

## The flooding of fishing vessel *Fredwood* after taking the ground on a drying berth Maryport, England 6 April 2016

Extract from The United Kingdom Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 – Regulation 5:

“The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of such an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame.”

### NOTE

This report is not written with litigation in mind and, pursuant to Regulation 14(14) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.

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### SUMMARY

On 6 April 2016, the UK registered fishing vessel *Fredwood* flooded and sank on a drying berth in Maryport, England. When *Fredwood* took the ground, it listed away from the quay wall and the weight of the vessel came to rest on a sonar tube that protruded from the bottom of the hull. The tube was pushed upwards and the hull planking around it was damaged. This caused the vessel to flood on the rising tide (**Figure 1**). All of the crew were rescued by local fire service personnel and there were no injuries or pollution. However, the vessel was declared a constructive total loss.

The investigation found that the mooring arrangement, mooring line monitoring and emergency response on board *Fredwood* were inadequate. The investigation also identified weaknesses in the management of Maryport’s commercial berths; a recommendation has therefore been made to the Maryport Harbour Authority designed to address these issues.

Photograph courtesy of News & Star



Figure 1: *Fredwood* flooded on the rising tide

## FACTUAL INFORMATION

### Background

*Fredwood*, built in 1975, was a 19.35m long wooden hulled scallop dredger with a loaded draught of 3.2m. The vessel was registered in Ballantrae, Scotland, and was manned by a crew of four. The skipper and one crewman, his son, were UK nationals; the other two crewmen were Ghanaian nationals. The skipper had worked on board *Fredwood* for 25 years and had been its skipper for 10 years.

*Fredwood* was operated nomadically, moving around the UK coast to find the best fishing grounds. The skipper had used Maryport as his base for the winter scallop season in the Irish Sea since 2012, and the quay he regularly used to berth *Fredwood* dried out at low water. *Fredwood* was constructed to be starboard side heavy and, to help ensure it leant towards the quay wall, it was normally berthed starboard side to the quay.

*Fredwood* had a steel sonar tube fitted to the bottom of its hull on the port side of the keel (**Figure 2**). It was welded to a steel spreader plate and protruded about 0.5m below the hull planking. The sonar system had been installed 15 years earlier to help locate the best scallop grounds when the vessel was being operated off the south-west coast of England. The system was still operational but had not been used for many years.



Figure 2: *Fredwood*'s sonar tube

## Environmental conditions

On 6 April 2016, the wind in Maryport was south-south-westerly Force 4 to 5 and gusting Force 6. The mean tidal range was 7.7m from a mean high water springs of 8.60m, to mean low water springs of 0.9m.

On 5 and 6 April 2016, the tides were predicted to be:

Tides			
Date		Time	Height
5 April 2016	High Water	2312	8.24m
6 April 2016	Low Water	0547	0.93m
	High Water	1127	8.71m

## Narrative

At about 2200 on 5 April 2016, *Fredwood* entered Maryport's Elizabeth basin (**Figure 3**) and was manoeuvred starboard side onto its usual berth. The crew secured the vessel alongside with four mooring lines: a headline, a sternline and forward and aft spring lines. During the following 2 hours, the crew offloaded the catch into waiting trucks and then cleaned the vessel. At about 0045 (6 April), the crew stopped the vessel's electricity generator and went to bed.

As the tide receded, *Fredwood's* mooring lines began to tighten and pulled the vessel hard onto the quay wall. At about 0300, *Fredwood* took the ground and began to lean away from the quay wall. As the tide continued to fall, the headline parted and the vessel suddenly lurched over to port and assumed a 30° list. The skipper awoke with the sudden roll and made his way to the wheelhouse. The skipper thought *Fredwood* had probably come to rest on the sonar tube and decided to remain in the wheelhouse and wait for the incoming tide to re-float the vessel.

At about 0820, *Fredwood's* fish hold bilge alarm sounded; about 5 minutes later the engine room bilge alarm sounded. The skipper, knowing that the alarm floats were located on the starboard side of the vessel, realised that the flooding was severe and mustered his crew. By now, the water level was over the port side gunwale (**Figure 4**) and the deck was partially awash. The crew accommodation had also started to flood. At 0830, the skipper called the emergency services.

Shortly after the call, the Workington all-weather lifeboat, a local fire service tender and Maritime and Coastguard Agency (MCA) staff were on scene. The skipper and his crew were quickly evacuated from the vessel to the quayside via the fire tender's ladder.

At about 0845, the Maryport Harbour Authority's duty officer went to the quayside and consulted with the skipper to establish the condition of his crew and assess the risk of pollution. The duty officer then briefed his general manager. Based upon the quantities of fuel and oils on board, the disposition of *Fredwood's* tanks, and location of the tank vents, the general manager considered the risk of pollution to be low, and decided not to deploy the port's pollution control equipment.

As the tide rose, water continued to flood into *Fredwood's* hull and at high tide it became completely swamped. At about 1100, with the vessel almost fully submerged, lines from the shore were attached to *Fredwood's* mast and gantry, and a crane was used to pull the vessel upright. Once upright, the vessel was secured to the quay wall.

During the following falling tide, salvage pumps were used to remove water from the vessel's hull. When the basin dried, *Fredwood's* hull was inspected externally. From the inspection, it was apparent that the hull planking around the sonar tube spreader plate had been forced up into the vessel. The damaged planking was temporarily sealed and *Fredwood* was re-floated on the next flood tide. Once afloat, the vessel was towed to a nearby slipway and pulled out of the water. *Fredwood* was later declared a constructive total loss by its insurers.

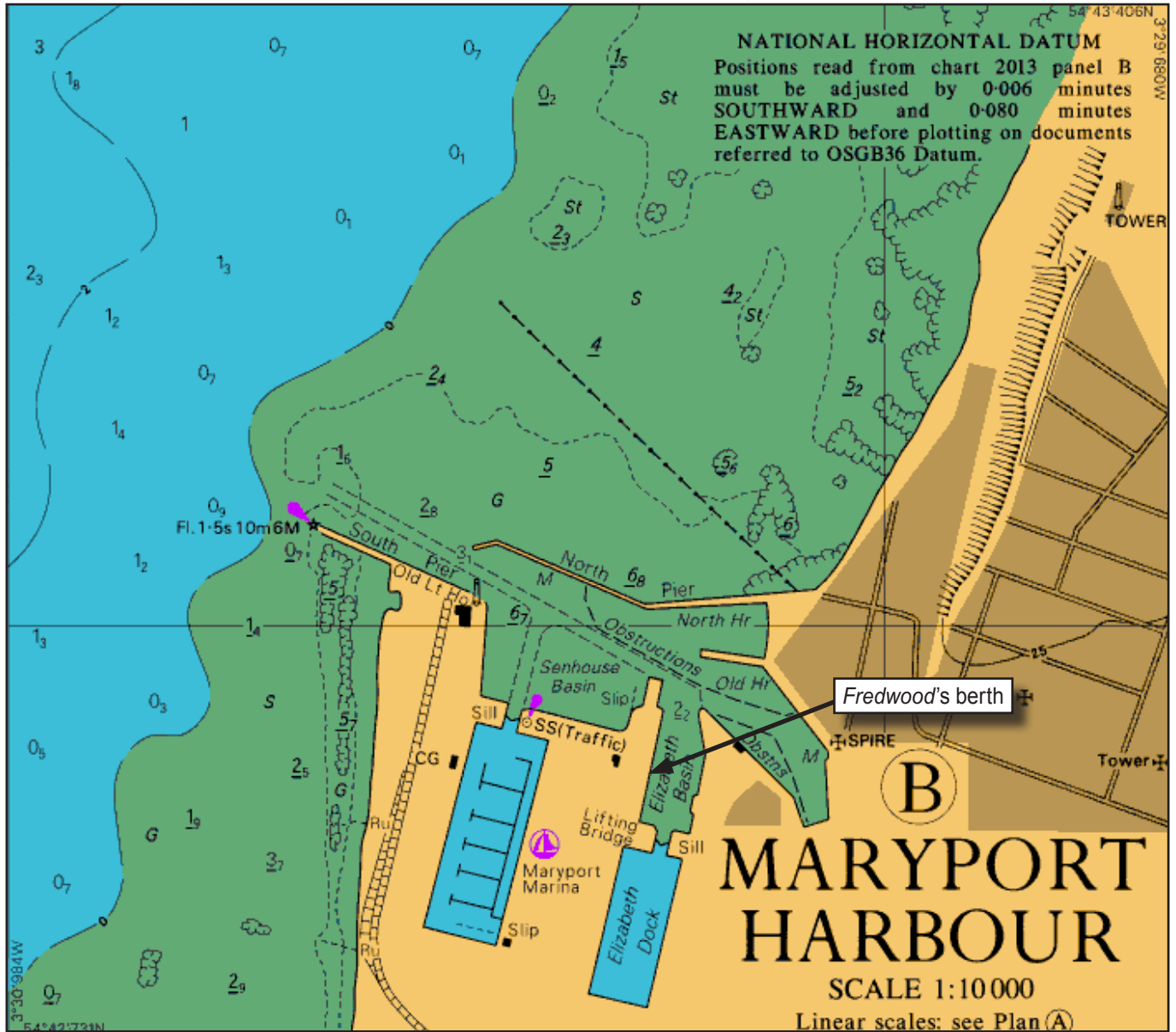


Figure 3: Maryport harbour

Image courtesy of Maryport Harbour



Figure 4: Maryport harbour CCTV snapshot of *Fredwood* at 0822 on 6 April 2016

## Maryport harbour

Maryport harbour sits at the mouth of the River Ellen and comprises two basins protected from the sea by north and south piers. The basins lead to the Senhouse Dock and the Elizabeth Dock. The Senhouse Dock was gated and contained the Maryport Marina, which was used mainly by leisure vessels. The gates to Elizabeth Dock had been decommissioned and the dock was open to its basin. The Elizabeth basin was used regularly as long-term moorings for commercial fishing vessels, and to land their catches.

The docks and their basins were originally constructed in the mid-19th Century, with their 7m high walls and 2m high foundation stones laid on a bed of sandstone (**Figure 5**). The dock walls and their foundation stones sloped towards the quay at an angle of about  $10^\circ$ . The base of the walls was set back about 20cm from the edge of the foundation stones.

Prior to its regeneration in the late 1980's, the port had been closed for many years and had fallen into a state of disrepair. During that time, the local fishermen had used the docks freely and without restriction. Maryport harbour was established as a trust port by a harbour revision order in December 2007, and the Maryport Harbour Authority had statutory responsibility for the whole port and its harbour approaches.

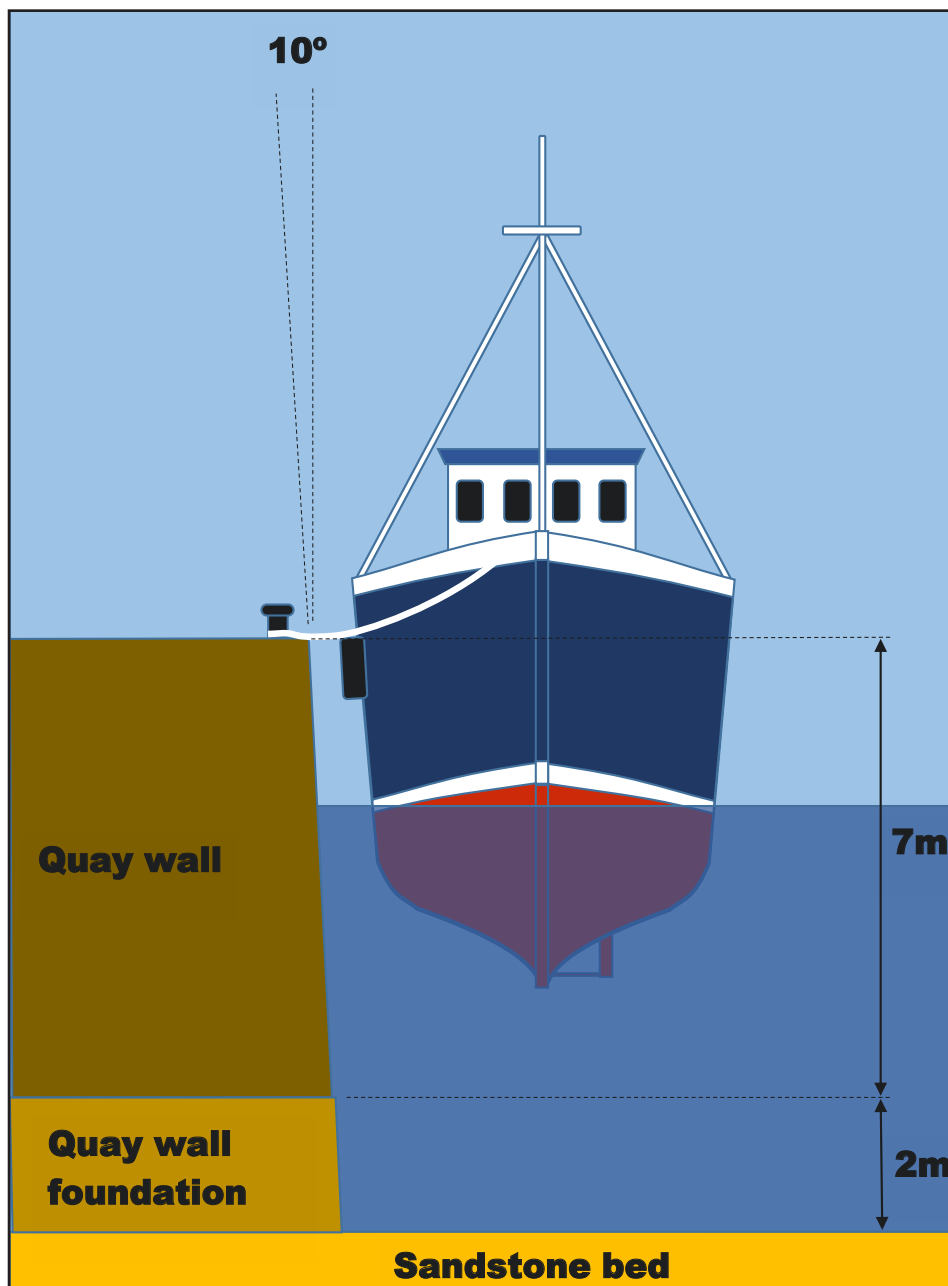


Figure 5: Elizabeth basin walls

## Maryport Harbour Authority

The Maryport Harbour Authority's board of trustees comprised officials from the local town, borough and county councils, independent representatives of the community, and the appointed general manager. The harbour authority's management team and board of trustees had little or no commercial maritime experience.

The port's marina and its commercial dock and basin were operated as two separate companies within the area managed by the harbour authority. The increasing levels of control exercised by the Maryport Harbour Authority, and the introduction of harbour dues for commercial vessels in 2012/2013, had created some resentment among the local fishermen. This was despite the harbour dues being significantly lower than those of other ports in the area.

## Dredging of the harbour

Maryport was subject to rapid silting and, up until 2006, the harbour had been routinely dredged at 5-yearly intervals. Due to financial constraints, 10 years had been allowed to elapse before the Elizabeth Dock and basin were dredged at the beginning of 2016. The dredging, which was completed on 12 March 2016, removed an average of about 2m of mud and silt, and exposed the dock's sandstone base.

Information concerning the dredging of the port was widely promulgated by the harbour authority and a Notice to Mariners (No. 1/2016) was issued on 7 March 2016. The notice warned small craft owners and skippers of the increased risk of snagging on the bottom of quay wall ladders on the rising tide in the Elizabeth dock and basin following the dredging because the ladders did not extend all the way to the dock bottom. The notice further stated that harbour users should ensure that vessels be '*...left in safe and secure manner for all occasions.*'

Despite the warnings, there were several incidents after the dredging operation where vessels listed away from the quay at low water and toppled on to their sides in the Elizabeth basin; one of which was observed by *Fredwood's* skipper. On one occasion, a boat had to be recovered with the assistance of harbour authority staff.

## Maryport Safety Management System and Port Marine Safety Code

Maryport Harbour Authority's safety management system (SMS) was compiled by a consultant in 2008. It encompassed the requirements of the Department for Transport's (DfT) non-mandatory Port Marine Safety Code (PMSC). The PMSC, introduced in 1996, provided a generic safety management structure that could be used to improve safety standards in UK ports. The PMSC was administered on behalf of the DfT by the Maritime and Coastguard Agency (MCA). Once a port authority considered that it met the standards of the PMSC, it could formally declare itself compliant by submitting a return to the MCA. The Maryport Harbour Authority had not declared itself compliant with the PMSC.

Maryport Harbour Authority's SMS contained several guidance documents. According to its guidance document, *Marine Safety in Maryport Harbour – A Guide to Safe Navigation*, the harbour authority required fishing vessel skippers to report to the harbourmaster or appointed deputy prior to their vessel's arrival and departure. The skippers were also required to moor or berth their vessels as instructed by the harbourmaster, though fishing vessel skippers tended to ignore the authority of the port, and moor their vessels where they liked.

The harbour authority had not conducted a risk assessment for fishing vessels berthing in the Elizabeth basin, and the port's SMS had not been fully maintained. At the time of the accident, the post of harbourmaster had been vacant for 6 months and the harbour authority had made little attempt to fill the vacancy.

## The management of safety on board *Fredwood* and precautions taken when sitting on drying berths

Prior to the 2016 dredging operation, *Fredwood* had always settled on the mud in the Elizabeth basin at low water (**Figure 6**). When *Fredwood* first visited Maryport after the dredging work had been completed (15 March 2016), it sat about 1m lower at low water and rested against the quay wall (**Figure 7**). *Fredwood* remained on the berth for several days and, during this time, the skipper had concerns about the close proximity of the quay wall to *Fredwood*'s hull.

Photograph courtesy of trawlerphotos.com



**Figure 6:** *Fredwood* sat in the mud in Elizabeth Basin  
March 2014

Photograph courtesy of Ronnie Bell



**Figure 7:** *Fredwood* leaning on quay wall in Elizabeth Basin  
March 2016

After the visit, the skipper sailed to Garlieston in Scotland to undertake repairs to the vessel's hull planking. During the repair period the vessel sat port side alongside on a hard ground drying berth. The skipper, conscious of the risk to his hull, was careful to ensure the vessel's protruding sonar tube remained clear of the ground.

While in Garlieston, the skipper purchased two used tractor tyres and rigged them as additional fenders on the starboard side of the vessel (**Figure 8**). At the end of the maintenance period the skipper sailed *Fredwood* from Garlieston to Maryport.

*Fredwood's* safety management system was documented in a safety management folder. The folder contained risk assessments for various identified hazardous activities, but did not include a risk assessment or procedure for sitting on a drying berth. The sections within the safety management folder relating to emergency procedures had not been completed.



**Figure 8:** New tractor tyre and existing truck tyre

## ANALYSIS

### The flooding

*Fredwood* began to flood on the falling tide, shortly after it grounded, because several of its hull planks had been damaged when the weight of the vessel came to rest on its protruding sonar tube after it had rolled away from the quay. The skipper realised that *Fredwood's* list had probably been arrested by the sonar tube, but did not appreciate the likelihood of this causing a breach in the hull.

Confident that his vessel would right itself and re-float on the rising tide, the skipper sat in the wheelhouse and did nothing for over 5 hours until *Fredwood's* bilge alarms started to sound. By that time, it was too late to save the vessel.



## **Fredwood's failure to lean against the harbour wall**

It was evident from *Fredwood's* visit to Maryport in March 2014 (**Figure 6**) that, prior to the dredging operation, the skipper was not concerned about ensuring his vessel listed to starboard while on the quay. This was because *Fredwood's* hull settled into the soft mud at low water and the vessel always remained upright. It was equally evident from *Fredwood's* first visit to the port after the dredging operations (**Figure 7**), that the skipper was aware of the increased depth of the basin. The skipper had also witnessed a fishing vessel topple over during that visit, and was therefore aware of the risk of his vessel suffering a similar fate.

Taking into account the design of the vessel and the skipper's heightened awareness to the risk that *Fredwood* would lean away from the quay, it is highly unlikely that *Fredwood* had a port list when its crew went to bed on 6 April 2016. Therefore, it is likely that several other factors prevented *Fredwood* leaning to starboard and resting against the quay wall when it took the ground. These included the tension in the mooring lines, the use of the new tyre fenders, and the effects of the recent dredging operations in the Elizabeth dock and basin.

It was apparent that the skipper and his crew had not allowed sufficient slack in the forward mooring line to prevent it pulling *Fredwood* onto the harbour wall prior to its keel touching bottom (**Figure 9**). This might have been because the wind was pushing the vessel off the quay when it was first moored and/or because the tractor tyre fenders were significantly thicker and more rigid than the older fenders. The skipper fitted the new tyres because he thought they would protect *Fredwood* from damage by holding its hull clear of protrusions and snagging hazards when leant on the quay wall. However, the tractor tyres probably held *Fredwood* upright as the tide fell, and might even have acted as a pivot point to initially induce the port list.

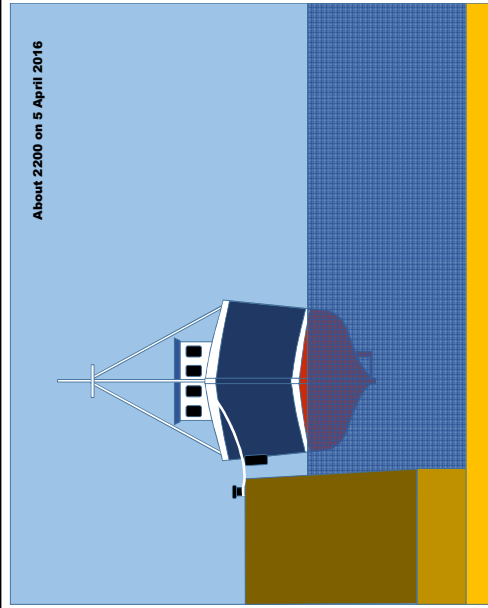
Regardless of the mechanism, *Fredwood* listed to port because its crew did not monitor and tend their mooring lines. Furthermore, the vessel rolled onto its sonar tube because no precautions were put in place to prevent that happening.

## **Precautions when taking the ground on drying berths**

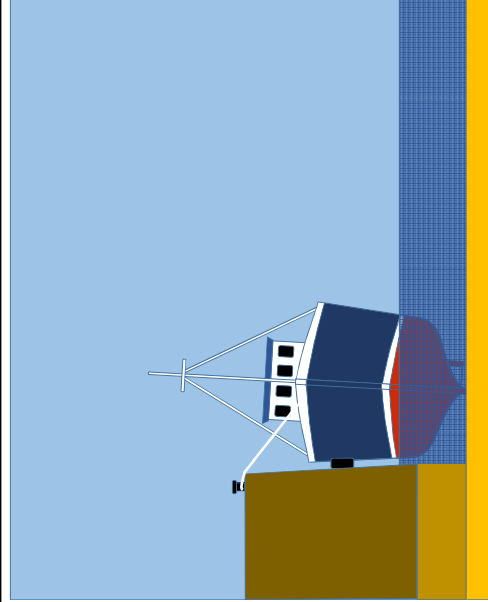
*Fredwood's* safety management folder did not contain a risk assessment for taking the ground on drying berths and the vessel did not have a procedure for this. However, the skipper and his crew had many years' experience of berthing in the Elizabeth basin and on other drying berths. It is possible that the soft muddy bottom, which had existed in the basin for several years before the dredging operation, instilled a degree of complacency. However, given that the skipper was fully aware that Maryport harbour had been dredged and that his vessel would sit on hard ground at low water, some basic precautions could have been taken.

There were numerous well established precautions that the skipper could have considered, such as setting a mooring line watch, rigging mooring lines on outboard cleats, closing all watertight openings and rigging beaching legs (commonly used on smaller boats).

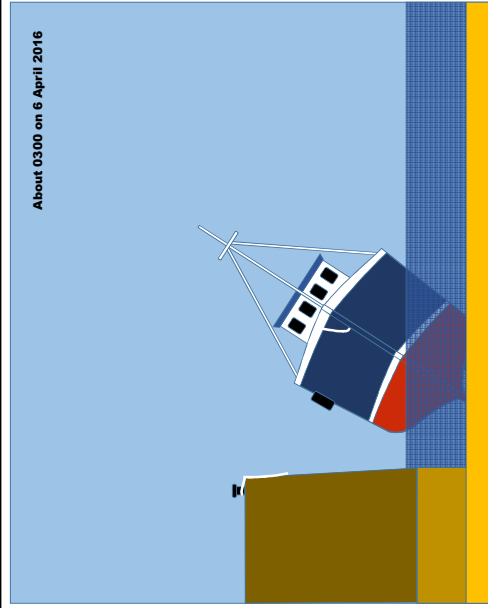
Some flat bottomed vessels are specifically designed to sit on the ground at low water and some are less suited than others. *Fredwood* had no bilge keels and its sonar tube presented an obvious hazard when taking the ground. This was the case even before the dredging works had been carried out because at any time the tube could have landed on an unexpected underwater obstruction. The sonar tube presented a foreseeable risk to the vessel and, as it was no longer in use, it should have been removed.



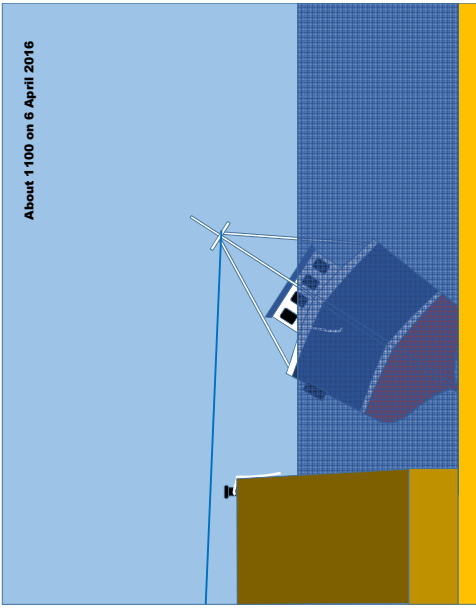
**Fredwood moored starboard side alongside the quay wall about 1 hour before high tide on 5 April 2016.**



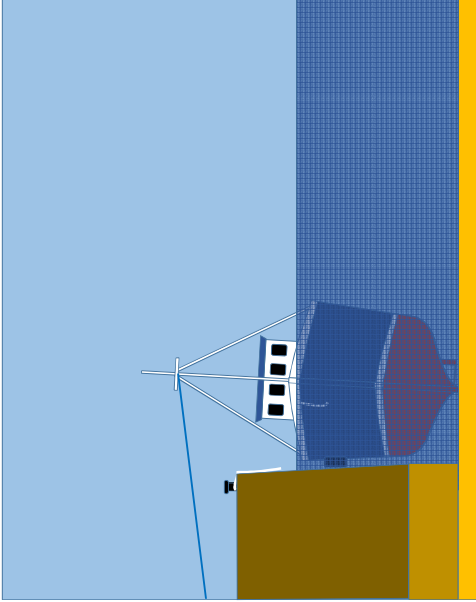
**Fredwood's headline became taught on the falling tide and pulled vessel against the quay wall; the tyre fenders held the vessel off the wall.**



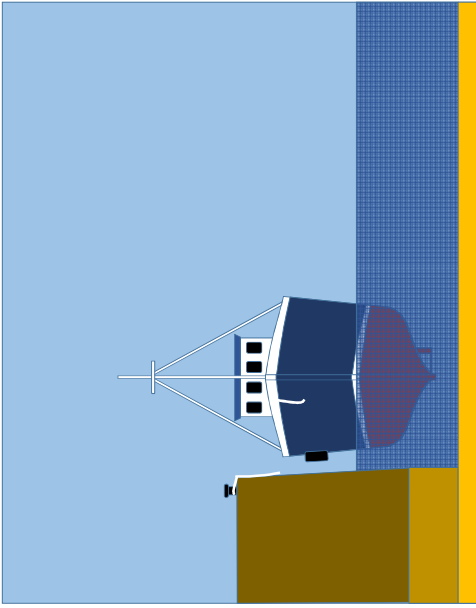
**Fredwood's mooring line parted as, or shortly after, the vessel grounded. As the tide continued to fall Fredwood rolled over to port about 30°.**



**Fredwood flooded on the rising tide.**



**While submerged, a line was secured to Fredwood's mast and the vessel was pulled upright.**



**Fredwood refloated on the next tide after a temporary repair had been made to the hull.**

Simplified illustration of key events

**Figure 9: Likely mechanism of induced port list**

## Emergency response

Once the vessel was aground and damaged, the crew had the time at low water to save it. Had the skipper roused his crew and conducted a damage assessment when he was first awoken by the vessel's sudden lurch to port, he would have immediately realised his vessel was taking on water. He could then have summoned assistance from the shore, rigged salvage pumps to control the water levels in the engine and fish rooms and plugged the holes when the basin was dry.

Given the skipper's familiarity with *Fredwood*, it is almost inconceivable that he did not fully appreciate the danger that his vessel was in as the tide started to flood over its deck (**Figure 4**). Because no one on board took action until the bilge alarms sounded, it is most likely that all of the crew, including the skipper – who was in the wheelhouse – were asleep as the boat progressively flooded on the rising tide.

Having consulted with *Fredwood*'s skipper, the harbour authority management team made the decision not to deploy the port's pollution control equipment. Although there was no pollution, it would have been prudent to have rigged booms around the vessel as a precautionary measure.

## Port safety management

Although not considered directly contributory to this accident, the investigation highlighted weaknesses in Maryport Harbour Authority's management of its commercial docks and berths. Its safety management system was not being maintained and its staff had limited commercial maritime experience.

Insufficient funding had prevented regular dredging of the commercial docks, significant maintenance, and the appointment of an appropriately qualified harbourmaster. This made it difficult for the harbour authority staff to have an influence on the actions of the fishing vessel skippers, and exercise full control of its port.

## CONCLUSIONS

- *Fredwood* flooded because several hull planks were damaged when the weight of the vessel came to rest on a protruding sonar tube when the vessel grounded on its drying berth.
- *Fredwood* was pulled onto the quay wall and started to list away from the quay wall because its mooring lines became taut and were not tended as the tide ebbed. This caused *Fredwood* to roll to port and its weight came onto the protruding sonar tube.
- The sonar tube presented a constant hazard to the vessel on drying berths; its removal once the device had become redundant would have eliminated the threat of damage to the hull planking.
- *Fredwood* was lost because the crew took no emergency response actions when it rolled heavily away from the quay. The skipper and his crew underestimated the danger the vessel was in and were all probably asleep as the water levels rose on the flood tide.
- The Maryport Harbour Authority was not sufficiently resourced to manage and maintain its commercial docks and port safety management system.

## RECOMMENDATIONS

The **Maryport Harbour Authority** is recommended to:

- 2016/153**      Ensure that sufficient resources are in place to manage its commercial docks and maintain and develop its port safety management system.

## SHIP PARTICULARS

Vessel's name	<i>Fredwood</i>
Flag	UK
Classification society	n/a
IMO number/fishing numbers	BA 338
Type	Scallop dredger
Registered owner	Privately owned
Manager(s)	n/a
Year of build	1975
Construction	Wood
Length overall	19.35m
Registered length	18.44m
Gross tonnage	45.17
Minimum safe manning	4
Authorised cargo	n/a

## VOYAGE PARTICULARS

Port of departure	Garlieston
Port of arrival	Maryport
Type of voyage	Fishing
Cargo information	Scallops
Manning	4

## MARINE CASUALTY INFORMATION

Date and time	6 April 2016; 0830
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	Maryport
Place on board	n/a
Injuries/fatalities	None
Damage/environmental impact	Total loss of vessel
Ship operation	n/a
Voyage segment	Discharge
External & internal environment	Wind SSW F4/5
Persons on board	4