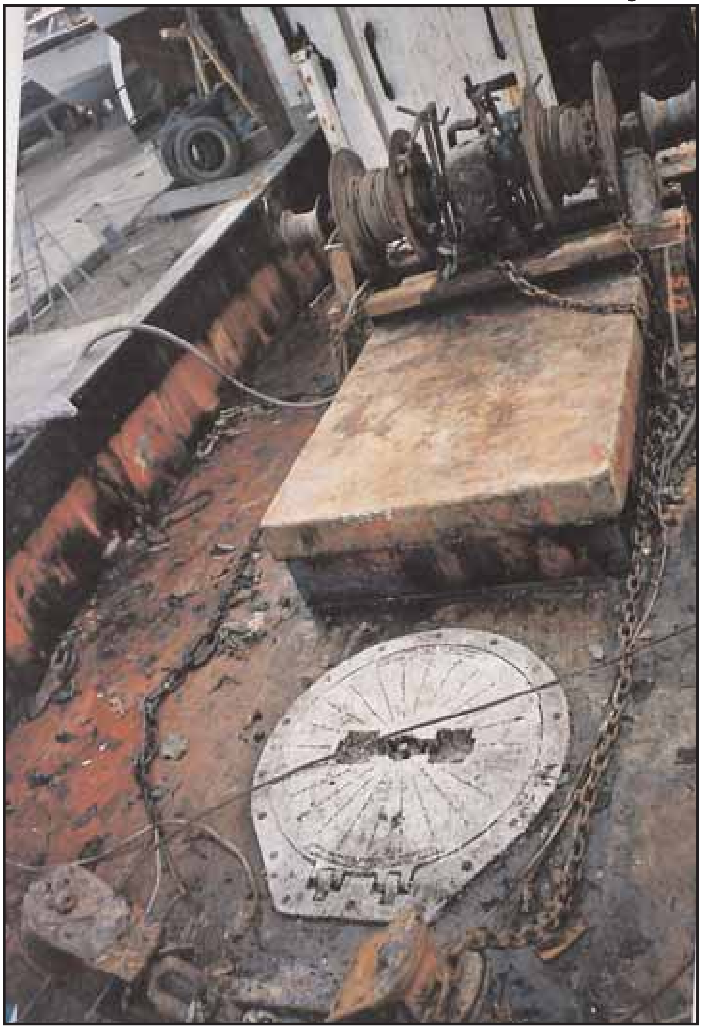
Figure 3

Stern showing freeing ports

Figure 4

Engine hatch and coaming penetrations

Figure 5



Circular watertight hatch and engine hatch

Adjacent to the transom stern, was an opening in the centre of the deck with a 450mm high coaming. The top of the coaming had a loose GRP cover which had no securing arrangements. The well formed by the coaming led down into the aft void. Immediately forward of the coaming was a rectangular, flush section of the deck that could be lifted for better access to the aft void. This piece of deck had no securing arrangements, but was a close fit in its aperture **(Figure 2)**.

Above the forward end of the engine hatch was a fishing winch mounted on a frame. This frame allowed the engine hatch cover to slide aft, for complete removal, or forward to give limited access to the aft end of the engine **(Figures 4 and 5)**.

Wires for towing the fishing gear ran from the two wire drums on the winch, then aft over the engine hatch to two blocks set in the deck. From there, the wires passed up to blocks on a gantry at the stern, one either side, then over the stern to the fishing gear.

Power for the winch was supplied from a hydraulic pump on the forward end of the engine, which also powered a pot hauler and net hauler at the starboard side of the wheelhouse. A single lever, mounted on the winch, controlled winch speed and direction. Separate levers were used to engage or disengage dog-clutches that connected the wire drums to the hydraulic motor. Each wire drum had a band brake, operated by a screwed shaft.

The single, fixed pitch, left hand rotating propeller was driven, through a reversing gearbox, by a six cylinder Perkins diesel engine. Control of engine and gearbox was by a single lever located in the starboard side of the wheelhouse adjacent to the helmsman's seat.

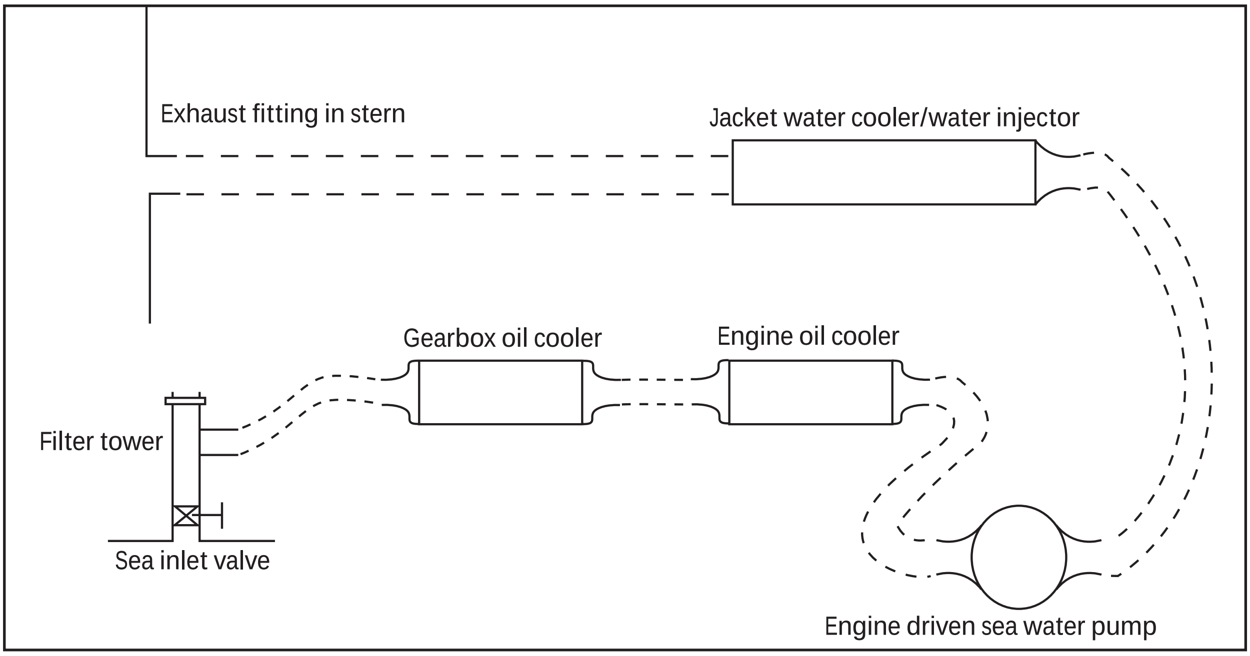
On top of the wheelhouse was a radar scanner and, fitted to a retractable mast, navigation lights, radio and GPS aerials.

1.5 ENGINE COOLING SYSTEM

From the seawater inlet valve, below the circular deck hatch, water passed to a gearbox oil cooler mounted over the gearbox. From this cooler, the water then passed to an engine oil cooler on the port side of the engine, before entering the engine-driven seawater pump. The outlet from the pump went to the jacket water cooler, high on the starboard side of the engine, before being injected into the engine's exhaust for cooling and silencing purposes. All seawater pipes between these units were plastic hoses secured with worm drive clips **(Figure 6)**.

The exhaust hose from the engine passed through the aft bulkhead, and then overboard through a skin fitting in the transom. This exhaust hose was of reinforced, corrugated, rubberised material, and was also secured with worm drive clips.

Figure 6



Engine's sea water and exhaust system

1.6 SAFETY CERTIFICATION

On 8 December 2003, *Blue Sinata* was inspected in Weymouth by the MCA under its Code of Practice for the Safety of Small Fishing Vessels. No deficiencies were recorded and Decal 000732 issued.

A requirement of this code is that the vessel's skipper/owner performs an annual check that all equipment required by the code is in satisfactory condition. The check should be documented in the form of a written declaration which is retained by the skipper for scrutiny at the next MCA inspection.

1.7 EQUIPMENT

Three bilge pumps were fitted to the vessel. A diaphragm type manual pump served the void space at the stern. A 12 Volt electric pump served the bilge in the engine space. Another manual pump served the bilge beneath the wheelhouse and cabin.

Other equipment carried, as required by the small fishing vessel code, included: lifejackets; quoit and buoyant line; flares; lifebuoy; VHF radio; bucket; fire extinguishers; fire blanket; anchor; navigation lights.

Although required by the code, a bilge alarm was not fitted.

A cooker, in the port side of the wheelhouse, was supplied by a single liquid petroleum gas (LPG) bottle stowed outside the wheelhouse on the port side. This bottle was not secured and sat on a collection of loose gear.

1.8 OPERATIONS

Blue Sinata was normally used by her skipper to catch sand eels which were sold to local anglers for bait.

However, between 2001 and the date of her loss, *Blue Sinata* had occasionally been chartered by Aquarium Technology Ltd. to catch undersized fish in inshore waters off Weymouth. On each occasion, an employee of the company was on board to monitor the condition of the fish caught.

Each charter covered a single day's fishing and, because undersized fish were being caught, a dispensation was obtained from the Department for Environment Food and Rural Affairs (DEFRA). Specific conditions applied to this dispensation: notice of each day's operation was required; *Blue Sinata* and skipper E Franklin were to be used; the area of operation had to be defined; and the fish caught were to be for display purposes only.

On 8 September 2005, *Blue Sinata* was working on charter to Aquarium Technology Ltd. to catch fish off Weymouth under the conditions of this dispensation. As before, an employee of the company was also on board the vessel.

A similar fishing expedition to catch undersized fish had been carried out on 31 August 2005. At the end of the first haul on that day, the fishing gear had become twisted, causing both trawl doors to come up together on the starboard side, where they slammed into the side of *Blue Sinata* as the vessel rolled.

1.9 THE CHARTERER

Aquarium Technology Ltd. is a Weymouth based company. A small part of its activities is the collection of undersized fish that are supplied, alive, to aquaria in the UK.

As part of the company's health and safety policy, a risk assessment of the fish collecting operation was performed, the person deemed to be at risk being the company's representative on board the vessel.

A number of hazards were identified, including the boat capsizing and/or sinking, and the calculated level of risk was High. One of the company's chosen methods of mitigating risks posed by the hazards was to use only registered vessels with the correct safety equipment carried on board.

1.10 HISTORY

Following the vessel's purchase in 1998, a stern gantry, deck blocks and fishing winch were fitted. This arrangement is typical of a stern trawler, and for a number of years the vessel was operated in this fashion, with the occasional period of potting. The skipper normally worked alone, and he performed much of the routine maintenance on the vessel.

During 2 weeks of August 2004, *Blue Sinata* was lifted from the water at Weymouth for maintenance. Once out of the water, contractors pressure washed the hull and placed the vessel on blocks and chocks, after which the skipper painted the vessel. There is no record of any other work being done before she was refloated.

The vessel had an engine powered seawater pump, driven by a Vee belt from the crankshaft pulley on the forward end of the engine, used to supply only the deck wash hose. During previous charters of the vessel by Aquarium Technology Ltd. this pump was used to supply water to the circular water tanks on deck. However, the engine pump had been removed by the skipper before the vessel was chartered for the trip of 31 August 2005 when portable electric pumps were used in its place.

1.11 PERSONS ONBOARD

The skipper had attended four safety training courses for fishermen: Fire Fighting (2001); First Aid (2001); Sea Survival (2001); Safety Awareness (2003). He had been a fisherman for several years, was considered experienced but had no certificate of competency.

The two others on board *Blue Sinata* on the day of the accident had none of the qualifications required by commercial fishermen. The woman was onboard for a trip out and was an experienced yachtswoman. The Aquarium Technologies employee owned a boat, and had assisted this skipper on a number of similar charter trips catching undersized fish. He was familiar with the operation of *Blue Sinata*'s fishing gear, but otherwise had limited knowledge of the vessel.

1.12 UNDERWATER SURVEY OF WRECK

On 14 September 2005, MAIB carried out an underwater examination of the wreck of *Blue Sinata.* The objective of this operation was to collect evidence that might help to explain the sinking.

The inspection was performed by a team of divers operating from a surface vessel. Each diver carried a camera connected to a video screen on the surface vessel. Following the instructions of their supervisor and the MAIB inspector, who were monitoring progress on the video screen, the divers recorded details of the wreck.

The results of this inspection were:

The wreck was sitting slightly on its starboard side, about 15° from the upright on a seabed of soft sand. There was some debris on the seabed around the wreck, including a fire blanket in a box, paint tins, and fishing rods.

No damage was found on any visible part of the outer hull, but the rudder and skeg were noted to be deflected towards the port side.

The port trawl door was in place, suspended from the port side of the gantry. The starboard door was sitting on the seabed, leaning against the protective rubber matting at the starboard quarter.

The LPG bottle, in a buoyant condition, was restrained from floating free by its outlet hose at the port side of the wheelhouse.

The sliding door of the wheelhouse was open and a large amount of debris was found in the wheelhouse, cabin and on deck just aft of wheelhouse. The bilge pump switch was found in the ‘on’ position. The combined engine and gearbox control lever was in the ‘neutral’ position.

Figure 7

Cut hose in engine sea water system

One electric bilge pump was found in the aft well connected to a discharge hose. This pump was recovered by the divers. A second, similar pump was found outboard, with its discharge hose running inboard through the port freeing-port in the stern.

The circular hatch in the deck was fully open. The engine hatch cover was displaced aft by a few centimetres from the closed position. The GRP cover to the aft well was missing.

By partly entering the circular hatch in the deck, the divers checked the seawater inlet valve of the engine cooling system. This valve's wheel turned, indicating it might be open. The hose from this valve was traced to the engine where it was found cut at the outlet of the gearbox's oil cooler **(Figures 7 & 8)**. Short lengths of hose either side of the cut were recovered for examination. The cut surfaces of the two parts matched and showed no signs of an intermediate fitting, indicating the hose was complete and had been cut in situ.

Figure 8

Cut hose in engine sea water system at gearbox oil cooler

The divers also checked the seawater inlet cock for the deck wash system. This was found closed, but the diver could not trace the hose connected to it over its complete length.

The winch's clutches were both in the 'released' position, as were the brakes. A wire passed aft from each wire drum of the winch, through two sets of blocks then over the stern to the fishing gear on the seabed.

1.13 VESSEL'S RECOVERY

Because the underwater survey offered no single explanation for the sinking of *Blue Sinata*, MAIB decided to recover the wreck of the vessel for further examination. The operation extended over 3 days, 5 - 7 October 2005.

5 October, between 1036 and 1400

The first diver in the water reported that the wreck had moved 20m west of the position seen during underwater survey. Supporting this observation was a shallow trench in the seabed generated by the vessel's keel as it moved.

After cutting the towing wires of the fishing gear, both trawl doors and the fishing net were recovered.

Two lifting strops were positioned around the wreck in preparation for lifting.

An anchor and portable bilge pump were recovered from the seabed near the original position of the wreck. The LPG bottle was also cut from its hose and recovered.

6 October, on site at 0935

Four air bags were fitted to the lifting strops already in place. As these air bags were being filled, and the wreck began to move to the surface bows first, the forward end of the wreck slipped from its strop when about 10m from the seabed. This caused the net hauler to be torn from its mountings and the wreck returned to the seabed, making gentle contact only. The divers reported no consequential damage from this contact.

Numerous pieces of debris came to the surface during these events Some lifejackets and an oil drum were recovered but other minor small items were not collected.

Once the forward lifting strop and air bags had been re-secured, the wreck was brought towards the surface without further incident until the top of the wheelhouse and stern gantry were visible. A tow line was secured and the tow to Weymouth began at 1330. The tow line parted at 1506, but was re-secured and the tow was continued at 1512.

The tow to Weymouth was completed without further event. Following a combined lifting and pumping operation in Weymouth, the wreck was transferred to a low loading transporter by 1720 for the road journey to Southampton **(Figure 9)**.

To comply with headroom restrictions, the road haulage company cropped the wreck's stern gantry and lowered the mast on the wheelhouse.

7 October

At 1500, the transporter arrived in Southampton where the wreck of *Blue Sinata* was unloaded, placed on blocks and chocked for storage and examination.

1.14 EXAMINATION FOLLOWING RECOVERY

Damage

On the starboard quarter of the hull, level with the deck edge and largely covered by a protective rubber sheet, was an area of damage **(Figure 10)**. The damage was centred on a moulded GRP rubbing strip running along the hull at deck level and had dimensions of 180mm long x 90mm high **(Figures 11 & 12)**. After lifting the rubber sheet, a hose test was performed on this damage **(Figure 13)**.

Figure 9

Blue Sinata after recovery

Figure 10

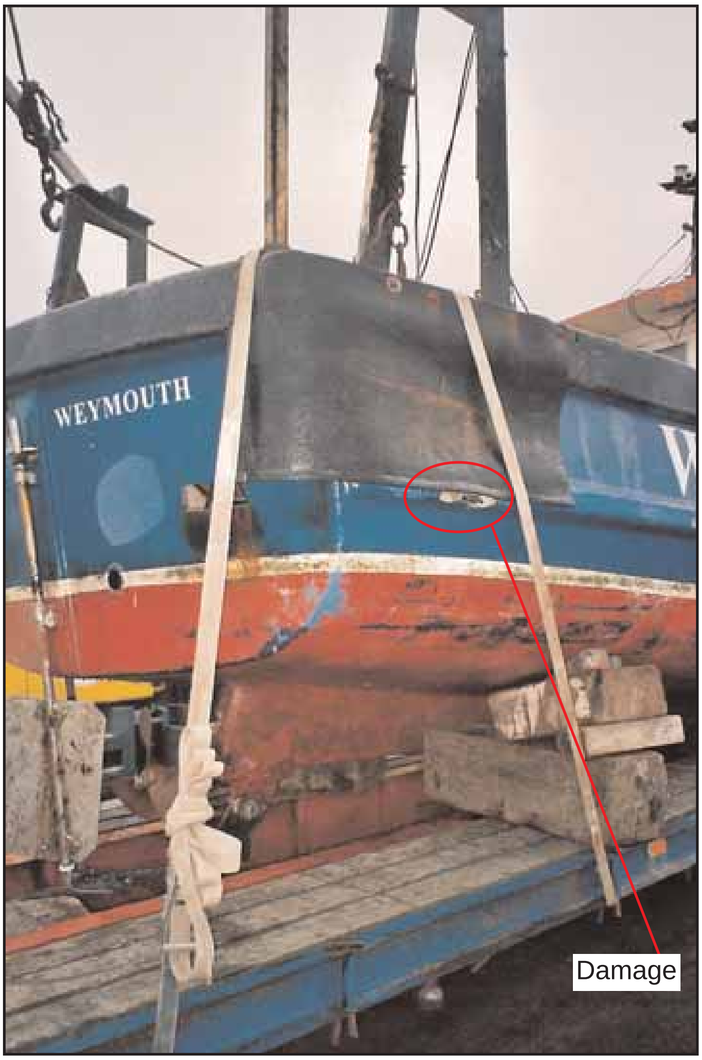


Figure 11

Damaged area

Figure 12

Damaged area

Figure 13

Hose test on damage

With a hose directed forwards and playing on the damage, water entered the engine space. A small quantity of water also migrated forward, within the moulded rubbing strip, to exit outboard at a small penetration.

When the hose was directed aft, or square on to the damage, water entered the void space at the stern.

Excess mass

Before it was possible to totally pump the hull dry for a full inspection, it was necessary to remove a substantial amount of stores, equipment and debris from the cabin and the store space beneath the wheelhouse. A large amount of loose gear was also removed from the deck areas either side of the wheelhouse.

A large proportion of this material was used engine components, multiple sets of tools and additional pumps.

All items removed were weighed.

Location	Tonnes
Items removed from store space beneath wheelhouse	0.268
Items removed from cabin	0.248
Items removed from deck areas either side of wheelhouse	0.248
Total	**0.764**

Pumps

An electric bilge pump was in the bilge space at the forward end of the engine. This pump was marked as having a capacity of 750 gallons/hour and was connected to the vessel's electrical system. As a test, a temporary 12Volt power supply was connected to this pump and it functioned as intended. The outlet hose from this pump passed through a non-watertight penetration in the coaming of the engine hatch and had sufficient length to pass over the bulwark.

On the floor of the wheelhouse was a pump of the type that might have been used as a deck wash pump. A short length of plastic hose was still connected to its inlet connection and this was compared to the open ended hose, the other end of which terminated at the sea inlet cock beneath the circular hatch. The two pieces of hose matched in size, type, colour and pattern of cut surfaces, and it was concluded that this pump had, at some time, been used as the deck wash pump.

The deck wash pump was dismantled to establish why it had been removed. The pump's flexible rotor was found in working condition, but the shaft bearing and seal were badly worn. Together with rust stains around the casing, this suggests the pump was defective and had been leaking in service.

Seawater inlets

The sea inlet strainer supplying the engine cooling system was opened, the filter removed and valve on the skin fitting sighted. The filter was clear of obstruction. The valve was found in the partly open position. Attempts to close the valve, by turning the handwheel, moved the valve disc no further closed than about one quarter open. Similarly, attempting to fully open the valve moved the valve no further than one third open **(Figures 14 & 15)**. Any attempt to move the valve beyond these limits resulted in the spindle turning freely, with no corresponding movement of the valve disc.

Watertight integrity

The engine exhaust hose passed through the aft bulkhead without being sealed, so losing the watertight integrity of the bulkhead **(Figure 16)**. This hose was inspected visually and tested with water, but showed no sign of damage or leakage.

The forward bulkhead, between engine space and under-wheelhouse store area was not watertight. It had a drain at its lowest point, on the centreline, and was penetrated by electrical cables and hoses using non-watertight methods.

The hatch cover to the engine space had no securing or sealing arrangements and was therefore not watertight. The coaming to this hatch was penetrated in three places: none used a watertight fitting.

The mechanism for securing the circular hatch, fitted to its underside, was in place but its operating handle was missing.

Other observations

During initial inspection of the wreck a number of observations were made including: the winch brake-linings were missing and had been replaced with rope **(Figure 17)**; the guard on the winch cooling fan was missing; there were no screws securing the control valve block to the winch; the hydraulic oil return hose from the winch was unsecured and of an incorrect type; there were no securing arrangements for the LPG bottle; the flare box contained flares with an expiry date of 12/94; there were four lifejackets in the cabin (in addition to the one used by survivors).

A short, 15mm diameter hose connected to the engine's fresh water cooling jacket had been plugged with a sparking plug of a type found in a petrol engine. This plug showed signs of possible minor leakage. However, no other part of the engine's fresh or seawater cooling system showed signs of leakage.

Figure 14

Sea inlet valve, limit of closing

Figure 15

Sea inlet valve, limit of opening

Figure 16

Penetration of aft bulkhead by exhaust hose

Figure 17

Brake band of winch

1.15 FREEBOARD CHECKS (Annex)

A set of tests was performed to establish the vessel's likely freeboard under various conditions. The results of the full range of tests are set out in the Annex, but the relevant results for freeboard measurements, taken at the freeing-ports in the stern, are:

- Weymouth departure, before water tanks on deck were filled = 230mm
- Condition after all the water tanks on deck were filled = 62mm

1.16 IN-WATER OBSERVATIONS

With the vessel floating at a freeboard aft of 230mm, assessed as being the Weymouth departure condition, no water leaked into the hull through the cut water pipe in the engine's seawater system at the outlet of the gearbox oil cooler.

However, as weights were added to represent the weight of water in the circular tanks on deck, the freeboard reduced sufficiently for water to leak into the hull through this pipe. The rate of ingress increased as weights were added. This check was made with the sea inlet valve closed as far as possible.

SECTION 2 - ANALYSIS

2.1 AIM

The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar accidents occurring in the future.

2.2 FATIGUE

Typical of fishing vessels the size of *Blue Sinata*, the skipper operated on a "day fishing" basis, returning to harbour at the end of each day's work.

While this working pattern can give no guarantee that the skipper was rested at the beginning of the day's work on 8 September, it gave him the opportunity to be so.

Therefore, and in the absence of any other evidence, fatigue is not considered to have contributed to the sinking of *Blue Sinata.*

2.3 FREEBOARD

The freeboard of the vessel, in her Weymouth departure condition before the tanks were filled with water, was probably close to its normal operating freeboard. Although there are no mandatory standards of freeboard for a vessel operating under the small fishing vessel code, the figure of 230mm in this condition was typical for a vessel of this size, type and service.

It is apparent that the vessel had operated without incident and with a similar freeboard for a number of years. This suggests this freeboard could be considered as 'safe', although it could have been enhanced to some extent by reducing the amount of excess gear on board; over 3/4tonne was found in the cabin, wheelhouse and on deck, much of it unnecessary to the vessel's operation.

Once the two circular fish storage tanks and rectangular sorting tank had been filled with water, their weight reduced the freeboard aft significantly, particularly with the tanks positioned aft of the engine coaming. Recollections of the two survivors indicate this was the most likely position of these tanks on the day of the accident.

None of these tanks were recovered after the sinking, and so were not available to be measured. However, the survivors also firmly indicate the tanks were of the size assumed for the in-water tests, indicating the mean freeboard of 62mm associated with this condition gives a reasonable indication of the vessel's likely condition shortly after the storage tanks and rectangular sorting tank were filled.

Once the fishing gear was shot and towing commenced, the towing load on the stern of the vessel was likely to have decreased the freeboard further, albeit by an uncertain amount.

In the good weather and sea conditions during the day of the accident, this rather limited freeboard might have been of little consequence, if the vessel's deck and hull had been watertight.

2.4 DAMAGE

In view of the limited freeboard measured during the tests, the damage to the starboard quarter at deck level is significant. This damage, coupled with the poor freeboard which brought the damage close to sea level, produced a potential flooding mechanism, as demonstrated by the hose tests. However, the event that caused this damage, and its timing, are uncertain.

The underwater survey of the wreck showed the starboard trawl door sitting on the seabed, leaning against the starboard quarter and its protective rubber matting. As the vessel struck the seabed, it is possible that the door caught the edge of the moulded rubbing strip on the hull, causing the damage seen. One factor against this theory is that the door was leaning against the protective rubber mat, with the mat between it and the hull, rather than behind the mat as might otherwise be expected.

An event during the previous charter trip on 31 August 2005 also had the potential to cause this damage. On the first haul of that trip the two trawl doors came up at the starboard side after the fishing gear became twisted and tangled. This made control of the doors difficult, and it was noticed that they swung against the starboard side of the vessel. The intensity of impact is not certain and no damage was noticed at the time; nor, apparently, was any looked for. However, if the damage was caused that day, at the end of the first tow, it is unclear why no flooding occurred later in the day's work.

Whenever this damage was caused, the protective rubber mats on the vessel's two aft quarters effectively shielded the damage from a casual observer. It was necessary to lift the mat aside to see the damage clearly. An observer on the deck of the vessel, and thus looking from above, would be unable to see this damage with the mat in its normal position. An observer on a pontoon or quay adjacent to her berth would be in a similar position. Thus, unless he was deliberately looking for damage in this area of his vessel, the skipper was unlikely to have noticed its presence.

In the area of the vessel's sinking, the seabed is soft sand. The damage to rudder and skeg was probably caused when the vessel hit the seabed as she sank, and this degree of damage is consistent with an impact with a soft seabed.

Other damage seen after the vessel's recovery was caused during the salvage operation or transport, and was unavoidable. This damage was: the net hauler broken from its mountings; cutting of the net's towing wires; and removal of the stern gantry.

2.5 CAUSE OF FLOODING AND SINKING

At the end of the second haul of the fishing gear, the skipper observed water in the stern well, indicating that water had entered the aft void. The lack of a watertight bulkhead between the void and the engine space means water might have entered the void from the engine space through the opening around the exhaust hose where it passed through the bulkhead.

However, this direction of flooding would have required a significant depth of water in the engine space in order to reach the level of the exhaust hose, sufficient to cause problems with the engine's drive belts and electrical system and, possibly, also to flow forward into the wheelhouse store and cabin. This mass of water would have been substantial and probably sufficient to sink the vessel on more of an even keel than was the case.

A more probable flooding mechanism, and one that indicates the hull damage was present when *Blue Sinata* sailed from Weymouth, is that almost from the time the water tanks on deck were filled as the vessel cleared Weymouth Harbour, the aft void began to fill through the damaged area on the starboard side. There might also have been a much smaller ingress, through the same damage, into the engine space. The extra weight of water in the stern reduced the already minimal freeboard further, so increasing the rate of ingress through the damaged area. Only when the level of water in the void reached the engine exhaust hose did the flooding spread to the engine space at any significant rate. However, by this stage there would have been a substantial amount of water in the aft void. This was probably shortly before the skipper noticed water in the aft well.

Although he was not seen to open either the round access hatch or the main engine hatch, it is likely and understandable that the skipper would have opened one or other hatch to assess the extent of the flooding in the engine space. It is surmised that the skipper slid the main engine hatch forward a short distance and, seeing water in the engine space, he took the extreme measure of attempting to pump out the engine space by cutting the engine's seawater hose. This would have allowed the engine's seawater pump to draw water from the bilge rather than from the sea, and should have significantly supplemented the pumping capacity of the electric bilge pump in that space.

However, because the sea inlet valve did not close fully, this action actually allowed water to flow into the engine space through this hose. Thus, although the engine's seawater pump would then have been able to draw water from the engine space, water would also have been able to enter the hull through the pipe leading from the defective sea inlet valve as well as the damaged area. The total rate of ingress might have been greater than the sum of the pumps' capacities, particularly with the engine, and thus also its pump, running at slow speed.

It is considered unlikely that the cooling pipe was cut earlier in the trip. Had the pipe been cut before there was a significant amount of water in the engine space, it would not have supplied sufficient cooling water to the engine which would have overheated in a few minutes. It is thus unlikely that the pipe was cut for any reason other than to pump out floodwater. The position of the cut, by the oil cooler, was easily accessible to somebody kneeling on deck, and consistent with someone reaching into the engine space through the aft end of the main engine hatch.

Once a significant quantity of water had passed onto the deck through the freeing-ports in the stern, the deck's lack of watertight integrity was exposed. Apart from openings in the port side of the engine coaming, the cover on this hatch was not secured or capable of being watertight. Also, as shown during the underwater inspection, and by its lack of an operating handle, the circular hatch was not and could not be secured closed. These were significant downflooding points and would all have contributed to the flooding rate in the later stages of the accident.

With a significant quantity of water in the aft void, the engine space, and on deck, the vessel had not only lost significant buoyancy but also her stability was seriously depleted. The result was the capsize to starboard. With the only remaining buoyancy being in the forward spaces, the vessel's stern became immersed and, once the air in the cabin had escaped through the hatch in the cabin roof, residual buoyancy was lost and the vessel sank stern first.

2.6 BILGE PUMPING ARRANGEMETS

The vessel had three operational bilge pumps: two hand pumps and one electrically powered pump. Also carried were several other electrical pumps that were capable of being used to pump bilges, two of which were used to supply water to the live fish storage tanks on deck. Three others of a similar type were found on the vessel, but none was connected electrically.

A fishing vessel of the size of *Blue Sinata* is required to carry one bilge pump, but regulations do not specify whether this should be a powered pump, nor its pumping capacity. As the usual function of a bilge pump on a vessel of this size is the removal of comparatively small quantities of water, such as from occasional minor leaks from seawater systems, the pump could not be expected to handle the quantities of water that may be generated by structural failure or damage.

Although the vessel carried bilge pumps in excess of requirements in number, the rate of flooding and the stage at which it was discovered meant that they were, under the circumstances, of little value. The two manual pumps would have required constant attendance, and the electric pump's capacity was only 750 gallons (3.4 tonnes) per hour. The skipper probably recognised the limitations of the manual pumps and that he should not wait for the powered pump to start having an effect. This was probably the stage at which he decided alternative action was called for, and made the decision to cut the seawater inlet pipe and use his engine seawater pump as a bilge pump.

An early warning of flooding is always an advantage to any skipper. *Blue Sinata* had no bilge level alarm to give such warning, even though one was required.

Bilge alarm sensors are commonly placed in the engine space, as this is where flooding is most likely to occur. The proposed mechanism of flooding described above, suggests the aft void flooded to a significant level before water flowed into the engine space through the exhaust hose penetration in the aft bulkhead. Until then, there might have been insufficient water in the engine room to activate an alarm, yet flooding would have been already significant and the stern of the vessel very low in the water. Flooding forward probably occurred shortly before the skipper first noticed water in the aft well, suggesting that a single bilge alarm fitted in the engine space might not have given him much earlier warning of the flooding.

2.7 MAINTENANCE

A number of symptoms indicate *Blue Sinata* was not maintained to a very high standard:

- winch brake bands wrapped with rope as friction material, instead of properly secured brake linings
- all screws securing the winch control valve body missing
- hydraulic oil return pipe arrangements not secured, of incorrect material and vulnerable to damage
- broken whipping drum on winch, generating hazard to personnel
- cooling fan on winch gearbox exposed, generating hazard to personnel
- incomplete securing arrangements on circular, flush deck hatch
- non-watertight penetrations of engine hatch coaming
- defective engine sea inlet valve
- non-watertight penetration of aft bulkhead
- accumulation of weight
- general poor housekeeping
- removal and non-replacement of deck wash pump
- redundant sea inlet hose for deck wash pump not blanked
- carriage of out-of-date flares
- LPG bottle not secured
- blanking of engine fresh water hose using a spark plug.

A number of these were not related to the cause of the sinking, or its consequences, and most, when considered in isolation, are typical of what may be found on many small fishing vessels. However, their sum is indicative of a casual approach to the vessel and her equipment, and a lack of appreciation of potential hazards.

Some shortcomings - such as the defective engine sea inlet valve, penetration of bulkheads, poor watertight integrity and general poor housekeeping - did have a role to play in the accident.

Once the skipper had cut the engine's seawater inlet hose, water was able to flow into the engine space through the defective sea inlet valve, which could not be properly closed. This added to the rate at which water entered the vessel.

Had the aft bulkhead been made watertight, by properly sealing the penetration of the exhaust hose, most flooding would have been confined to the aft void. Comparatively small quantities of water might still have entered the engine space through the damaged area of the hull, but this could probably have been handled by the electric bilge pump in that space.

The vessel's lifejackets were stowed in the forward cabin. Although the numbers carried were in excess of requirements, access to them was not good, and the large quantity and general untidiness of gear in the cabin probably obstructed the skipper's attempts to collect lifejackets.

2.8 CERTIFICATION AND INSPECTION

Blue Sinata was inspected in December 2003 under the provisions of The Code of Practice for the Safety of Small Fishing Vessels. There were no deficiencies recorded.

Post recovery examination of the wreck suggests that the vessel was not in full compliance with the Code at the time of her loss. Significant items were the absence of a bilge alarm, and the carriage of flares that should have been taken out of service over 10 years previously.

Serviceable flares might have been carried at the time of the vessel's departure from Weymouth on 8 September 2005, and these could have floated free during the foundering. However, it is unsafe to carry flares that are not serviceable, and those that were found on board should have been removed from the vessel.

It has not been possible to establish whether the skipper was aware of these shortcomings and made any efforts at rectification. The annual written declaration required of him, stating his vessel carried all the safety equipment required by the Code, could not be found among his or the vessel's records.

2.9 SEARCH AND RESCUE

The request for assistance made on VHF by the skipper was not a distress call. However, Portland Coastguard treated it as a 'PanPan' urgency call, and alerted and tasked SAR units.

Although Portland coastguard station has the facility to identify the position of a VHF transmission using a direction finding system, unfortunately the strength and duration of the message from *Blue Sinata* were insufficient for the system to obtain a reliable position. As a result, the SAR units had to rely on the position given by the skipper, 'off White Nothe', much further north-east than the vessel's actual position.

In the event, this inaccurate position resulted in no significant delay in recovering the two survivors. In less favourable sea conditions, or lower water temperature than was experienced that day, the consequences of the inaccurate position could have been fatal.

Radios with Digital Selective Calling (DSC) facility have the advantage that they do not require the transmission of a voice message in an emergency. Provided the radio is connected to a Global Positioning System (GPS), briefly pressing the designated emergency button on a DSC radio will transmit a distress message that includes the vessel's position. All coastguard stations are equipped to receive these messages. Had *Blue Sinata* been equipped with a DSC radio, there would have been no uncertainty as to its position, and the survivors would have been recovered sooner.

There is no requirement for a vessel of *Blue Sinata*'s type and size to be equipped with DSC. However, this accident offers an example of the potential value of DSC and one of the shortcomings of VHF Channel 16 as a distress system.

2.10 SURVIVAL

Of the three people on board *Blue Sinata*, only the skipper had received any training in sea survival techniques. Although his earlier actions could have shown a greater sense of urgency, there is little doubt that he had the wellbeing of his companions in mind when he went into the cabin to collect lifejackets. This action is to his credit, and it is unfortunate that this concern for others might have contributed to him losing his own life.

A greater awareness of safety issues, and the general advice given to fishermen, might have prompted the skipper to wear a lifejacket at all times; or at least required his two companions to do so. It is acknowledged that some fishermen have strong objections to this practice, quoting the difficulties of working while wearing a lifejacket. However, serious consideration of this issue by a number of fishermen has resulted in them storing their lifejackets in easily accessible positions; one popular solution being to store them in a locker on the wheelhouse roof. This solution, while not guaranteeing availability during a rapid capsize, removes the need for anybody to enter the cabin, or any other part of the vessel, in the event of an emergency, so reducing the risk of becoming trapped.

Once in the water, the two survivors had to rely on their own resources and a single lifejacket. Although sea conditions were good, their wait for rescue must have seemed lengthy, particularly when they saw the first SAR units head to the north-east of them, to the position given by the skipper on VHF. This is the type of situation where lack of survival training and awareness could result in despair and panic. It is to the credit of these two, particularly the experienced yachtswoman, that they remained calm and together in the vicinity of the vessel's sinking.

2.11 THE VESSEL'S STATUS

On her departure from Weymouth on 8 September 2005, *Blue Sinata* carried a skipper and two others. One was a friend of the skipper and played no part in fishing activities; the other was an employee of the charterers, Aquarium Technology Ltd. Neither was a commercial fisherman nor a trainee fisherman.

Safety regulations covering UK registered fishing vessels include no provision for the carriage of passengers, or carrying out any activity other than commercial fishing. Implicit in these regulations, is the understanding that all persons onboard a registered commercial fishing vessel are members of the crew and subject to the training requirements for fishermen, particularly with regard to safety training.

The skipper's two companions could not be considered members of the crew, but were passengers.

Blue Sinata was operated under the MCA code of practice applicable to fishing vessels less than 15 metres in length. To cover the safety requirements of other types of small vessels which may have a requirement to carry passengers and/or cargo, the MCA has developed another code of practice entitled the Code of Practice for the Safety of Small Workboats and Pilot Boats (the Workboat Code).

This Code has been developed for application to small vessels of up to 24 metres load line length, which are either in commercial use at sea and which carry cargo and/or not more than 12 passengers, or provide a service in which neither cargo nor passengers are carried.

Recognised organisations, called Certifying Authorities, are authorised by the MCA to perform the regular inspections of vessels operating under the Workboat Code.

There are major and significant differences between these two codes. Some of the extra safety requirements of the Workboat Code, above those contained in the code for small fishing vessels, and applicable to existing vessels, are relevant to this accident.

Workboat Code Requirement	**Small Fishing Vessel Code Requirement**
Liferaft to be carried	No Liferaft required on vessel the size of *Blue Sinata*
Minimum freeboard of 400mm	No minimum freeboard requirements
Periodic out-of-water inspection by Certifying Authority	Third party inspection not required.
Annual examination by Certifying Authority	Third party inspection not required. Annual self certification by owner.
All hatchcovers to be properly secured and weathertight	No requirement
Hatch coamings to be weathertight	No requirement
Safety critical bulkheads to be watertight	No requirement
Two bilge pumps required with combined capacity of not less than 8.4tonne/hour	One bilge pump required, capacity not specified.
Skipper to have a Certificate of Competency	No requirement

Undoubtedly a properly functioning liferaft would have been helpful for the two survivors from *Blue Sinata* and, under only slightly different conditions, might have been critical to their survival.

The Workboat Code requires a vessel of the size of *Blue Sinata* to have a minimum freeboard of 400mm. While such a freeboard alone could not have guaranteed the safety of the vessel, the larger margin of safety might have prevented any significant water ingress through the hull damage. A greater reserve of buoyancy would also have been provided, so offering an increased ability to carry the fish storage tanks on deck.

The maximum interval between out of water hull inspections required by the Workboat Code is 3 years. Although the last date of examination of *Blue Sinata*'s seawater sea inlet valves is not known, had they been dismantled, examined and serviced at the time of out of water inspections, there is a better chance both would still have been serviceable at the time of this accident. Before cutting the sea inlet hose to the engine, the skipper would have been able to completely close the sea inlet valve, so reducing the rate of flooding.

Weathertight hatches and coamings are sensible features on any decked vessel. Had those on *Blue Sinata* been weathertight, the latter stages of flooding might have been less sudden and given greater time for a complete evacuation.

*Blue Sinata'*s aftermost bulkhead lost its watertight properties when it was penetrated by the engine's exhaust hose. Had this bulkhead been maintained watertight, flooding might not have spread at a rate and degree sufficient to cause the loss of the vessel.

Clearer requirements for the capacity of bilge pumps might have resulted in *Blue Sinata* being better able to control the flooding, and the skipper might not have felt compelled to cut the engine's seawater inlet hose.

Other than the requirement to have completed a series of safety training courses, the skipper of *Blue Sinata* needed no other training and qualification to operate the vessel under the small fishing vessel code. It has not been possible to make any reasonable assessment of his abilities, but it is assumed that, even as an experienced fisherman, he would have required some extra training to obtain the certificate of competency required by the Workboat Code. Any extra training could only have been beneficial to the safe operation of his vessel.

A vessel equipped, examined, maintained and operated according to the requirements of the Workboat Code, is likely to offer a safer working platform than a vessel operating under the small fishing vessel code. *Blue Sinata* was not operating under the Workboat Code, and was unable to satisfy the more rigorous requirements of that code.

Because *Blue Sinata* had moved outside her normal operating regime of catching fish for commercial purposes, where certification under the small fishing vessel code was acceptable, alternative safety certification was required. Inspection and certification under the Workboat Code would probably have been acceptable, and would also have resulted in a significantly enhanced level of safety for all on board. Indeed, the accident would probably not have had the tragic consequences that it did.

Clearly, neither the skipper of *Blue Sinata,* nor its charterers, was aware of the need or importance of having alternative safety certification for the vessel. They were, however, aware that permission was required from DEFRA to catch undersized fish, the very operation that removed the vessel's normal operating status. Withholding issuing the necessary permission, or dispensation, until suitable safety certification is submitted would ensure that a vessel chartered for this type of service was able to offer the level of safety required by its change of status.

SECTION 3 - CONCLUSIONS

3.1 FINDINGS

1. Because the skipper operated *Blue Sinata*, on a day fishing basis, returning to harbour each night, he had ample opportunity to be rested before beginning his day's work. As a result, fatigue is not considered to have contributed to this accident. (2.2)

2. The vessel's normal operational freeboard, although reduced to some extent by the weight of unnecessary gear on board, did not necessarily make the vessel unsafe. (2.3)

3. Extra weight was taken on board in the form of tanks filled with water. This significantly reduced the vessel's freeboard. (2.3)

4. Damage to the starboard quarter of the hull, coupled with the reduced freeboard, produced a flooding mechanism. (2.4)

5. The cause and time of the hull damage are not known, but as a protective rubber sheet shielded the area from any observer on deck, the skipper might have been unaware of its presence. (2.4)

6. Floodwater entered the aft void space through the damaged area, and spread forward through a non-watertight bulkhead. (2.5)

7. The skipper probably attempted to stem the rise of floodwater by cutting the sea inlet hose to the main engine, in order to use the engine's seawater pump as a bilge pump. (2.5)

8. In the final stages, the rate of flooding through non-watertight hatches was rapid. (2.5)

9. Once flooding had spread forward into the engine space, the vessel's stability was so reduced that it capsized. (2.5)

10. The bilge pumps carried by *Blue Sinata* satisfied the requirements of the MCA's code for small fishing vessels. The rate of flooding, and the stage at which it was discovered, resulted in their capacity being insufficient. (2.6)

11. Although required to do so, *Blue Sinata* did not carry a high level bilge alarm. However, in the event, an alarm in the engine space might not have alerted the skipper very much earlier. (2.6)

12. *Blue Sinata* was not maintained to a very high standard. (2.7)

13. The engine's seawater inlet valve was defective and could not be closed. This contributed to the flooding once the skipper had cut the hose leading to the engine's seawater pump. (2.7)

14. General untidiness probably obstructed the skipper when collecting lifejackets from the cabin. (2.7)

15. Although operated under the code for the safety of small fishing vessels, because of several shortcomings *Blue Sinata* was not in compliance with the code at the time of her loss. (2.8)

16. The skipper's VHF request for assistance did not give the vessel's correct position. Also, the poor VHF signal prevented Portland Coastguard from obtaining an accurate position electronically. (2.9)

17. The recovery of the survivors was slightly delayed by the inaccurate position given to Portland Coastguard. (2.9)

18. There is no requirement for a vessel of *Blue Sinata*'s type and size to be fitted with a Digital Selective Calling (DSC) radio. However, this accident offers an example of the potential value of DSC and one of the shortcomings of using VHF Channel 16 as a distress calling method. (2.9)

19. The skipper's attempts to collect lifejackets for others is to his credit. It is unfortunate that this concern for others might have contributed to him losing his own life. (2.10)

20. The two survivors remained afloat by clinging to a single lifejacket. (2.10)

21. Had the vessel's aft bulkhead been maintained watertight, flooding might not have spread at a rate and extent sufficient to cause the loss of the vessel. (2.11)

22. Because *Blue Sinata* had moved outside her normal operating regime of catching fish for commercial purposes, where certification under the small fishing vessel code was acceptable, alternative safety certification was required. (2.11)

23. Neither the skipper of *Blue Sinata,* nor her charterers, was aware of the need or importance of having alternative safety certification for the vessel. (2.11)

SECTION 4 - ACTION TAKEN

Aquarium Technology Ltd:

Has issued instructions that none of its employees is to board or travel on any commercial vessel chartered for the collection of live specimens, unless the vessel meets the Work Boat Code of Practice in every respect.

SECTION 5 - RECOMMENDATIONS

The Department for Environment Food and Rural Affairs (DEFRA) is recommended to:

2006/139 Require that any application for a dispensation to catch undersized fish, is accompanied by evidence that any vessel and skipper named in the application has the appropriate safety certification, as required by the Maritime and Coastguard Agency.

The Maritime and Coastguard Agency (MCA) is recommended to:

2006/140 Advise the Department for Environment Food and Rural Affairs, of the safety certification requirements for vessels and skippers, when carrying passengers, while catching undersized fish under dispensations issued by them.

Marine Accident Investigation Branch
March 2006

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

Freeboard measurements

A series of 27kg masses was used to replicate the weight removed from the vessel during cleaning and de-watering. With the vessel emptied of water, the following masses were added:

- 9 x 27kg in cabin
- 9 x 27kg in storage space below wheelhouse
- 5 x 27kg on deck at starboard side of wheelhouse
- 5 x 27kg on deck at port side of wheelhouse.

The following equipment was reloaded onto vessel:

- Net hauler at starboard side aft of wheelhouse
- Net on aft deck between circular hatch and after well
- Cross bar and blocks of gantry on deck below gantry aft
- Trawl doors below gantry aft
- Anchor on deck aft of wheelhouse.

During these tests, each fuel tank was half full of seawater. This was established by filling both tanks to their brims, shutting the cross connection, emptying the port tank with a pump and opening the cross connection to allow tanks to level. Total removed from port tank was 270litres. Thus, approximately 270 litres remained in tanks, 135litres per side.

Vessel was then placed in water in the above condition, which replicated, as far as was possible to establish, her loaded condition at Weymouth departure on 8 September.

- Freeboard measurement in this condition at the freeing ports aft was <u>230mm (mean)</u>.

To assess the effects on the vessel's freeboard of filling the two circular tanks on deck, weights were added.

17 x 27kg was added to each side of the deck, with centreline at aft edge of engine coaming (to replicate two circular tanks 1m diameter filled to depth of 0.6m)

- Freeboard measurement in this condition at the freeing ports aft was <u>115mm mean</u>.

To replicate the effect of the weight of water contained in the rectangular sorting tank further 6 x 27kg weight was added at aft well

- Freeboard measured in this condition at the freeing ports aft was <u>85mm mean</u>.

The account for some uncertainty as to the position of the circular tanks, the masses of 17 x 27kg already on each side of the engine coaming were moved aft by 205mm

- Freeboard measured in this condition at the freeing ports aft was <u>70mm (mean)</u>.

The masses of 17 x 27kg each side were moved aft by a further 205mm

- Freeboard measured in this condition at the freeing ports aft was <u>62mm (mean)</u>.