Report on the investigation of

the grounding and subsequent foundering of

fv *Greenhill*

off Ardglass, Northern Ireland

19 January 2006

Marine Accident Investigation Branch
Carlton House
Carlton Place
Southampton
United Kingdom
SO15 2DZ

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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 litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, 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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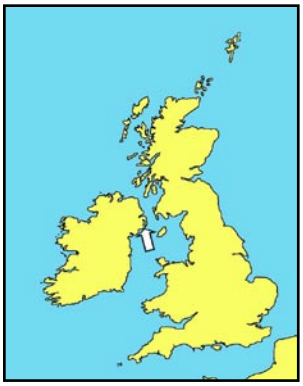
GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ALB	-	All weather Lifeboat
CEC	-	Certificate of Equivalent Competence
CO_2	-	Carbon Dioxide gas
COLREGS	-	Convention on the International Regulations for Preventing Collisions at Sea, 1972
DC	-	Direct Current
DSC	-	Digital Selective Calling
EPIRB	-	Emergency Position Indicating Radio Beacon
GM	-	Metacentric height
GMDSS	-	Global Maritime Distress and Safety System
GPS	-	Global Positioning System
hp	-	horse power
HRU	-	Hydrostatic Release Unit
ILB	-	Inshore Lifeboat
IMO	-	International Maritime Organization
LBP	-	Length between perpendiculars
LSA	-	Life Saving Apparatus
m	-	Metre
MCA	-	Maritime and Coastguard Agency
MFA	-	Marine Fisheries Agency
mHz	-	mega Hertz
mm	-	Millimetres
MRCC	-	Maritime Rescue Co-ordination Centre
N	-	Newton
nm	-	nautical mile
°C	-	degrees Celsius
PSNI	-	Police Service of Northern Ireland
RNLI	-	Royal National Lifeboat Institution
SOLAS	-	International Convention for the Safety of Life at Sea, 1974
”the Code”	-	MCA Code of Safe Working Practice for the construction and use of 15m length overall to less than 24m registered length fishing vessels.”
UTC	-	Universal Co-ordinated Time
V	-	Volt
VHF	-	Very High Frequency

Figure 1

Photograph of *Greenhill*'s port side

SYNOPSIS



At about 1955 on 19 January 2006, fv *Greenhill* grounded on the shore between Ardglass and Ringfad Point on the east coast of Northern Ireland. The vessel was returning to Ardglass with her skipper and two deckhands on board. After the grounding, the vessel was manoeuvred into open water and started to flood rapidly. At 2002 she foundered in a depth of 24m. The skipper and two deckhands initially clung on to the vessel's liferaft canister. The skipper then managed to inflate the liferaft, but it inflated upside down; by the time the skipper managed to right it, the deckhands had disappeared. The skipper was rescued from the liferaft by the Portaferry lifeboat, which had been tasked by the MCA to locate fv *Greenhill* after receiving a distress signal from the vessel's EPIRB. The body of one of the deckhands was later recovered from the seabed close to the wreck of fv *Greenhill*. The body of the second deckhand was not found.

Several factors contributed to the grounding and foundering of fv *Greenhill*, which resulted in the loss of her two deckhands, including:

- The wheelhouse was unattended. The skipper and deckhands were working on the shelter deck from where neither a visual or aural lookout could be maintained.
- When the skipper last visited the wheelhouse, no electronic aids were used to verify the vessel's position.
- Following the grounding, manoeuvring the vessel ahead, and penetrations on the vessel's main transverse bulkheads, increased the rate of flooding through the vessel's damaged bow.
- No distress call was made using the VHF DSC function.
- All electrical power was lost because the vessel's generators, batteries and switchboards were fitted low down in the engine room, they were not protected against water ingress, and because the construction of *Greenhill* pre-dated the requirement for a separate, emergency power source for lights and VHF radio.
- It was not possible to retrieve the lifejackets, flares, or immersion suits from their normal stowage in the accommodation space.
- The liferaft inflated upside down, probably due to the skipper and deckhands holding on to the liferaft canister.
- It is possible that the deckhands were struck by the liferaft canister as the liferaft inflated.

Recommendations have been made to the Fishing Industry Safety Group and Seafish with the following aims:

- Improve the standard of watchkeeping on fishing vessels with particular emphasis on the importance of not leaving the wheelhouse unattended when at sea.
- Provide fishermen with practical guidance and instruction on actions to be taken in various emergency situations including the application of damage control procedures following an accident.

Recommendations have also been made to the owner and skipper of *Greenhill* regarding the stowage of lifejackets, the watertight integrity of their vessel(s) internal structure, and the keeping of a proper navigational watch.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF FV *GREENHILL* AND ACCIDENT

Vessel details

Registered owner	:	Private
Port of registry	:	Newry
Flag	:	UK
Type	:	Fishing Vessel
Built	:	1975
Construction	:	Wood
Length overall	:	20.04m
Gross tonnage	:	75
Engine power	:	425hp
Service speed	:	8.5 knots
Other relevant info	:	Draught 3m aft and 2m forward

Accident details

Time and date	:	2002UTC on 19 January 2006
Location of incident	:	54° 15.211 N, 005° 35.755 W, 600m south of Ardglass Harbour, Northern Ireland
Persons on board	:	3
Injuries/fatalities	:	1 fatality and 1 missing, presumed dead
Damage	:	Vessel sunk

1.2 NARRATIVE

(All courses are true and all times are UTC)

1.2.1 The grounding

On completion of hauling at about 1730 on 19 January 2006, the skipper of *Greenhill* set a course of 335° on the autopilot to return to Ardglass, which was about 18 miles to the north-west. Speed over the ground was between 6.5 and 7 knots. The skipper then joined the vessel's two deckhands in the shelter deck **(Figures 1 and 4)**. During the passage, the skipper and deckhands prepared the catch of prawns for market, using a table on the port side of the shelter deck. The skipper returned to the wheelhouse about every 5 minutes to check on the vessel's position and to adjust the course set on the autopilot. He also reset the watch alarm during these visits. The vessel's position at 1847, which was transmitted automatically to the MFA, is shown at **Figure 2**.

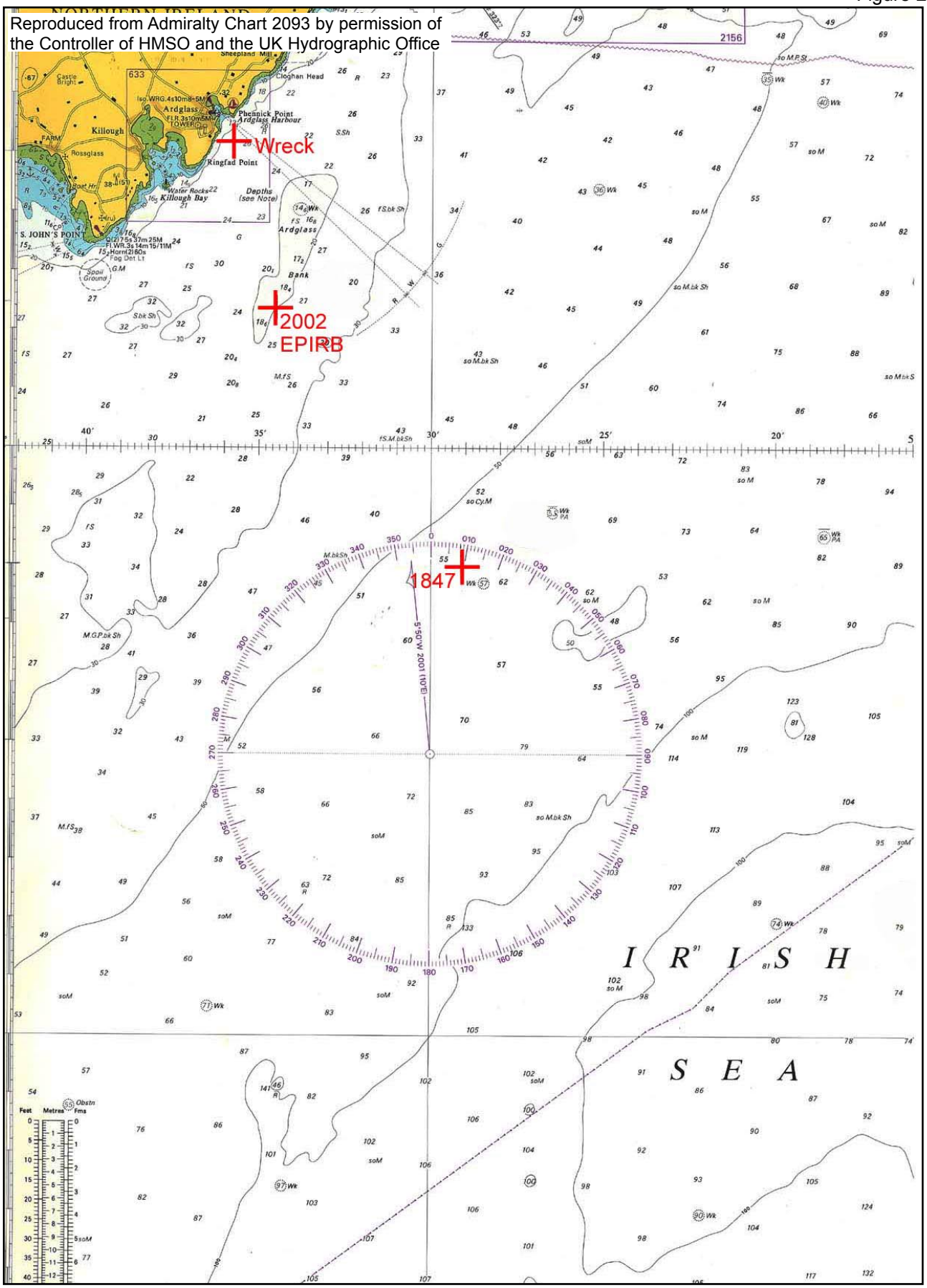
At about 1945, the skipper made a routine visit to the wheelhouse. The red sector of the light in Ardglass **(Figures 2 and 3)** was visible, and he estimated by eye that the ship was about 1 mile from the shore. Neither radar, nor GPS were used to verify *Greenhill*'s position. The skipper then returned to the shelter deck to complete the preparation of the prawns, which he estimated would take about 5 minutes.

Shortly after, *Greenhill* struck the rocky shore between Ardglass harbour and Ringfad Point. The force of the impact was sufficient to throw the skipper and deckhands off balance. The skipper ran straight to the wheelhouse and put the engine full astern. One of the deckhands went forward to check for damage; the other accompanied the skipper in the wheelhouse.

1.2.2 Flooding and foundering

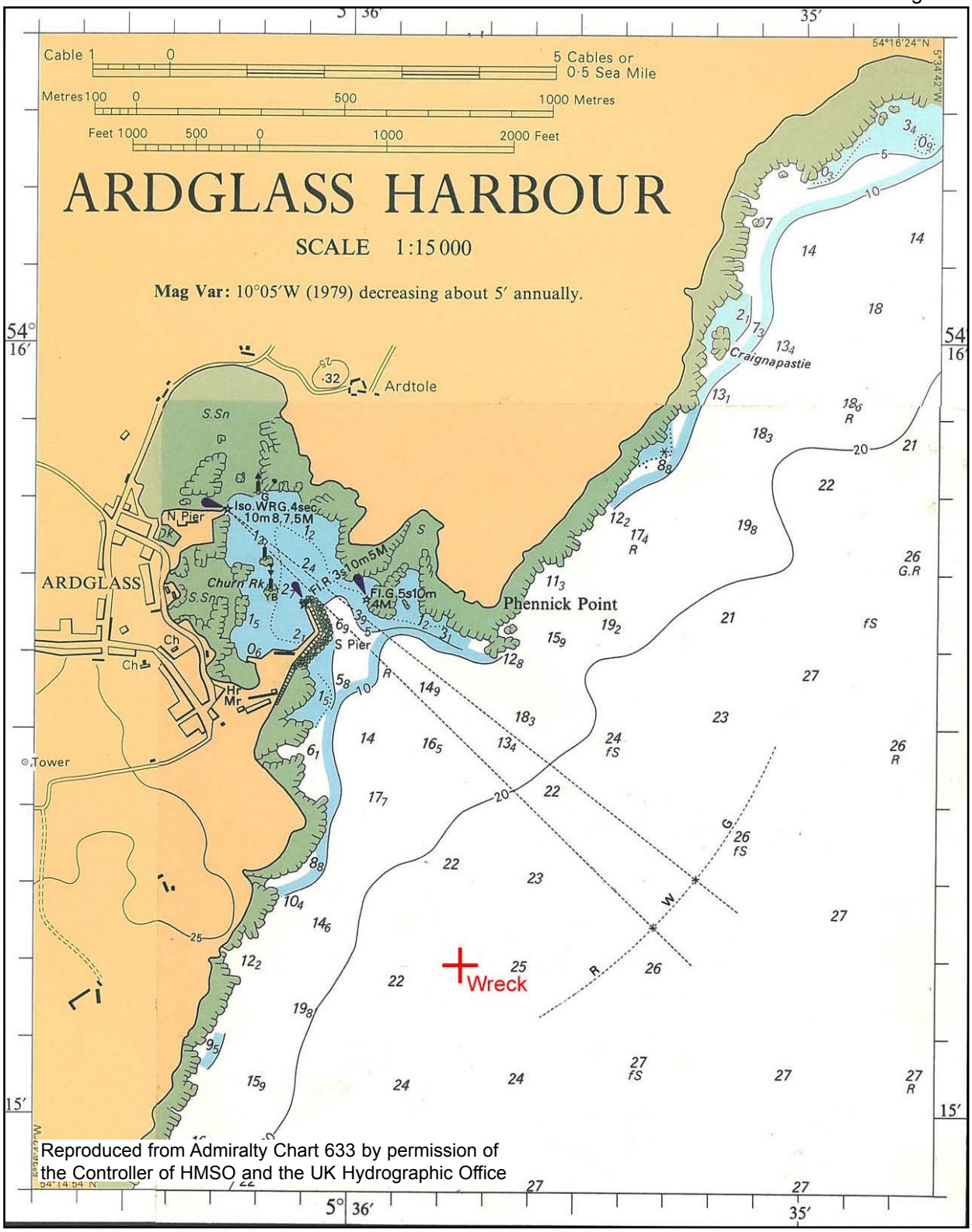
After about 20 seconds of running the engine at full astern, *Greenhill* had cleared the rocks, and was in open water. The skipper then put her engine to full ahead, and turned *Greenhill* to starboard, towards the harbour entrance. The low-level engine room bilge alarm was now sounding and, after telling the accompanying deckhand to steer for the harbour, the skipper went down into the engine room and started the auxiliary engine to power the vessel's secondary bilge pump. This took only a few seconds, during which the skipper saw water entering the engine room bilge through penetrations in its forward bulkhead.

When the skipper returned to the wheelhouse and engaged the secondary bilge pump clutch, the high-level bilge alarm was also sounding, and the vessel had stopped answering the helm. *Greenhill* was heading away from the shore, with the engine throttle still at full ahead. Almost immediately, the deckhand who had checked for damage forward, reported that the forepeak was almost full and the fish room was half full of water. The skipper instructed the deckhands to take off their oilskins and to prepare the liferaft. He then went below to retrieve lifejackets from the accommodation. However, the skipper considered it to be unsafe to enter the accommodation because its access was flooding, and it was unlit following the loss of all electrical power.



Extract of Chart BA 2093

Figure 3



Extract of Chart BA 633

1.2.3 Evacuation

The skipper joined the deckhands on the galley roof and saw that the vessel was now trimmed considerably by the head. Immediately after he released the slip holding the liferaft in its cradle, which the deckhands had been unable to achieve in the dark, *Greenhill* sank. The skipper and two deckhands were left holding onto the floating liferaft canister; the skipper was at the end of the canister to which the painter was secured, and the deckhands held on to either side. When the skipper pulled the painter, the liferaft inflated, but it was upside down. The deckhands had difficulty holding onto the inverted liferaft and it took the skipper several attempts to right it. By the time he was finally successful, both deckhands had disappeared.

The skipper climbed into the liferaft. The light in its roof was working, and the skipper located survival rations and water sachets. However, he could not find a torch or flares. The door of the liferaft was initially kept open to keep a lookout for the two deckhands, but was later closed to stop waves from entering. The skipper did not cut the liferaft's painter, which was still attached to *Greenhill.*

1.2.4 Search and rescue

When *Greenhill* sank, her Emergency Position Indicating Radio Beacon (EPIRB) was released, and the Maritime Rescue Co-ordination Centre (MRCC) in Falmouth detected its signal at 2002. The signal was quickly identified as belonging to the EPIRB registered to *Greenhill*, and by 2016, sufficient data had been received from the EPIRB to enable its position to be calculated with a 66% probability of accuracy **(Figure 2)**. This information was passed to Belfast Coastguard, which immediately attempted to contact *Greenhill*, and at 2020, tasked the Portaferry RNLI Inshore Lifeboat (ILB) to try and locate the vessel.

On leaving Strangford Lough, about 6nm to the north of Ardglass, the ILB encountered strong southerly winds and up to 5m seas, which reduced the speed at which the boat was able to transit safely. As the boat rounded Phennick Point **(Figures 2 and 3)**, the crew of the ILB smelled diesel fuel, and recorded its position. The ILB arrived in Ardglass at about 2100 and, by chance, met the owner of *Greenhill* who was on the deck of *Olive Branch*, another fishing vessel he owned. The owner stated that he had not seen *Greenhill* and that he had expected her to have already returned. After the owner attempted to contact *Greenhill* on VHF channel 13, the working channel for Ardglass fishing vessels, the ILB returned to the position where diesel fumes had been detected and commenced a search. At 2120, the liferaft was found off the entrance to Ardglass, and *Greenhill'*s skipper was transferred to the ILB and taken to hospital ashore.

The Newcastle All weather Lifeboat (ALB) later attempted to recover the empty liferaft, but found it made fast beneath the water surface. On the instruction of Belfast Coastguard, the ALB left the liferaft in its position, as it was possibly attached to the wreck. When the ALB returned between 20 and 30 minutes later, the liferaft had blown ashore. The search for the two deckhands continued using the Portaferry and Newcastle RNLI Lifeboats, Rescue and Police helicopters, the Fisheries vessel *Ken Vickers*, and a number of local fishing boats. The missing deckhands were not found, and the search was called off at 1538 on 20 January. Items recovered from the sea during the search included the liferaft's torch, repair kit, and all bar one of its flares.

The wreck of *Greenhill* was located 600m from Ardglass harbour **(Figure 3)** on 20 January 2006. The vessel was searched by divers from the Police Service of Northern Ireland (PSNI) and the Army. Reports from these and subsequent dives by local volunteers, indicate that the vessel was embedded in the seabed of hard sand and mud up to the normal waterline, with a slight list of about 5° to starboard. The wheelhouse engine control was set in the 'ahead' position. Damage included: a hole through the bottom half of the vessel's bow; sprung planks; the shelter deck dislodged to port; and the forward part of the whaleback lying down, and over, the port rail.

The body of one of the deckhands was recovered from the seabed near the wreck on 22 January 2006. The postmortem indicated that the cause of death was drowning. To date, the body of the second deckhand has not been found.

1.3 ENVIRONMENT

During the passage from the fishing grounds towards Ardglass, the wind was south, south-west force 5 – 6. The weather deteriorated throughout the evening and it rained periodically. A strong southerly wind and large seas were experienced by the Portaferry ILB when searching for the vessel and during the recovery of the skipper from the liferaft.

Low water at Ardglass on 19 January was at 2015. The predicted tidal stream off Ardglass at 1855 was north-east at 0.4 knots, and at 1955 was south-west at 0.3 knots. The sea water temperature was 8°C. It was dark and overcast. Visibility was good.

1.4 THE CREW

1.4.1 Skipper

The skipper was 26 years old and had been in charge of *Greenhill* for 4 years. He was the son of the vessel's owner, and had been awarded a 2nd Hand Limited qualification in 1998 at the National Fisheries College in Greencastle, Eire. The minimum requirement to be skipper of the vessel was a 2nd Hand Special qualification, and although the skipper had more than the one-year sea experience necessary to have his qualification endorsed to this level, he had not done so. During the MCA statutory survey of the vessel on 24 June 2005, it was identified that the skipper did not hold an appropriate UK Certificate of Equivalent Competence (CEC) for his Irish 2nd Hand Limited qualification. A UK CEC for the skipper's 2nd Hand Limited was later issued to the skipper by the MCA on 9 September 2005. The survey did not identify that the skipper did not hold a 2nd Hand Special certificate, and therefore was not qualified to be in charge of the vessel.

The skipper completed Basic Sea Survival and VHF radio courses in 1996, followed by Basic Fire Fighting, Electronic Navigation Systems, Restricted Radio Telecommunications and First Aid courses in 1998. He had attended a Seafish Ltd Safety Awareness Course in 2002 and was awarded a Global Maritime Distress and Safety System (GMDSS) Short Range Certificate in May 2005, following his successful completion of the prerequisite course.

The skipper had between 7 and 8 hours sleep per night during the 4 nights prior to the accident. He was in good health, had not drunk any alcohol since 14 January 2006, and had not taken any drugs or medication. He was a strong swimmer.

1.4.2 Deckhands

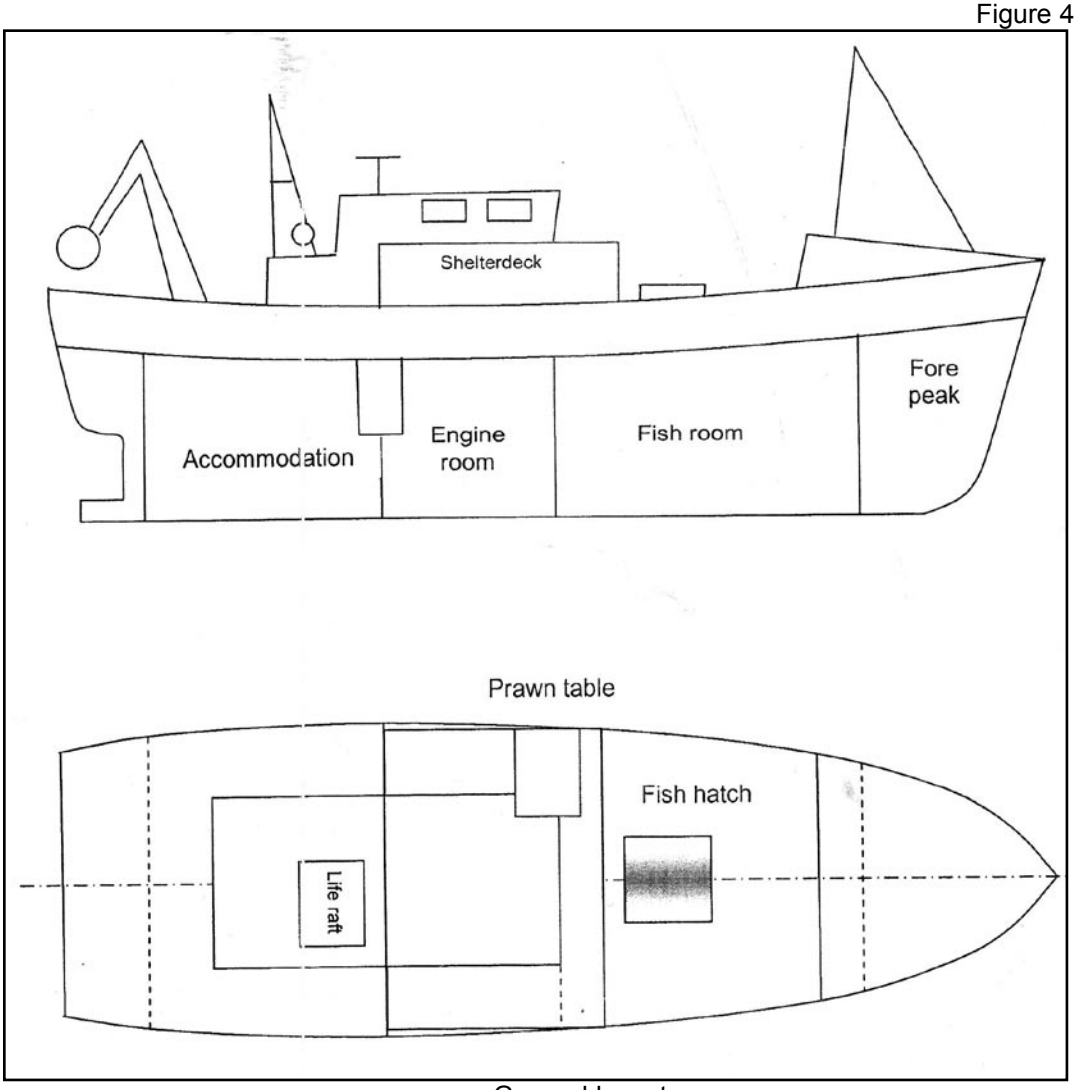
The deckhands were 24 and 22 years old, respectively. The elder deckhand had worked on board *Greenhill* for about 18 months. The younger deckhand had worked periodically on both *Greenhill* and other vessels since leaving school. Both deckhands had attended a Basic Sea Survival course in Kilkeel, and one had also attended Basic Fire-Fighting and First Aid courses. Both were reported to have been in good health and were strong swimmers.

1.5 VESSEL DESCRIPTION

1.5.1 General

A general layout of *Greenhill* is shown at **Figure 4**. The vessel was one of the largest of about 20 boats based in Ardglass harbour. Built as a herring trawler in 1975, the vessel was made of larch on oak in carvel construction. *Greenhill* had a whaleback at her bow and had, in 2004, an aluminium shelter deck fitted forward of the wheelhouse and galley **(Figures 1 and 5)**. The vessel was roll tested on 18 November 2004 to confirm her stability after the shelter deck was fitted. The test results indicated that the vessel's calculated metacentric height (GM) was 0.90m, which was in excess of the 0.69m minimum required for the vessel's dimensions.

Figure 4



General layout

Figure 5

Photograph of *Greenhill*'s starboard side

The shelter deck was enclosed. From inside, it was not possible to see ahead or to either side of the vessel. It was also not possible to hear the VHF radio, or the watch alarm, which were located in the wheelhouse. Entry to the wheelhouse was from aft, via the galley.

The bulkheads between the forepeak and the fish room, the fish room and the engine room, and the engine room and the accommodation space were constructed from vertical planking on both sides with foam sandwiched between, giving a thickness of about 50mm. The bulkheads were not watertight, and the bulkhead between the fish room and engine room contained several penetrations for pipework and electrical conduits. These included hydraulic supply and return lines between the oil storage tank in the fish room and the engine room pump, and conduits for the echo sounder transducer and bilge suction pipework. None of the penetrations had been sealed, and the original 75mm diameter bilge suction pipe had been replaced with a smaller flexi-hose, leaving a gap in the bulkhead.

1.5.2 Lifesaving equipment and emergency communications

To meet the applicable statutory requirements for the carriage of lifesaving equipment, a six person Surviva 6 liferaft manufactured by RFD Beaufort was carried. The liferaft canister was stowed on the galley roof, immediately behind the wheelhouse **(Figure 5)**, and was secured in its cradle by an HRU/Senhouse slip arrangement. It was provided under a hire arrangement by KTS Sea Safety in Kilkeel, and was last surveyed on 5 January 2005. The survey was valid for 12 months. Other lifesaving equipment carried included six lifejackets and pyrotechnic flares, which were stowed in the accommodation area to prevent theft while the vessel was in Ardglass. Two lifebuoys with smoke markers attached were fitted, one on either side of the wheelhouse. Each of the crew had a personal immersion suit, which was kept on their bunks.

Greenhill was fitted with a Skanti VHF radio with DSC capability, and also carried an Icom M IC M12 hand-held GMDSS VHF radio. A 'float free' McMurdo E3 406mHz EPIRB was fitted to the main gantry. On activation, this model of EPIRB broadcasts a signal from which the registered owner of the EPIRB can be determined. The signal is detected by satellite, and the rescue authorities are alerted. Determining the location of the EPIRB is calculated using Doppler techniques, and takes between 1 and 2 hours. The resultant position is accurate to within a 5km radius, with an 87% probability. Other EPIRB systems are available which broadcast a Global Positioning System (GPS) position on activation. These provide an immediate and more accurate position, but are more expensive.

1.5.3 Navigation aids

Navigation aids fitted in the wheelhouse included: a Koden radar display, which was set on the 3 mile range scale and was head up; a Navitron autopilot fitted with a watch alarm set to alert at 4-minute intervals; a Trax chart plotter; two GPS receivers; and a Furuno echo sounder.

1.5.4 Engine room

Greenhill was powered by a 425hp Caterpillar main engine, with a power take off for a 110V generator and bilge pump. Propulsion was via a Twin Disc reversing gearbox. The vessel was fitted with a 140hp Daewoo auxiliary engine, powering a hydraulic pack to drive the winches. A 30hp Lister engine drove a bilge pump and a 110V generator. All three engines drove 24V DC alternators. Three banks of lead acid batteries were fitted, all could be cross connected such that any engine could charge, or be started by, any battery bank. The battery banks were all in the engine room, and sited at or below the deck plates, each covered and fitted with vent pipes. Splash proof, but not water proof, electrical junction and fuse boxes were fitted to the forward bulkhead of the engine room.

1.5.5 Statutory survey

The vessel was last surveyed by the MCA on 24 June 2005 in accordance with the Code of Safe Working Practice for the Construction and Use of 15m length overall to less than 24m registered length Fishing Vessels ("the Code"). A small number of deficiencies were identified, all of which were typical of a vessel of this type and age. At the time of the accident, one item was outstanding from the survey; a seized seacock supplying water to a hand-operated fire pump. Until this defect was rectified, the vessel was required to carry two additional fire extinguishers. During the survey, the vessel's lifejackets were considered to be readily accessible when stowed in the accommodation area.

1.6 OPERATING PATTERN AND MANNING

1.6.1 Fishing pattern

Greenhill mostly fished for prawns, and during the summer months typically fished for two 48 hour trips from Monday to Thursday, and during the daytime on Fridays. In the winter months, or when the weather was unsettled, the vessel tended to operate close to Ardglass, leaving early in the morning and returning at night.

Between 15 and 18 January, *Greenhill* had fished relatively near to Ardglass because the prawns had been close in and the weather unsettled. On 19 January, the weather improved, and the skipper decided that a better catch could be made in the vicinity of a wreck, 18nm south south-east of Ardglass. It took 2.5 - 3 hours to sail this distance. Two, four hour trawls were then conducted with about 30 stones of prawns and some white fish being caught in each.

1.6.2 Manning and watchkeeping

The vessel normally carried five or six crew during the summer, and four during the winter. This had been the case until the week before the accident when the crew had been reduced to three. A relative of the skipper, who had worked on board *Greenhill,* had left the industry at Christmas, and a foreign deckhand employed during the previous week had also left. It was reported that although Eastern European deckhands were available, the recruitment of experienced local crew was difficult.

Tailing prawns is labour intensive, and it was the skipper's normal practice to work in the shelter deck while on passage. Although the deckhands were experienced and their wages were linked to the weight of the catch landed, he considered this supervision necessary to ensure the preparation of the catch was conducted as efficiently as possible, and to be seen joining in with the more mundane tasks on board. The skipper felt that it would have still been necessary for him to supervise the crew and help prepare the catch when underway, even had more crew been carried. The need for skippers to work the catch when returning from the fishing grounds was endorsed by the vessel's owner, who considered this to be a common practice among local fishermen.

1.6.3 Market

Fish landed in Ardglass were either bought by prior arrangement or sent to auction at Kilkeel. Fish could be stored in freezers in Ardglass, or immediately transported by lorry. Fishing boats tended to be alongside by 2030 to allow the lorries to leave at around 2200. Prices were evenly matched and there was no significant benefit in landing first. Boats expecting to be late alongside could make arrangements with the buyer to either store their catch or delay the departure of the lorries.

1.7 LIFERAFT

1.7.1 General description

The RFD Beaufort Surviva 6 liferaft is one of the smallest SOLAS approved liferafts produced, and is therefore popular with fishing vessel owners and skippers. It has been in production since 1987, with about 750 being manufactured each year, and has current type approval in accordance with International Maritime Organization (IMO) test procedures.

The liferaft is roughly circular and about 2.5m in diameter. It has an inflatable canopy and a foam insulated floor. There is one large access door, with a ledge and foot holds below to assist entry from the water. The entrance is relatively large, and it is important to close it as soon as possible to prevent water ingress, and to prevent losing contents from inside the raft. The liferaft was rated for stowage at a deck height of up to 18m, and as SOLAS regulations require the painter to be an additional 10m in length, the total painter length was 28m. Although designed to inflate the correct way up, external

forces can cause the liferaft to inflate upside down. If this happens, the raft can be righted using tapes secured to the underside. This technique is taught on all Basic Sea Survival courses, and for a liferaft of this size, can be achieved by one person in calm conditions.

The liferaft is fitted with a SOLAS type A survival pack. This is supplied in two, identically sized orange coloured pouches, sealed with tape and secured with webbing straps just inside the door. The lighter pouch contains flares, a torch and a repair kit. The heavier pouch contains survival rations and water. A knife for cutting the painter has its own pocket on the inside of the door frame.

A log card in a watertight plastic cylinder is attached to the raft. This is led out through the canister so that it is visible both in storage and once deployed. Serial numbers and inspection dates are also written indelibly on each survival pouch.

1.7.2 Operation

The liferaft is packed into a cylindrical canister, manufactured in two halves and joined along the length of the cylinder. All heavy items are placed at the bottom of the lower canister, giving a low centre of gravity to ensure that the liferaft floats the correct way up. The canister halves are held together with plastic securing straps, which are crimped adjacent to the canister join. These break under consistent tension to allow the canister halves to 'unfold' cleanly.

Raft deployment is initiated by pulling the painter and releasing a CO_2/nitrogen gas mix at 150 Bar. The gas is released via flexible hoses into two separate liferaft tubes. The inflating liferaft forces the two sides of the canister apart, breaking the plastic retaining straps. This is a violent action.

1.8 REGULATIONS AND GUIDANCE

1.8.1 Code of Safe Working Practice

The Code of Safe Working Practice for the Construction and Use of 15m length overall to less than 24m registered length Fishing Vessels ("the Code"), which was effective from 23 November 2002, includes:

(With regard to watertight bulkheads -)

The bulkhead arrangement of an existing vessel is acceptable provided that such arrangement continues to remain in efficient service.

(With regard to electrical equipment and installation requirements -)

Arrangements for existing vessels will continue to be accepted.

(With regard to emergency power sources -)

Vessels 18 metres in length LBP and over, constructed before 23 November 1995, may continue to locate the emergency power source inside the engine room, where structural characteristics do not permit relocation.

The Code also requires skippers to familiarise their crew with emergency procedures and conduct monthly drills in either fire-fighting, flooding or launching the liferaft. Details of these should be recorded with a signature in the vessel's log. Lifejackets are required to be stowed either in a deckhouse or other dry and readily accessible position.

1.8.2 Collision regulations

The IMO Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs), describe the requirements for maintaining an effective lookout. Rule 5 states:

"Every vessel shall at all times maintain a proper and effective lookout by sight and hearing as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision".

1.8.3 MCA guidance

The MCA promulgated guidance on safe watchkeeping practices to the owners, operators, skippers and crews of fishing vessels in MGN 84 (F) Keeping a Safe Navigational Watch on Fishing Vessels, which was published in October 1998. The MGN, a copy of which is at **Annex A**, states that:

The wheelhouse must not be left unattended at any time

Further guidance with regard to lookout is contained in MGN 137 (M+F), a copy of which is at **Annex B**.

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

From 15 to 18 January, *Greenhill* sailed at 0600 - 0700 and returned at around 2000 to land the catch. As the skipper reported that he regularly slept for between 7 and 8 hours during each of these nights, fatigue from excessive working hours or lack of sleep is not considered to be a contributory factor in this accident.

2.3 SIMILAR ACCIDENTS

Between 2000 and 2005, the MAIB investigated 28 accidents and hazardous incidents involving fishing vessels where manning issues, including poor lookout, were found to be major factors. In one of these accidents, which occurred in July 2005, two Northern Ireland based fishing boats collided when a vessel which had suffered engine failure, and was drifting, was hit by a vessel returning to port. The skipper of the vessel returning to port had left the wheelhouse to assist his crew with the catch and did not realise that the first vessel had stopped in the water. He also did not hear the warnings made by the crew of the disabled vessel made over VHF radio. After the collision, the vessel which had been drifting sank. In January 2006, the skipper of the vessel returning to port was formally cautioned by the MCA for failing to keep a proper lookout. The MCA Marine Office in Belfast also issued a Safety Alert **(Annex C)** to draw attention to the responsibility of owners and skippers of fishing vessels in relation to the Merchant Shipping (Distress Signals and Prevention of Collision) Regulations 1996, particularly with regard to the keeping of a proper lookout.

2.4 LOOKOUT AND WATCHKEEPING PRACTICE

On his last visit to the wheelhouse, *Greenhill's* skipper estimated that the vessel was 1nm from the shore. At a speed of 6.5 – 7 knots, it would have taken about 9 minutes to cover this distance. Therefore, it is evident that the skipper either underestimated the distance to the shore, and/or stayed on the shelter deck for longer than he had intended. In either case, the grounding could have been prevented had a continuous wheelhouse lookout been maintained, and the vessel's proximity to navigational dangers accurately monitored using the electronic aids available, such as radar and GPS.

Regardless of the number of crew on board, and the absence of pressure to have his catch fully prepared for landing on arrival, it was the skipper's usual practice to leave the wheelhouse unattended to help the crew on the shelter deck. Such action demonstrated that the skipper was influenced more by the social and economic pressures to work with the crew, than the fundamental safety and regulatory requirements regarding wheelhouse manning and lookout. It also indicated that, although the skipper could not see outside the vessel or hear the VHF radio when working inside the shelter deck, he did not appreciate the potential risks of leaving the wheelhouse unattended, even during darkness, and when close to navigational dangers.

Given the approval of this practice by the vessel's owner, its reported use by other local fishermen, and the circumstances of the similar accident highlighted in paragraph 2.3, the dangerous practice of leaving the wheelhouse unattended when on passage may be practised by a number of other skippers in the region. This suggests that the guidance issued by the MCA **(Annexes A and B)**, and the action taken by its Belfast Marine Office **(Annex C)**, has not been heeded, despite references to a skipper's liability to prosecution, and the formal cautioning of a local skipper in 2005.

2.5 DAMAGE AND FLOODING

When *Greenhill* grounded, her skipper's first reaction was to get the vessel clear of the rocks while the crew checked for damage. The skipper was aware that the bulkheads were not watertight and that any flooding could be serious. His priority was to try and save the vessel. Once *Greenhill* was clear of the rocks he therefore put the engine ahead, turned towards the harbour, and started an additional bilge pump.

As *Greenhill* was only about 600m away from Ardglass, this action was perhaps understandable. However, it was taken without any assessment or consideration of the vessel's condition. In addition to the normal effect of water pressure below the waterline, the rate of flooding from a hole at the bow would be considerably increased as a result of the vessel's forward speed. Also, the water pressure generated by the vessel's movement could make the hole larger, resulting in further structural damage to the vessel. Therefore, in view of the degree of damage to the bow seen during the diving surveys of the wreck, the skipper's decision to put the engine ahead is likely to have significantly increased the rate of flooding.

Greenhill was built before the introduction of 'the Code' and therefore did not have to comply with its stringent requirements for bulkhead construction and watertight integrity. Consequently, when the vessel started to take in water forward, it quickly moved through the vessel via penetrations in the main transverse bulkheads, including the forward engine room bulkhead. Although the provision of watertight bulkheads in older vessels is problematic, and is not generally feasible, there appears to be no reason why the main bulkheads in these vessels cannot be made as watertight as possible. The presence of through bulkhead penetrations in *Greenhill,* which were larger than the relevant pipework required, allowed water to ingress into the engine room at a greater rate than would otherwise have been the case. If these penetrations had been packed, the engine room would not have flooded so quickly.

2.6 EVACUATION

2.6.1 Lifesaving equipment

In the absence of any positional data for *Greenhill* after 1847, it has not been possible to determine the precise time, or position, of her grounding. However, based on a speed of about 7 knots, and the approximate timings provided by the skipper, it is estimated that the vessel grounded at about 1955. Therefore, as the EPIRB activated at 2002 when the vessel sank, the crew had only about 7 minutes to prepare for evacuation. Indeed, by the time the deckhands had removed their heavy clothing and were attempting to release the liferaft, it had already become impossible for the skipper to access the cabin to retrieve the lifejackets. Had the lifejackets, pyrotechnics, and the immersion suits been kept in a more accessible stowage, the opportunity for the crew to use them would have been much greater. However, given the rapid sinking of the vessel in this case, the use of constant wear buoyancy aids by the crew would probably have saved their lives.

The crew's immersion in water of about 8°C, exacerbated by large seas, wind, and rain, would have been extremely debilitating. It would have caused the function of their muscles and nerve endings to deteriorate, and impaired their manual dexterity and grip. In these circumstances, it would have been very difficult for the crew to keep hold of the liferaft and, without lifejackets or immersion suits, the likelihood of them drowning was significantly increased.

2.6.2 Loss of electrical supplies

The skipper's attempt to retrieve the lifejackets, and the deckhand's attempts to release the liferaft, were hampered by the loss of lighting, as water flooded the electrical systems. The loss of radio communications at the same time also removed the option of raising the alarm by VHF radio or DSC. The loss of lighting and VHF radio was due to the vessel's generators, batteries and switchboards being fitted low down in the engine room, not being protected against water ingress, and because the construction of *Greenhill* pre-dated the requirement for a separate, emergency power source for lights and VHF radio. In this situation, the use of torches and a portable radio, which were available but not used, would have been of significant benefit.

2.6.3 Liferaft deployment

Although the liferaft on board *Greenhill* was outside its service period and should have been exchanged 2 weeks before the accident, this would not have caused it to inflate upside down. To inflate the liferaft, the whole length of the painter needed to be pulled from the canister. As the skipper did not cut the painter, and the liferaft appeared to be tethered when first approached by the ALB, it is almost certain that the painter was still attached to *Greenhill*'s hull when the liferaft was inflated. Therefore, given that *Greenhill* sank in about 24m of water, most of the 28m of the painter would have been pulled out as she went down. However, during the time it would have taken the skipper to remove the last few metres of the painter, the canister would have provided less support than a single 150N lifejacket. With three people struggling to stay afloat and hold on, it is highly likely that the canister was rotated, causing the liferaft to inflate upside down when the painter was pulled.

Furthermore, once the painter was pulled, the canister halves would have parted with considerable force. If the deckhands were holding onto the sides of the canister at the time of inflation, it is possible they would have been struck by the canister halves, and been either injured or disoriented. In such circumstances, their chances of survival would have undoubtedly been jeopardised. Sea survival courses teach that liferafts should be inflated away from other people in order to reduce the risk of such an occurrence.

Although the skipper was unable to find a torch or any flares when he climbed in to the liferaft, these items were later recovered from the water. Therefore, they must have been in the liferaft when it was inflated. As the liferaft was initially inverted and took several attempts to right it, the sea was rough, it was dark, and the skipper was likely to have been in a state of shock, it is not surprising that the pouch holding the flares and torch became dislodged and was lost overboard without the skipper realising.

2.6.4 Distress alerting

Greenhill's EPIRB was first activated at 2002, and the liferaft was located at 2120. In the circumstances, this was a commendably rapid result. However, while the vessel's EPIRB worked as designed, and the Coastguard was alerted, no positional data was immediately available because of the type of signal transmitted by the EPIRB. Had a distress signal been sent by VHF radio, either by voice or via its DSC function before electrical power was lost, such an alert would have immediately localised the vessel and facilitated a quicker response. Importantly, it would have also alerted other vessels in the area, particularly vessels alongside in Ardglass, which were manned.

2.7 SKIPPER'S QUALIFICATIONS

Although the skipper had held an Irish 2nd Hand Limited qualification since 1998, and had been skipper of *Greenhill* for 4 years, he was not qualified to be skipper because his qualification had not been endorsed to upgrade this to 2nd Hand Special. That the skipper did not hold a UK CEC was identified and rectified during the statutory survey of the vessel conducted by the MCA on 24 June 2005, but the absence of an appropriate endorsement was not. However, in view of the skipper's experience, and the fact that the endorsement of 2nd Hand Limited qualification is an administrative function based on experience, the lack of an appropriate level of formal qualification in this respect is not considered to have contributed to the accident.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES

The following safety issues have been identified from the preceding analysis. They are not listed in any order of priority.

1. Fatigue is not considered to be a contributory factor in this accident. [2.2]

2. This is one of a number of accidents involving fishing vessels caused by poor lookout. [2.3]

3. The grounding could have been prevented had a continuous wheelhouse lookout been maintained, and the vessel's proximity to navigational dangers accurately monitored using the electronic aids available such as radar and GPS. [2.4]

4. The skipper was influenced more by the social and economic pressures to work with the crew, than the fundamental safety and regulatory requirements regarding wheelhouse manning and lookout. [2.4]

5. The dangerous practice of leaving the wheelhouse unattended when on passage may be practised by a number of other skippers in Northern Ireland. [2.4]

6. The skipper's decision to put the engine ahead after the vessel cleared the rocks is likely to have significantly increased the rate of flooding. [2.5]

7. If the penetrations in the main transverse bulkheads had been packed, the engine room would not have flooded so quickly. [2.5]

8. Had the lifejackets, pyrotechnics and immersion suits been kept in a more accessible stowage, the crew would have had a greater opportunity to use them. [2.6.1]

9. In view of the speed at which *Greenhill* sank, the use of constant wear buoyancy aids by the crew would probably have saved their lives. [2.6.1]

10. Given the loss of electrical supplies, the use of torches and a portable radio, which were available but were not used, would have been of significant benefit. [2.6.2]

11. It is highly likely that the liferaft inflated upside down because the crew rotated the liferaft canister when holding on to it while in the water. [2.6.3]

12. The deckhands' chances of survival would undoubtedly have been jeopardised if the canister struck them as the liferaft inflated. [2.6.3]

13. Had a distress signal been sent by VHF radio, either by voice or via its DSC function before electrical power was lost, such an alert would have facilitated a quicker response from the Coastguard and other vessels in the area. [2.6.4]

14. The skipper's lack of an appropriate level of formal qualification to permit him to skipper the vessel is not considered to have contributed to the accident. [2.7]

SECTION 4 - ACTION TAKEN

The MCA has:

1. In February 2006 revised and re-issued its guidance on *Keeping a Safe Navigational Watch on Fishing Vessels* (previously contained in MGN 84(F)) in MGN 313(F).

2. In April 2006, emphasised to its surveyors in its Belfast Marine Office that holders of Irish 2nd Hand Limited and the UK Class II Limited are not entitled to command a vessel.

SECTION 5 - RECOMMENDATIONS

The Fishing Industry Safety Group is recommended to:

2006/190 Explore ways of improving the standard of watchkeeping on fishing vessels, giving emphasis to the importance of not leaving the wheelhouse unattended when at sea.

Seafish Ltd is recommended to:

2006/191 Use this and similar accident investigation reports to facilitate the provision of practical guidance to fishermen on the actions to be taken in various emergency situations.

The Fishing Industry Safety Group and **Seafish Ltd** are also recommended to:

2006/192 Include damage control and actions to be taken in various emergency situations in future safety videos produced for the fishing industry.

The owner and skipper of *Greenhill* are recommended to:

2006/193 On all vessels they own or skipper in the future, ensure that lifejackets are always readily accessible in the event of an emergency, and that all penetrations through main transverse bulkheads are packed wherever possible.

2006/194 Ensure a proper navigational watch is maintained from the wheelhouse of all vessels they own or skipper, when at sea

Marine Accident Investigation Branch
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