MAIB

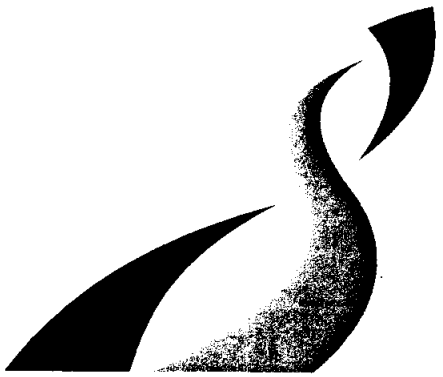
MARINE ACCIDENT INVESTIGATION BRANCH

Marine Accident Report 2/98

Report of the Inspector's Inquiry
into the loss of the Fishing Vessel

"GORAH LASS"

with three lives on 11 March 1997
off Portreath, North Cornwall



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July 1998

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11 March 1998

The Right Honourable John Prescott MP
Deputy Prime Minister and Secretary of State
for the Environment, Transport and the Regions

Sir

I have the honour to submit the report of Captain N Beer, an Inspector of Marine Accidents, on the circumstances which led to the loss of three lives and the fishing vessel GORAH LASS on 11 March 1997.

I have the honour to be
Sir
Your obedient servant

J S Lang
Rear Admiral
Chief Inspector of Marine Accidents

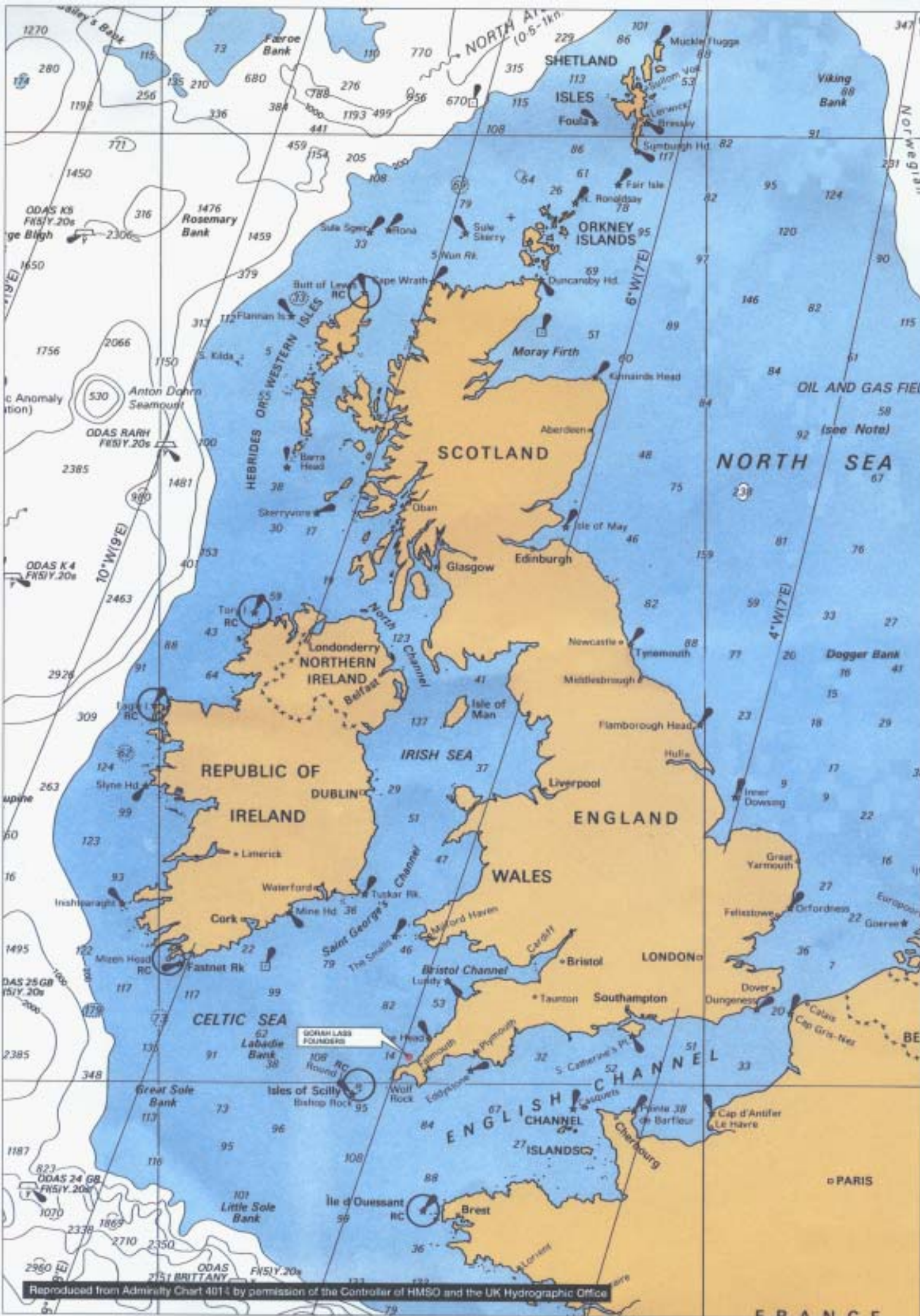
Extract from
The Merchant Shipping
(Accident Reporting and Investigation)
Regulations 1994

The fundamental purpose of investigating an accident under these Regulations is to determine its circumstances and the causes with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame.

CONTENTS

Glossary of Terms and Abbreviations

GPS	Global Positioning System (satellite navigator)
GRP	Glass Reinforced Plastic
katabatic wind	local wind caused when cold air from high ground flows down over a comparatively warm sea
M Notice	Merchant Shipping Notice issued by the Marine Safety Agency
MAIB	Marine Accident Investigation Branch
MSA	Marine Safety Agency (now Maritime and Coastguard Agency)
RNLI	Royal National Lifeboat Institution
VHF	Very High Frequency



Synopsis

The accident was notified to the Marine Accident Investigation Branch (MAIB) at 0928 on 11 March 1997 and an investigation commenced the same day. The investigation was carried out by Captain N Beer, Inspector, with contributions by Mr K Dixon, Principal Inspector, and Mr O Brown, Inspector.

GORAH LASS, a GRP fishing vessel of 7.78m in length with three people on board foundered with the loss of all hands while returning from a successful fishing trip towards her home port of St Ives in North Cornwall. The accident occurred suddenly and without warning at about 0455 in weather conditions which were described as "nasty" by the only witnesses, the Skipper and crew of another fishing vessel who raised the alarm.

An extensive search of the area began within minutes. The bodies of the two crew members, along with various items of wreckage, were recovered later in the morning. Despite all efforts that day, and a continuing search of the shoreline over subsequent days, the body of the Skipper has not been recovered.

The initial investigation, which included a survey of the wreck by divers, was unable to explain the reason for the loss of the vessel. In order to assist with the investigation the MAIB contracted a firm of divers to recover the wreck. A full survey of the vessel and analysis of her stability was then undertaken.

The investigation has concluded that the vessel was swamped by one or more waves which were unable to drain rapidly from the decks. The additional weight of water on deck and sudden reduction in stability caused the vessel to list and then to capsize and founder. The lives of all three people on board were consequently lost. The lack of a liferaft and the fact that lifejackets, and other emergency equipment were not readily available were contributory factors in the loss of life.

Two recommendations arising from the investigation have been directed to the Maritime and Coastguard Agency (MCA) with the aim of encouraging research into the behaviour of small fishing vessels in rough seas and improving methods of promulgating the simple safety messages which are at the heart of this accident.

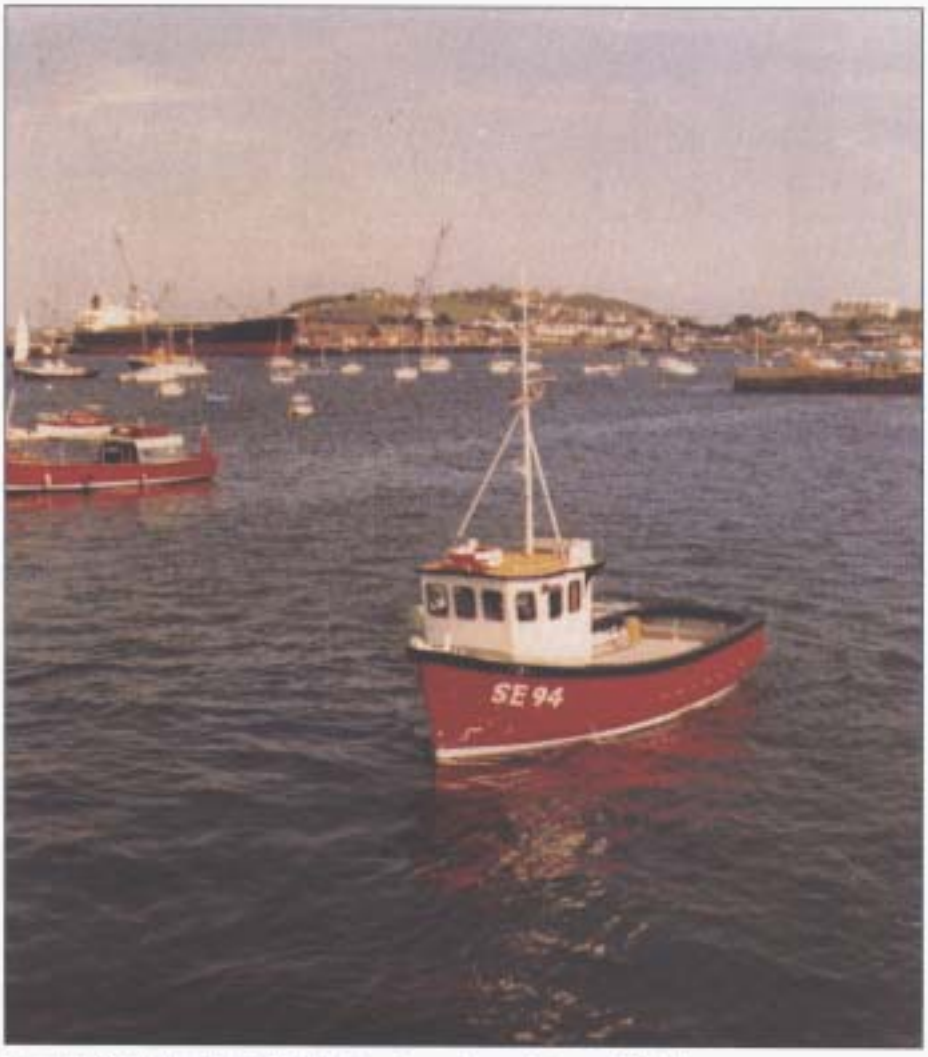


Figure 1: "Gorah Lass" in 1977 (Photograph courtesy of Cygnus Marine)

Vessel and Incident Particulars

Vessel Particulars:

Name:	GORAH LASS
Type:	Fishing Vessel/Netter, Cygnus 26
Fishing No:	SE 94
RSS No:	A22576
Port of Registry:	Salcombe
Year of Build:	1977
Material of Construction:	GRP
Registered Length:	7.78m
Depth:	0.90m
Gross Tonnage:	4.03 tons
Place of Build:	Falmouth
Propulsion:	Ford Sabre 60 kW
Speed:	Approximately 8 knots
Owner and Skipper:	P W Benney (deceased)
UKFV Certificate:	N/A
Crew:	3 (including Skipper)

Accident particulars:

Date of Accident:	11 March 1997
Time of Accident:	0455 hours
Type of Accident:	Capsize
Place:	Off Portreath, North Cornwall 50°17'92N 05°19'75W
Weather Conditions:	Wind SE force 5/6, steep seas, moderate visibility in mist patches.
Sea Temperature:	9°C
Damage:	Vessel lost (later recovered)
Injuries:	All three crew lost their lives
Pollution:	Minimal – from diesel fuel oil

SECTION 1
Factual information

1.1 BACKGROUND TO THE VOYAGE

The Skipper of GORAH LASS operated various fishing methods from the vessel, depending on the season. At the time of the accident GORAH LASS was carrying nets designed to catch Dover sole.

Every Skipper has his own method of arranging the rig and deploying sole nets. The length of each net used is one variable factor. Some Skippers choose to arrange their nets in 457m (500 yd) lengths, others in 914m (1000 yd), 1371m (1500 yd) or 1829m (2000 yd) lengths. Whatever the length each rigged net is locally referred to as a "tier". Each vessel will carry a number of tiers of nets depending on the Skipper's preference and the size of the vessel.

At the time of the accident GORAH LASS was carrying five tiers of sole nets, each of 1829m in length. Each net was transported to and from the fishing grounds in a plastic net bin. 1829m of sole net is as much as it is possible to get into a standard net bin.

The nets when deployed, are designed to lie with the lower weighted side on the sea bed and the higher buoyant side about 2 metres above the sea bed, (see Figure 2). Some Skippers shoot their nets and leave them deployed over a full tide before returning the following day to haul them. Others, like the Skipper on GORAH LASS, prefer to shoot them at dusk and remain by them before starting to haul them at about midnight. Dover sole are known to feed during this period.

The nets not only catch sole but other fish, crabs and anything else the tidal stream pushes into them. A quantity of garbage is unavoidably collected in the nets off the north Cornish coast having drifted down from towns and cities further east. For this reason many fishermen choose not to use sole nets during spring tides. It also follows that the longer the nets are deployed the more rubbish and non commercial fish are caught.

Each Skipper has his preferred location for deploying his nets. Skipper Benney on GORAH LASS generally deployed his nets in an area about 5 miles off St Agnes Head, (see Figure 3 – Chart Extract). Suitable ground for sole netting has to be unofficially agreed locally to avoid conflict between trawlers and other fishermen.

Figure 2 **One End of a Typical Sole Net Rig** *Not to Scale*

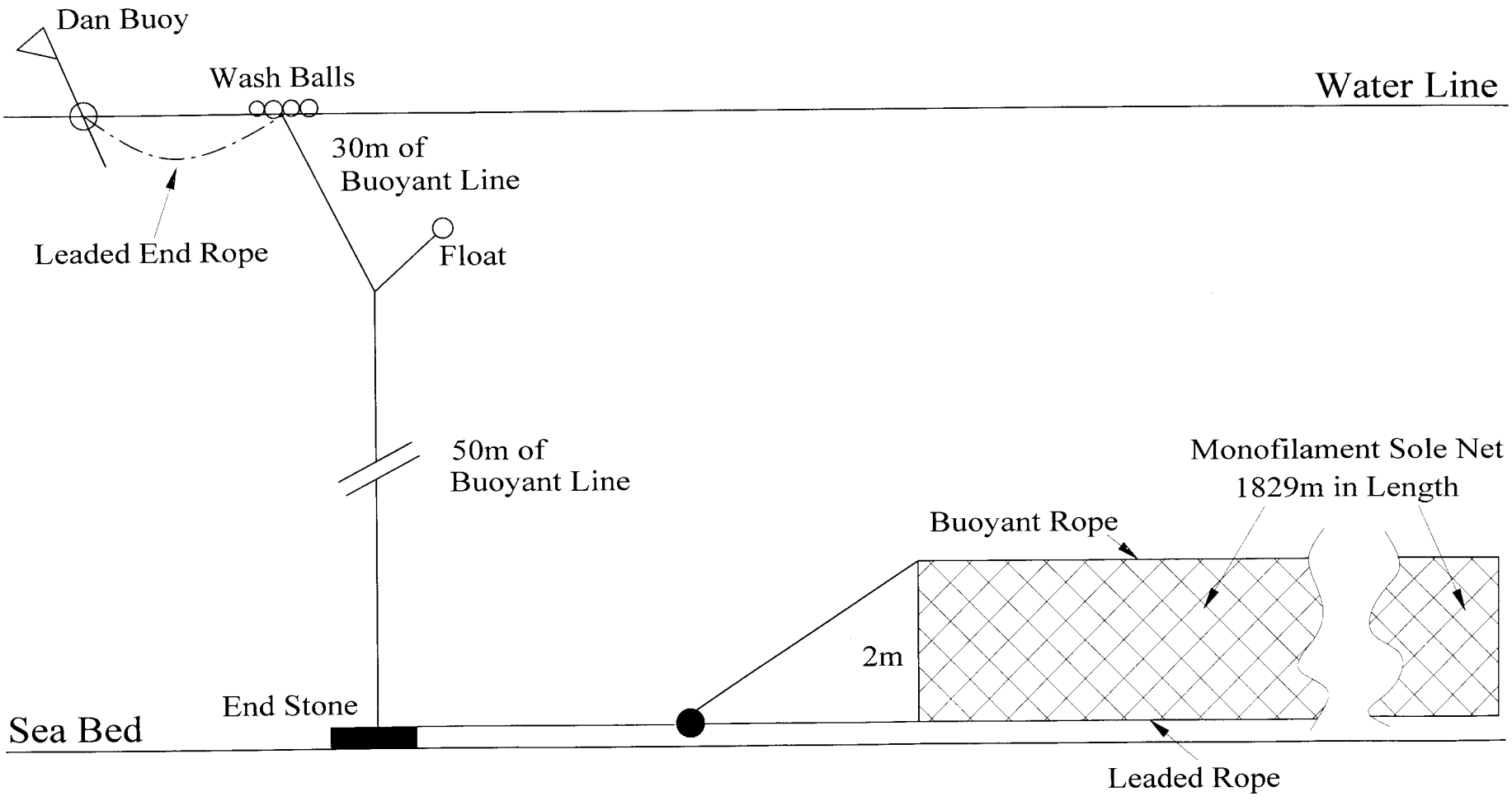
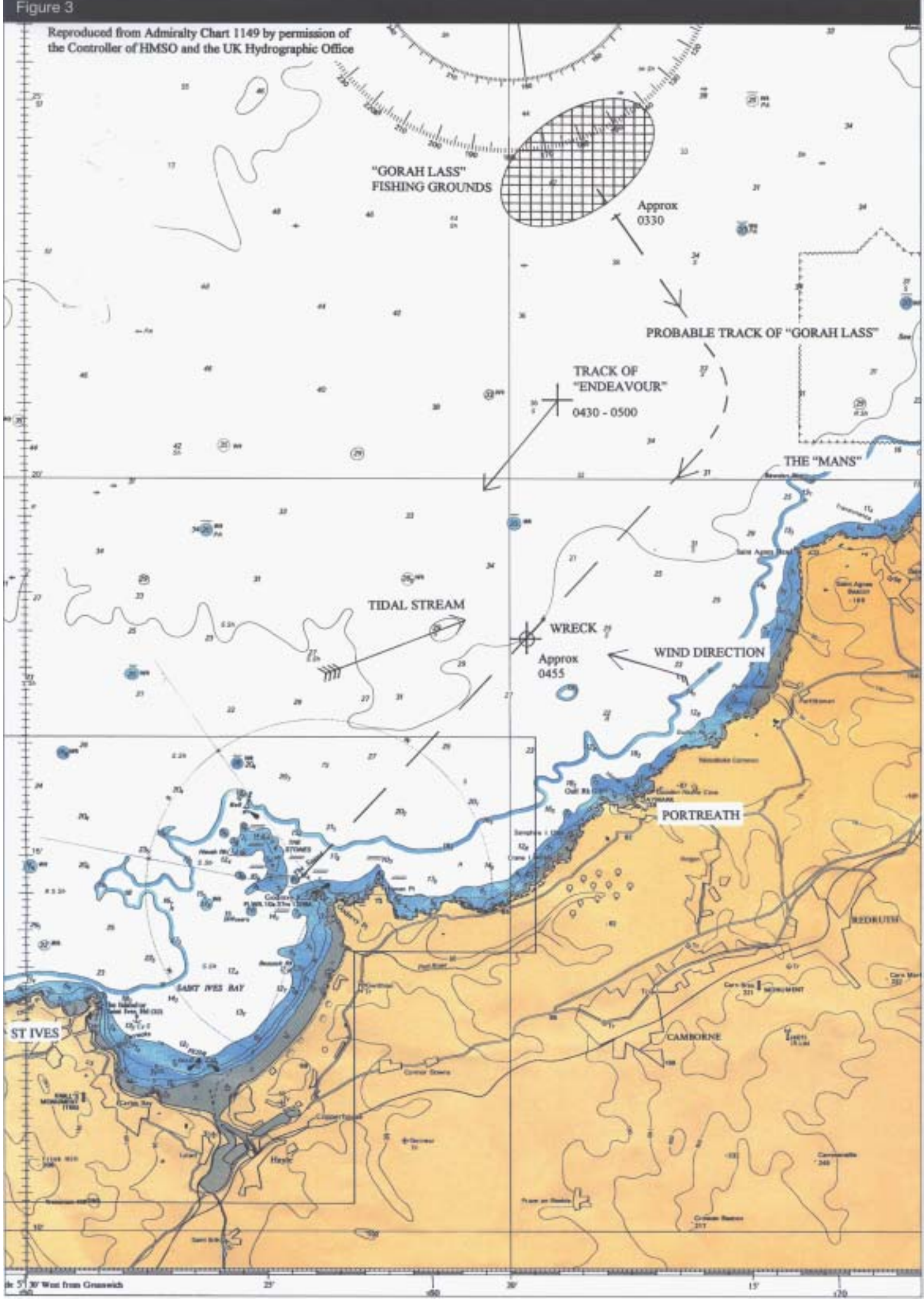


Figure 3


Reproduced from Admiralty Chart 1149 by permission of the Controller of HMSO and the UK Hydrographic Office
"GORAH LASS" FISHING GROUNDS
Approx 0330
PROBABLE TRACK OF "GORAH LASS"
TRACK OF "ENDEAVOUR"
0430 - 0500
THE "MANS"
TIDAL STREAM
WRECK
Approx 0455
WIND DIRECTION
PORTREATH
REDRUTH
CAMBORNE
ST IVES
SAINT IVES BAY
Hayle

1.2 NARRATIVE OF THE VOYAGE

The Skipper and the usual two crew of GORAH LASS met on the vessel on the morning of Monday 10 March, 1997. During the day the Skipper refuelled GORAH LASS while the crew prepared the vessel and her five tiers of nets. The Skipper telephoned the Harbour Master's Office at 1530 for a weather forecast. Having received a favourable forecast (see Annex 1) which indicated the wind would fall calm close inshore overnight, GORAH LASS put to sea at 1620. The wind at the time was from the south-east about force 4.

During the thirteen mile passage to the fishing grounds the Skipper called another fishing vessel, ENDEAVOUR-A, using the VHF radio. The Skipper of ENDEAVOUR-A had been intending to return to harbour because of the poor conditions. However the Skipper of GORAH LASS was able to inform him that the weather forecast indicated the wind would fall to calm overnight. On the strength of this ENDEAVOUR-A's Skipper decided to remain out trawling his normal grounds off Portreath. ENDEAVOUR-A is 11.3m long and, like GORAH LASS, built by Cygnus Marine.

GORAH LASS arrived at her fishing grounds and shot her nets at about 1745 as planned. She remained by her nets and began to haul them at about midnight.

At about 0330 on Tuesday 11 March the Skipper called the ENDEAVOUR-A's Skipper on VHF Channel 8 and informed him they had picked up their nets and, due to the poor weather, intended coming inshore towards Bawden Rocks, known locally as "The Mans" (see chart extract), before heading along the coast for the return passage to St Ives. The Skipper said he was "very well satisfied" with his catch and would say more when they saw each other after the market. The wind at the time was described by ENDEAVOUR-A's Skipper as south-easterly force 5 and the sea, being affected by the offshore wind against the spring flood tide, as "not at all comfortable". Additionally there was a large ground swell coming in from the west. Visibility was moderate but poor in mist patches.

Skipper Stevens and his crewmember started hauling their trawl net at about 0430 at which time GORAH LASS's side light was seen about two and a half miles away. The wind had freshened by this time and the visibility had improved. ENDEAVOUR-A was in approximate position 50°18'N 05°21'W.

Approximately twenty minutes later, when ENDEAVOUR-A had nearly finished hauling, her crew member remembered seeing the working deck lights of GORAH LASS. A few minutes later and as he emerged from the engine room, the Skipper's attention was caught by a sound from the VHF radio. He cannot recall exactly what he heard but assumed it was Skipper Benney trying to call him. Few other local vessels were out that night.

Although not alarmed by the call, the Skipper tried immediately to call GORAH LASS on Channel 8. He received no reply and, puzzled, tried calling on other channels but failed to get a response. By this time he had become concerned. He turned off his deck lights and together with his crewmember, looked for any sign of GORAH LASS. There was none. The Skipper then checked the radar but again saw no trace. He immediately called the Coastguard to inform them of his concerns.

The Skipper and crew of ENDEAVOUR-A describe the weather at this time as having been "nasty". For a period of about one to one and a half hours the wind had freshened, creating short sharp seas of about 1.5 metres and whipping the tops off the waves. Although ENDEAVOUR-A took no water on deck, it became very wet with spray and,

according to the crew after the accident, would have been difficult to keep ones footing on deck.

Falmouth Coastguard received the call from ENDEAVOUR-A at 0458. They immediately tried calling GORAH LASS themselves but, failing to receive a reply, alerted St Ives RNLI Lifeboat and called for the Search and Rescue Helicopter, R193. At 0516 they broadcast a Mayday relay.

1.3 SEARCH AND RESCUE

Having alerted the Coastguard at 0458, the Skipper of ENDEAVOUR-A and his crew calculated the position where GORAH LASS had last been seen as 50°16'9N 05°19'85W. They passed this information to the Coastguard and started their own cautious search of the area. As it was dark, and they could not risk running down survivors in the water, they proceeded at very slow speed.

The St Ives lifeboat arrived on scene at 0542 and Rescue Helicopter R193 at 0605. In addition a search of the coastline by Auxiliary Coastguards got underway while other lifeboats and fishing vessels, including ASPER and CELTIC LASS from St Ives, proceeded to the area to assist in the search.

Nothing was found of GORAH LASS until daylight when fishing buoys attached to her nets were located. It was thought that these indicated the likely position of the vessel in 34 metres depth of water. A diver was deployed from the rescue helicopter but was unable to confirm the presence of a wreck as his equipment restricted him to go to a depth of 32 metres. At 0757 the Skipper of ENDEAVOUR-A, using his sonar, detected a probable wreck in position 50°17'9N 05°19'7W, (see chart extract).

Soon afterwards search vessels recovered the bodies of two crew members, Steven Cooper and William Pirie, and items of fishing and safety equipment from the sea.

At 0952 a diver from the minehunter HMS DULVERTON on Fishery Protection duties, was able to dive on the wreck and confirm it as GORAH LASS. Although it was surrounded by netting he was able to land on the wheelhouse top and shine his torch into the wheelhouse. Although the visibility was only about 0.6m and a tidal stream of about 1 knot was running he ascertained, as far as he was able, that the Skipper's body was not in the wheelhouse.

Despite the efforts of 15 vessels, the rescue helicopter and the teams searching the coastline, the body of the Skipper was not found. The search was called off on 11 March when darkness fell. The coastline search was resumed the following day but without success.

1.4 GENERAL LAYOUT OF THE VESSEL (FIGURE 4)

GORAH LASS is constructed of GRP. She has a small wheelhouse forward and an open after deck. She has two compartments within the hull; a small forepeak store which has open access via two steps forward from the wheelhouse; and an engine compartment situated beneath the wheelhouse and after deck. There is a single watertight bulkhead between these two spaces.

Ready access to the engine compartment is available from the wheelhouse through two small non-watertight floor panels. Additionally, for major maintenance, there are two flush fitting removable plates situated on the after deck. The engine compartment also houses the fuel tank.

There are bulwarks of 0.58m height around the after deck and on the port, non-working, side a single square section tubular railing of stainless steel is fitted above the bulwark for the whole length of the afterdeck. Two open topped rectangular section air vents which serve the engine compartment are tucked-in under the bulwarks towards the after end of the working deck, one on the port and the other on the starboard side. There are fourteen freeing ports fitted at deck level through the bulwarks, seven on each side of the after deck. Each freeing port has a maximum freeing area of 0.0125 m^2. An after "A" frame of stainless steel supports a stainless steel after mast which is rigged to deploy a mizzen steadying sail. The hydraulic net hauler is mounted on the forward starboard side of the after deck.

Mounted on the wheelhouse top there is a short fore mast, a radar scanner and the vessel's lifebuoys. The engine exhaust is carried above the wheelhouse top in insulated trunking.

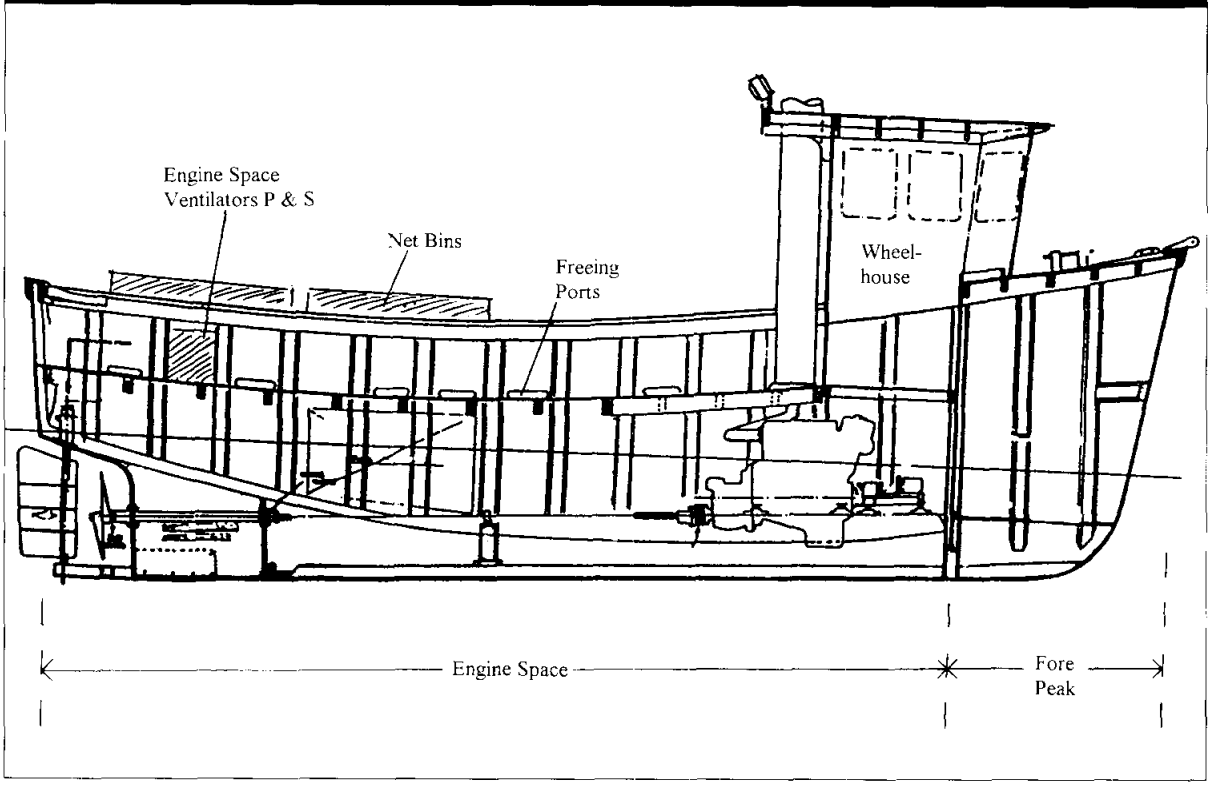
1.5 WHEELHOUSE ARRANGEMENT

The wheelhouse contains the following navigational and communications equipment:

VHF Radio	:	Compact WR Shoreline
Radar	:	Furuno
GPS navigator	:	Furuno GPS 80
GPS navigator	:	Magellan 1200XL
Autopilot	:	Autohelm (belt driven)
Compass	:	Sestrel

The wheelhouse is entered from the after deck by a narrow sliding door situated on the port side. Within the wheelhouse there is just space for three or four men to stand shoulder-to-shoulder. The steering position is sited on the starboard side with an instrument console immediately in front of it comprising switch panel, compass and engine monitoring instruments and controls. The engines can be controlled, by interlinked "Morse" controls, from the steering position and from the after deck adjacent to the net hauler, one lever for gear selection and one for throttle. The VHF radio is mounted on the deckhead above the steering position. The radar is mounted on the console to the left of the steering position with the main GPS on the deckhead above it.

Figure 4 **"Gorah Lass" Profile Drawing** *Not to Scale*



The vessel appears to have been well equipped to navigate in the local area in which the vessel worked. The instrumentation was new.

The VHF set had been bought new in 1997 and had been used successfully earlier during the night of the accident. The Skipper also had a mobile phone on board GORAH LASS which could have operated successfully from the vessel while she was offshore.

1.6 HISTORY OF THE VESSEL

The mould for the "Cygnus 26" hull was developed in 1976. Between 1976 and 1982, 188 hull mouldings were produced, including that of the GORAH LASS. In 1981 the hull design was modified increasing the depth by approximately 380mm and renamed "Cygnus 27". This allowed potential purchasers the option of a vessel with an increased payload and an increased freeboard of between 180mm and 380mm. Additionally an optional design based on the remodelled hull but having increased sheer was also introduced and called "Cygnus 28".

Approximately 50 "Cygnus 27/28" hulls were moulded between 1981 and 1992. Since then only two have been moulded due to a reduction in demand.

GORAH LASS is a "Cygnus 26" vessel built by Cygnus Marine in 1977 for owners based in Salcombe. For nearly ten years she was owned, operated and worked by the same family as a potter out of Salcombe. During this time she had a platform built out over the stern for carrying empty tea chests to store the catch. She had no after mast or gantry. Commonly, the vessel would carry 20 or more empty tea chests on the rack and a fleet of forty pots on the working deck during a passage to the fishing grounds. The payload at such times would have been in the region of 1 tonne. The maximum payload carried might have been as

much as 2.5 tonnes for short periods when a good catch and one fleet of pots were on deck prior to shooting and leaving the pots deployed. The weight of a good catch of crabs might be as much as 1.5 tonne.

The owner of the vessel at this time has described her as a good sea vessel that rolled a lot. He had confidence in GORAH LASS and had, at times, been caught out in force 7 winds without any problems. She had been well equipped with safety gear including a 4-person "Surviva" liferaft fitted with a hydrostatic release. The liferaft had been serviced regularly in accordance with the manufacturer's instructions.

The vessel passed to an owner in Weymouth in 1987 where she was again used as a potter. She carried slightly less weight during this time with the owner indicating the maximum load to have been in the region of 1.5 tonne. This owner, too, said he had confidence in the vessel and that she rolled a lot. He stated he had been out in her in winds of force 5 or 6 off Portland Bill and, if caught out, sometimes in force 7. She was a "wet" vessel and "heavy" in that she drove through waves rather than riding over them. The liferaft had not been serviced during this period of ownership.

Figure 5: GORAH LASS as a Crabber (Photograph courtesy of Cygnus Marine)

Note: Since this time the following changes have been made:

- the liferaft has been removed;
- the platform aft has been removed;
- an after gantry which supports a small mast and the mizzen sail has been fitted;
- the for'd mast has been renewed in stainless steel;
- handrails have been fitted along the port side of the after deck.

GORAH LASS was sold again in September 1988, to an owner in St Ives, who started to use her as a netter. At some stage the platform over the stern was removed and an after gantry and mast built. This enabled the new owner to use a steadying mizzen sail to dampen the rolling. He too commented on the vessel's propensity to roll. The worst weather the vessel encountered during this period was on the delivery voyage from Weymouth where, while rounding Lands End, she had taken several seas. As she was lightly loaded at this time no undue problems were experienced. The liferaft complete with its hydrostatic release was still carried but was not serviced during this period of ownership.

She was purchased by Skipper Benney in 1990 and continued to operate out of St Ives. During his ownership, GORAH LASS was involved in a number of incidents which have been notified to MAIB:

November 1990	–	Engine break down – no further details.
May 1992	–	Flooding – no further details.
December 1992	–	Flooding due to water ingress through transom mounted engine exhaust. RNLI Lifeboat carried pump to vessel which was able to safely make its way back to harbour.
January 1994	–	Mooring leg broke while in St Ives Harbour. Vessel flooded and sank on the incoming tide.
December 1994	–	Fouled propeller and had to be towed into harbour.
December 1996	–	Vessel caught on quayside at St Ives, flooded and sank on incoming tide.

After the flooding incidents in 1992 the MAIB made enquiries about the causes but received no response and recommended the MSA should carry out a random inspection of the vessel. This was done in August 1993. During the inspection a number of deficiencies were discovered and revealed she was carrying no lifejackets, no distress flares, no lifebuoys and no fire extinguishers in contravention of the Fishing Vessel (Safety Provision) Rules 1975 and the Fishing Vessel (Lifesaving Appliances) Regulations 1988. These and some other deficiencies were corrected by the owner. The Surveyor making the inspection noted that the owner was unable to produce a certificate to show the liferaft had been serviced. He also saw the liferaft was lashed in a stowage cradle directly under the radar scanner. The MSA Surveyor advised the owner to service the liferaft and relocate it somewhere where it could float-free in the event of an accident.

Although there is no requirement to carry a liferaft on a vessel the size of GORAH LASS there is a strong recommendation to do so. However the Skipper chose not to heed the Surveyor's advice and told him he could not afford to have the liferaft serviced. He was, in turn, advised that, under those circumstances he should remove the raft from the vessel. This advice was given by the Surveyor on the basis of the general MSA policy and guidance contained in Merchant Shipping "M" Notices and Instructions to Surveyors. This policy is designed to ensure that life-saving appliances carried in excess of statutory requirements meet the minimum standards to prevent a false sense of security and valuable time being wasted in an emergency.

After the flooding incident in December 1996 the vessel underwent essential repairs, modifications and some refurbishment. The work undertaken included:

- the main engine was flushed through;
- the electrical wiring and circuitry was renewed;
- all new electronic navigation, communication and fish finding instruments were fitted;
- a new bilge alarm buzzer was fitted;
- the mild steel after gantry and mast was replaced with a new structure made from light scantling stainless steel;
- a safety rail of light scantling stainless steel was mounted on the port side bulwark capping for the length of the after deck;
- the vessel was tidied up generally and the hull repainted.

GORAH LASS was brought back in service about three weeks before the accident.

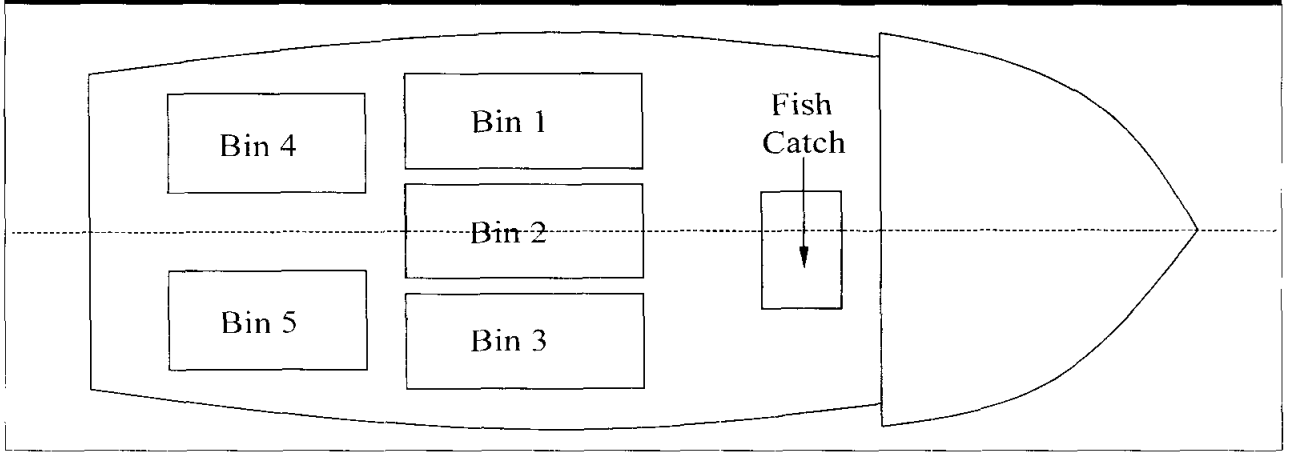
1.7 FISHING ARRANGEMENT

Figure 2 indicates a typical rig for a sole net. It does not necessarily indicate the exact arrangement used by Philip Benney. The "end stones" typically consist of scrap metal, often links of vessel's anchor cable. Each end stone weighs about 8 kg. On GORAH LASS five tiers (rigged nets) each of 1829m were carried. Each tier was stowed in, and shot from, a plastic net bin. Each full net bin, complete with end stones and net, weighs about 160 kg. In the process of shooting a net the net bin is manhandled to the after end of the deck and, at the chosen location, one dan buoy and end stone are thrown into the water. The net is then streamed out over the transom while the vessel steams slowly ahead in the chosen direction of deployment. As the last end of the net goes over the stern the final dan buoy, and end stone, are dropped into the sea.

The process of recovery involves manhandling a dan buoy on board first and then, using the hydraulic net hauler, the end stone and net. As the net is recovered Dover sole are removed from it and stored in a separate smaller plastic bin. If time and weather permits, other fish and crabs may be untangled from the net at this stage. However, this is more usually done on the way back to harbour, or frequently, after returning to harbour when the nets are over-ended and cleaned.

During the passage to and from the fishing grounds, the six bins on GORAH LASS were stowed as indicated in Figure 6. Three of the bins (Nos 1, 2 and 3) fit tightly across the middle of the after deck and are unable to move sideways. Some small movement is possible in the two after bins (Nos 4 and 5) and in the forward smaller bin which is dedicated to the catch.

Figure 6 **Layout of bins and catch**



1.8 THE CREW

Recovering over 9000m of net is a labour intensive operation. GORAH LASS therefore sailed with a Skipper and two, sometimes three, deck hands. On the night of 10 March 1977 the Skipper and two deck hands were on board.

Philip Benney, aged 39, Owner/Skipper of GORAH LASS since 1990, experienced fishermen with no formal fishing qualifications.

William Pirie, aged 40, Deckhand/share fisherman on GORAH LASS just for the 1997 sole and cod season. He was an experienced fisherman who owned his own vessel which was laid up at the time of the accident. He had no formal fishing qualifications.

Steven Cooper, aged 29, Deckhand/share fisherman on GORAH LASS taken on about two weeks before the accident. He had no formal fishing qualifications but was an experienced fisherman.

The bodies of William Pirie and of Steven Cooper were recovered from the sea by search vessels. Post mortem examinations have attributed the cause of death to drowning in both cases. Despite an extensive search the body of the Owner/Skipper, Philip Benney has not been recovered to date.

1.9 WEATHER AND TIDAL INFORMATION

Weather as Forecast

At about 1530 on 11 March the Skipper telephoned from the St Ives Harbour Master's Office and obtained a weather forecast. He later passed this information to the Skipper of ENDEAVOUR-A as having been obtained from "Bracknell". It is concluded that this forecast was the current MARINECALL 2 day inshore forecast for the area Lyme Regis to Hartland Point. The 2 day inshore forecast is available either by fax (METFAX) or over the phone (MARINECALL). The information contained in the forecasts is identical. The METFAX forecast, current at 1530 on 10 March, is included in Annex 1. The forecast was formed in the Southampton Weather Centre in the early hours of the morning and covered the period from 0700 on 10 March, in two sections, first for the first 24 hours to 0700 on Tuesday 11 March and then for the subsequent 24 hours. Although the forecasts are formed by The Met Office their transmission is handled by a private company, Telephone

Information Services plc. The key elements of the forecast, which are of particular relevance to this accident, are the predictions for the wind and sea state covering the first 24 hours. These were as follows:

> " *WIND: Calm or easterly force 1 becoming south-easterly force 2 or 3 by midday and locally touching 4 for a while in the afternoon around the Isles of Scilly and the headlands of south Cornwall as well as in areas more than a mile or two from the coast. The winds will fall calm in many areas close inshore again this evening, especially near the north coast of Cornwall.*
>
> *SEA STATE: Smooth* "

Weather as Experienced

The Skipper of ENDEAVOUR-A, the only other vessel in the immediate vicinity, has stated that at about 0330 the wind had been about force 5 from the south-east. Even though the wind was blowing off the land giving limited fetch in which to build up, the height of the sea waves together with the combined effect of the wind against the spring flood tide created short sharp seas. In addition there were long ground swell waves. The overall conditions were described as "not at all comfortable".

At the time of the accident, about 0500, the wind had freshened and conditions had become "nasty" according to those on ENDEAVOUR-A. They had noticed and remarked on that before they knew that GORAH LASS was in trouble. The seas at this time were estimated to have been about 1.5 metres high superimposed on an underlying long low ground swell. The conditions had abated slightly by the time other rescue craft arrived at the scene.

The Met Office has a wind recording station at Camborne, approximately 5.5 km to the south-south-west of Portreath Harbour, and some 87m above sea level. During the night of the 10/11 March, the wind at Camborne blew consistently from a direction of 110° with a slight veering to 130° after 0100. The mean wind speeds at Camborne decreased through the night from about 18 knots at about 2000 to only 9 knots at the time of the accident. The wind was very gusty however with maximum gusts of 29 knots being recorded at 1900 on the 10 March and around 20 knots at about 0500 on 11 March.

It is difficult to convert these inland winds over high ground to wind speeds over the sea. In general the wind at sea level will be less than the wind over a hill top and this is especially true when the sea is in the lee of the higher ground. However, under certain conditions the wind speed inland can be enhanced by local meteorological and topographical effects to create higher speeds immediately offshore.

The meteorological conditions at 0500 and the topography of the high ground around Portreath were especially conducive to the formation of a local katabatic wind. There is no direct evidence that such a local wind existed on the morning of the 11 March but the comparison between the conditions observed by the experienced fishermen on ENDEAVOUR-A and those recorded at Camborne strongly suggest that some local enhancement of the overall prevailing wind had taken place.

Tidal Stream

The highest spring tides of the year occurred on 11 March. At 0500, the tidal stream where GORAH LASS was lost reflected these spring tides and was flowing at a rate of about 1.5 knots. Although the general direction of the tidal stream off the north Cornish coast at this time was north-east, it is likely the actual tidal stream follows the coastline further inshore and might well have been east-north-easterly at the position of the accident.

1.10 LIFESAVING EQUIPMENT

Lifesaving Equipment Required to be Carried

Under the Fishing Vessel (Safety Provision) Rules 1975 GORAH LASS should have carried the following lifesaving equipment:

- Two lifebuoys, one of which should have attached to it a buoyant heaving line;
- Six red star distress signals.

Additionally under the Fishing Vessel (Life-saving Appliances) Regulations 1988 she should have carried:

- Four lifejackets, of which three are required to be fitted with a lifejacket light.

Lifesaving Equipment Actually Carried

From photographic evidence and reports of equipment recovered by craft involved with the search for survivors on the 11 March, and from an inspection of the vessel and her contents after her recovery on the 19 April, it is deduced that the following lifesaving appliances were carried on GORAH LASS on the 10 March:

- Four Department of Transport approved lifejackets each marked with retro-reflective tape but without lifejacket lights;
- Four red parachute flares which were in date marked "to be replaced by 12/97". Note: The vessel carried other distress flares and smoke signals which were just out of date and marked "to be replaced by 12/96";
- Two lifebuoys.

The flares and lifejackets were carried in separate plastic bags sealed weathertight with adhesive tape or string.

1.11 THE SURVEY AND RECOVERY OF THE WRECK

Underwater Survey

At an early stage of the investigation it was decided to contract a firm of professional divers to inspect the vessel. On 13 March Falmouth Divers Ltd were contracted to inspect and video film GORAH LASS where she lay. To this end their diving support vessel BONITO repositioned from Falmouth to St Ives and enabled an initial underwater survey to be carried out on Sunday 16 March.

GORAH LASS was lying in a depth of about 34 metres and shrouded in monofilament nets. At that depth visibility was restricted by suspended sand in the water and darkness. Each dive was restricted to a few minutes which limited what could be achieved, but an inspection of the outer hull was made and a preliminary inspection of the wheelhouse was carried out. As this was insufficient to determine the cause of the accident the decision was taken to lift the vessel and tow it to Padstow or Newquay.

An attempt was made on Monday 17 March when divers and equipment deployed to the wreck site. After much difficulty, lifting strops were connected to the after gantry and the forward towing bollard. The wreck was successfully lifted clear of the seabed, but the process took longer than expected. She was towed gently into shallow water but because strong winds were forecast for the following day, the plan to take her into harbour was abandoned. GORAH LASS was lowered to the seabed in a depth of 22 metres and her new position was marked by buoys and notified to St Ives Harbour Master and HM Coastguard.

The poor weather generated a fresh problem. It was feared it would damage GORAH LASS and prevent the cause of the accident being determined. To establish her condition a small team of divers re-visited the wreck on 1 April and found it to be in good condition although the net hauler hanging over the side had damaged the hull. Although the sea was calm, the long low ground swell was seen to be moving the vessel. A more thorough survey of the vessel was undertaken on this occasion and some measurements of deck and bulwark heights were made.

Recovery of the Wreck

Following the dive, the available evidence was considered and the decision taken to make a further attempt to recover the vessel. This was carried out by Falmouth Divers Ltd on the 18 April. The intention was to bring the vessel to the surface, pump her out and tow her to Padstow. In the event, the hull was found to have been holed by the continual contact with the net hauler. She was therefore taken to Portreath Harbour where she was allowed to dry out. Over the next low water, temporary repairs were carried out and, on Saturday 19 April, she was lifted out to storage on the quayside at Portreath where a detailed inspection of the vessel was carried out by an MAIB Inspector.

Figure 7: "GORAH LASS" drying out at Portreath. Note: Damage to starboard side caused by contact with net hauler after the accident

General Inspection

The following is a compilation of relevant information gained from underwater video evidence and the various inspections carried out on the vessel after recovery.

- The body of the Skipper was not found on board the vessel.
- At the time of the initial inspection by the diver from HMS DULVERTON the vessel was grounded by the bow with some buoyancy in the stern causing her to lie at an angle to the sea bed of about 30°. She eventually settled on the sea bed to lie slightly on her starboard side.
- The hull was intact and undamaged immediately after the accident.
- All wheelhouse windows were intact immediately after the accident.
- The engine controls were set at about three quarters power ahead.
- The rudder and propeller were largely clear of ropes and netting. The rudder position at the time of the accident could not be established.
- The after deck was empty of equipment and many of the spilled nets were wrapped about the vessel.
- The wheelhouse door was lashed open by its handle.
- The main deck scuppers (freeing ports) were partially blocked by pieces of plastic mesh held in position by screws.
- The VHF Radio was switched "on" with the "squelch" control turned fully "on".
- Lifejackets and flares were untouched in their plastic weatherproof bags.
- All miniature circuit breakers on the main electrical circuits were in the "on" position.
- The sea valve on the intake to the deck wash/bilge pumping system was closed and the other valves on the system were set to pump bilges.
- There was no drive belt connecting the engine driven bilge and deck wash pump to the shaft and no broken belt could be found. (It was later confirmed that the drive belt had been missing on the previous voyage).
- All engine room pipework was found to be intact.
- The electric bilge pump was switched to "pump".
- The bilge level sensor was in position and its wiring was intact.
- The flush-deck fitting watertight hatches situated in way of the after deck were sound and in position.

In addition to the inspections, after recovery both GPS instruments were sent to Furuno, Aberdeen for analysis of their memories. Despite commendable efforts on the part of the Furuno engineers, the information could not be recovered due to the instruments' prolonged immersion at depth.

Figure 8: Plastic mesh blocking scuppers of "GORAH LASS"

Inclining Trial

On 25 April GORAH LASS was returned to the water in Portreath Harbour and an inclining trial was carried out to assess the vessel's initial stability. In addition, measurements were taken of the vessel's draught and freeboard, see Annex 2 – Inclining Trial Report.

1.12 HUMANE AND ENVIRONMENTAL MATTERS

The sea search for the Skipper was called off at about 1600 on 11 March, some 11 hours after the vessel had foundered. The information available at that time indicated a strong possibility that his body was trapped inside the wreck. The only diving survey of the wreck carried out that day had been necessarily brief. Poor underwater visibility, lack of available diving time at depth and the extensive presence of monofilament fishing net meant the inspection of the vessel was limited to positive identification, a description of how she was lying and a brief look inside the wheelhouse.

The failure to locate the Skipper's body was a source of great distress to his family. This was exacerbated by the search and rescue authorities decision to confine the search to the shoreline once they had concluded there was no further hope of finding the Skipper alive in the open sea. The relatives' frustration increased further when they failed to identify anyone who had responsibility for the search and recovery of bodies that might still be in, or attached to, the wreck.

It was no comfort to the family to be told that while every effort would always be made to search for survivors, or that bodies found would, if possible, be recovered, it was not the policy to look for, or recover, bodies that might be trapped in a wreck. The accepted practice that the sea bed is an honourable and dignified resting place, and that the victims of the sea should be allowed to rest in peace, was vigorously challenged. The alternative view was put forward that every effort should be made to search the wreck for bodies which, if found, should be recovered.

A further problem arose at this time; the presence of 9000m + of monofilament net. The Skipper's relatives not only believed his body might be trapped in these near invisible nets, but their very presence constituted an environmental hazard or, indeed, danger to other fishermen. Once again they failed to identify any organisation who might have had responsibility for retrieving the nets. The relatives themselves finally made their own arrangements to recover the nets but failed to locate the body.

Later, and for the purpose of accident investigation, the MAIB arranged for the recovery of GORAH LASS. The Skipper's body was not found in the wreck and remains unaccounted for to this day.

1.13 FORMAL SAFETY ADVICE TO FISHERMEN

At an early stage in the investigation it was apparent that many of the issues being raised were familiar and had already been highlighted in previously issued Merchant Shipping Notices (M Notices) for the fishing industry, and by means of MAIB's *Summary of Investigations*. It became very evident however that neither system was effective. Although both contain information which, if followed and acted upon, would go a long way to saving life, too few fishermen appear to know of their existence or read them. The lessons and advice are not reaching those people to whom they are aimed.

SECTION 2
Analysis

2.1 FUNDAMENTAL CAUSE OF THE LOSS OF THE VESSEL

GORAH LASS did not transmit a distress call. The distress flares which the vessel carried were not used. The crew were apparently unable to don lifejackets, release the lifebuoys or make any other preparation before the vessel foundered. This evidence indicates she was lost rapidly and with little or no warning.

The following possible fundamental causes have been considered.

- **Collision**

  The absence of any damage to the hull rules out collision as the cause of the accident

- **Flooding through the hull**

  The hull had not been damaged. If flooding was the fundamental cause it must have occurred through sea-valves, faults in the internal pipework or past the stern gland. All these items, although not pressure tested, were inspected and found to be intact. Any flooding so caused would have been relatively slow. The evidence suggests that the bilge alarm and electric bilge pump were probably in working order. These facts suggest that flooding was not the cause. Although the post recovery inspection showed the engine driven bilge pump to have been inoperable during the voyage, it is probable the electric bilge pump would have had the capacity to deal with any minor ingress of water. The lack of the engine driven pump was not, therefore, a factor in the accident.

- **Movement of weight on deck causing capsize**

  The vessel had a propensity for heavy rolling. In the moderate to rough conditions prevailing she would have been rolling heavily on the morning of the accident. The fishing equipment and catch provided the main weights on the deck of GORAH LASS. The nets and end stones were stowed inside the net bins. Three of the net bins were wedged in position across the beam of the vessel and could not have moved athwartships, (see Figure 6). Although the two after bins and the small bin containing the catch could probably have moved by a small amount (0.43m), analysis has shown that this would not, on its own, have caused the capsize and loss of the vessel, but it may have been a contributory factor.

- **Swamping causing capsize**

  The vessel had a very low nominal freeboard (0.226m) and low bulwarks (0.584m). On the passage towards St Ives while proceeding parallel to the coastline and heading south-west, she was affected by oceanic swell waves coming from the west. These

would have caused her to yaw, pitch and roll. Moreover the strong wind against tide would have caused steep waves to close the vessel's port quarter. She was heavily loaded and had a reputation to "dig in" rather than to ride over waves. Under these circumstances it is probable that a wave, or a series of waves, broke onto the vessel's after deck, very likely over the bulwark on the port quarter. Any significant quantity of water on deck would have been unable to drain rapidly and could have downflooded into spaces below decks and caused the vessel to list and subsequently capsize. Divers found the wheelhouse door to be lashed open and close inspection showed there was no means of closing the engine room vents. Video film taken by divers confirmed the after deck to be empty and nets wrapped around the hull to indicate the likelihood that GORAH LASS capsized.

All the evidence indicates the fundamental cause of GORAH LASS's loss was swamping followed by rapid capsize.

2.2 OTHER CAUSES CONTRIBUTING TO THE LOSS OF THE VESSEL

Loaded Condition

The vessel is known to have been carrying five plastic bins of sole nets arranged in two rows across the aft deck, as shown in Figure 6. The bins and their contents have an estimated weight of 160 kg each.

In addition to the bins carrying sole nets, GORAH LASS was carrying the night's catch in a smaller bin which was probably stowed on deck immediately aft of the wheelhouse. The conversation which the Skipper had with ENDEAVOUR-A suggests that GORAH LASS had made a good haul that night. For the purpose of the stability analysis, from the records of previous catches, this has been estimated as 254 kg of fish.

Full details of the loading condition which has been assumed for the time of the vessel's loss are shown in Annex 3 Figure A.

GORAH LASS was therefore probably carrying over one tonne on deck which was, by all accounts, the vessel's normal load when operated by Skipper Benney. Other evidence confirms she frequently and successfully carried larger loads in the past when working as a potter off the south coast of England. The size of the load was not a crucial factor but did increase her draught and, therefore, her vulnerability to shipping seas on deck.

Stability

To test the hypothesis that the vessel was lost due to capsize after being overwhelmed by waves, her stability was examined in detail. The analysis was based on the results of the inclining test which was carried out on 25 April 1997, following her recovery from the seabed, (see Annex 2).

The level of stability of the vessel, under the assumed loading condition, is shown in Annex 3 Figure B. This level of stability has been calculated on the basis that the vessel is watertight up to the working deck aft, and watertight up to the fo'c'sle deck forward.

As with many under 12 metre fishing vessels her stability fell far short of the minimum standard required of a fishing vessel of over 12 metres registered length. A comparison between the stability estimated to exist at the time of her loss and the minimum standard for over 12 metres registered length fishing vessels is shown in Annex 3 Figure A.

The stability analysis carried out for GORAH LASS has been based on traditional assessment of the "static" righting levers, and the stability data presented in this report are based on calculations of "static" stability. These analyses show that the vessel's stability disappears when the aft deck and the available volume (taken to be 40%) of bins 1 and 4 are filled with water. [Note: Bins 1 and 4 were already filled with net]. In reality, the loss of the vessel would have been a "dynamic" process influenced by a number of parameters such as the vessel's rolling characteristics, the sea state, water on deck, downflooding and the effectiveness of the freeing ports. On balance the stability of the vessel would have been worse than that indicated by the "static" stability analysis.

Freeboard

GORAH LASS had a loaded nominal minimum freeboard of only 0.226m. But in practice, due to the plastic mesh fitted over her freeing ports, this can be considered as extending to the top of the bulwarks giving a figure of about 0.810m. However even this additional height would not have provided secure protection against waves reported to have been 1.5 metres in height. This is especially applicable to GORAH LASS which was known to be a "heavy" vessel that tended to go through waves rather than ride over them.

The range of stability of a vessel and the magnitude of the maximum righting lever are determined to a large extent by freeboard. A high freeboard is beneficial provided the vertical centre of gravity can be maintained at the necessarily low level. Thus, not only did the low freeboard of GORAH LASS expose her to the risk of taking waves onto the aft deck in adverse conditions, it also ensured that once swamped she lacked the stability to resist capsize.

Rolling in Waves

Several eminent researchers have stated that a high degree of roll damping is a crucial safety factor against capsize when a vessel is rolling heavily in waves. Bilge keels are fitted primarily to damp out rolling, and to prevent excessive roll angles from building up in conditions where this could possibly occur. GORAH LASS was not fitted with bilge keels. At the time of her loss it is believed GORAH LASS was confronting a confused sea with a wind/wave system superimposed in opposition to the prevailing swell. With the wind/waves on her quarter, and without the damping effect of bilge keels, she could have been in a situation where she was rolling to an excessive and dangerous degree. This could have exposed her to shipping waves over the side and to broaching, with the consequent risk of capsize associated with such a violent and involuntary manoeuvre.

Freeing Arrangements and the Use of Net Bins

Water would have been unable to drain quickly from the after deck. The vessel had been designed to Sea Fish Industry Authority Guidelines with regard to the number and size of scuppers (freeing ports). On GORAH LASS, in common with numerous other small fishing vessels, the scuppers had been partially blocked. Fishermen do this to stop fish being lost overboard when handling the catch on deck. Many fit just a single bar across the scupper hole, others block the holes completely. GORAH LASS had plastic mesh screwed into position over the freeing ports which, it is estimated, reduced the capability to free water off the deck by about 80%. This was a factor in the accident. However, even without the plastic mesh guards in position it is thought possible she would have been lost in the conditions prevailing on the night of the 10/11 March. Although the freeing arrangements were built to approved guidelines, freeing might not have taken place rapidly enough to prevent capsize if two or more waves broke onto the deck in quick succession.

Additionally the deck space was well covered with net bins which, although full of net, could still ship and retain water calculated as approximately 40% of the internal volume of

each bin. The net bins in use on GORAH LASS were of a substantial size. They measured about 1.5 metres in length by about 0.76 metres in both width and height. Each of these net bins had about 10 small holes or slits cut into the plastic bottom and lower part of the sides of each bin. These drain holes were, on average, about 18mm in diameter, too small to cope with the large amount of water that might fill the bins when a sea breaks on deck. Drainage would have been very slow.

The water on the after deck and, possibly in the bins, caused the vessel to list and reduce stability and freeboard to make her more vulnerable to following seas.

Meteorological Information

The Skipper prudently telephoned for a forecast before he left port. Having received one that was favourable at 1530 on the afternoon of 10 March (see Annex 1) which indicted the wind would fall calm overnight, his decision to embark on the voyage was entirely reasonable. It was this weather information that he passed to ENDEAVOUR-A during his passage to the fishing grounds. It might also have been this information that, some twelve hours later, persuaded him to come closer inshore during the return passage to St Ives.

Once at sea however, and as the night progressed, it would have become apparent to the Skipper that the wind was stronger than forecast. It would then have been prudent to have obtained the latest weather forecast available. Although an updated MARINECALL weather forecast was available for transmission from 1900 in the evening of 10 March there is no evidence that GORAH LASS obtained this information either directly, through telephoning the MARINECALL line, or by VHF radio through the Coastguard. The updated forecast predicted south-easterly winds of force 3 or 4 through the night and moderate seas. Had this forecast been obtained however, it is unlikely it would have persuaded the Skipper of GORAH LASS to alter his plans.

Weather forecasting is not an exact science. Mariners are advised to treat all weather forecasts as guidance and to obtain updated information when it becomes available. When sea conditions are worse than forecast and become marginal for small vessels which are dependent on fair weather for safe operations, they should adjust to the new circumstances and consider a range of options including heaving to, seeking more sheltered waters or even abandoning the voyage. On 11 March GORAH LASS found herself, unexpectedly, in weather conditions rougher than she was able to withstand.

Choice of Route – Passage Plan

The Skipper of GORAH LASS commented on the poor weather at his fishing grounds and chose an inshore route for the return journey to St Ives in an attempt to seek more sheltered waters. The fact that the Skipper chose to deviate from the direct passage back to St Ives is indicative that the vessel was being badly affected by the conditions. It is likely that the weather forecast he had received at 1530 the previous day, indicating that the winds would fall calm close inshore off the north Cornish coast overnight, persuaded him to choose an inshore route. In the event it is possible that his choice of route was a factor in the accident.

By choosing to come closer inshore he brought the vessel into shallower water in the bay off Portreath. As explained earlier the prevailing wind was probably enhanced by both katabatic and funnelling effects in the sea area off Portreath. Additionally, in bringing the vessel further into the bay, it is possible that he moved the vessel into an area where the

strong tidal stream curved in and around the shallow bay formed between Godrevy Point and Penhale Point becoming more east-northeasterly and therefore more directly opposed to the wind.

The Skipper chose a prudent route bearing in mind the forecast information. However, the choice of route may have, albeit inadvertently, brought GORAH LASS into the less favourable wind and sea condition which was a major factor in the loss of the vessel.

2.3 LOSS HYPOTHESIS

The precise circumstances surrounding the loss of GORAH LASS will never be known. However, a hypothesis is suggested which fits the known facts of the case.

i) The vessel was rolling heavily under the influence of the swell waves on her starboard bow and wind waves on her port quarter. In the darkness the height of the waves was difficult to judge.

ii) As a result of her heavy rolling GORAH LASS immersed her bulwark rail and took a substantial quantity of water over the side onto the working deck. This may or may not have been associated with her broaching .

iii) The free water on deck was unable to drain rapidly and she listed heavily to one side.

iv) Possibly bin 4 or 5, and the catch bin, slid to one side exacerbating the list.

v) Water downflooded into the fore-cabin and engine space through the open wheelhouse door.

vi) In quick succession, and due to her heavy list, she took further waves onboard which caused her to capsize and sink.

As designed, equipped and loaded on 11 March, GORAH LASS was especially vulnerable to shipping seas on deck and, with weathertight doors and vents open, to downflooding over the low sill to the wheelhouse door and through the open engine room vents. Furthermore, her partially blocked scuppers and the slow draining net bins meant that she was incapable of surviving a succession of waves breaking onto her after deck. She was not suited for safe operations in the sea conditions that prevailed that morning and there is no evidence to indicate the Skipper was aware of the danger he and his crew were in.

2.4 STABILITY REQUIREMENTS FOR UNDER 12M FISHING VESSELS

Whilst the stability regulations for over 12 metres fishing vessels have been shown to impose a reasonably effective and adequate standard of stability on those vessels, nothing similar exists for under 12 metre vessels. Indeed very little is known about the dynamic behaviour of small fishing vessels in rough seas. For example, it is not known what level of stability is required to avoid capsize. There is little research information on the importance of bilge keels, the likelihood of broaching-to, the likelihood of vessels shipping waves on deck, the effectiveness of freeing ports and the importance of adequate freeboard.

GORAH LASS, in common with all fishing vessels of under 12 metres was not required to meet any statutory regulations. Consequently, her stability characteristics had not been examined at any time prior to her loss. However, the stability of under 12m fishing vessels in general has been a subject of concern. The development of stability standards for under 12m vessels was thus integral to the development of a draft 'Code of Safe Practice for Registered Fishing Vessels less than 12m length'. Consideration of those standards by MSA, Sea Fish Industry Association and industry members of a working group resulted in an Annex on stability in the draft Code on which industry was formally consulted. The industry has received the draft code unfavourably and, as a result, discussion with industry on a revised draft Code is now underway. Whilst we cannot anticipate the outcome of those discussions they are unlikely to produce a more onerous code and it should be noted that, in terms of stability under the draft code, as "an existing vessel with a history of successful operation", GORAH LASS would not have had to be examined. There is every prospect that further accidents with loss of life will occur until such time that the stability characteristics of ALL small fishing vessels are scrutinised.

2.5 GORAH LASS – BASIC DESIGN

GORAH LASS was one of 118 vessels built in GRP from the Cygnus 26 mould. The vessel operated successfully for twenty years prior to this accident. However, the investigation has identified shortcomings in the GORAH LASS's design in terms of her freeboard, stability, propensity for rolling and potential for downflooding. The same shortcomings do not necessarily exist to the same degree for other vessels coming from the Cygnus 26 mould. Although each hull was taken from the same mould, fitting out has always been arranged to suit the particular requirements of the individual purchaser. The exact draught/freeboard, height of deck, arrangement of wheelhouse, arrangement and equipment on the working deck, freeing arrangements and mast arrangements are unique to each vessel delivered. In common with other manufacturers of this size of vessel, the stability of individual vessels delivered is not usually analysed.

Additionally, in 20 years of operation, GORAH LASS had undergone many modifications which to a greater or lesser degree affected the vessel's stability and operational characteristics. Further, the loss of GORAH LASS was influenced by operational factors such as the freeing ports being partially blocked, the characteristics of the net bins and the wheelhouse door being lashed open.

With many unknown and incalculable factors influencing the loss of GORAH LASS it is impossible to positively identify shortcomings in the original design of the class of vessel as being crucial.

Owners of all small inshore fishing vessels should be made aware, however, that it is unlikely that their individual vessels have ever undergone a full stability analysis and the method that they adopt to equip and operate their vessels may significantly and dangerously affect the vessels' seaworthiness.

2.6 LOSS OF LIFE AND DISCUSSION ON LIFESAVING EQUIPMENT

Three fishermen lost their lives in this accident. The post mortems on the two who were recovered indicate that the cause of death was drowning and it must be assumed the Skipper died from the same cause. The precise circumstances of their final moments will never be known but, once GORAH LASS had capsized, their chances of survival beyond a few minutes in the clothes they were wearing, and without any form of lifesaving equipment, would have been extremely slim.

Conclusions drawn, and eyewitness accounts in other fishing vessel accidents, indicate that without any form of lifesaving equipment, survival time for a fisherman in the water is short. On those occasions however, when lifejackets and liferafts are available and used, accident victims have survived.

The crew of GORAH LASS were at a major disadvantage from the outset because:

(i) no apparent attempt was made to don lifejackets;

(ii) the lifejackets carried were not readily available but were stowed in sealed plastic bags, probably in the forepeak store;

(iii) from the evidence available the lifejackets were not fitted with lights;

(iv) no liferaft was carried – GORAH LASS was not required to have one;

(v) none of the crew were wearing flotation suits which might have provided a measure of insulation and buoyancy.

Fishermen are extremely reluctant to wear lifejackets and few, if any, will wear them while working. Records indicate that crews do put them on once an emergency is clearly established but there is very little evidence to suggest that they are worn as a contingency measure when a potentially dangerous situation has arisen. The Skipper may have ordered his crew to don lifejackets on this occasion but, as the actual events onboard GORAH LASS will never be known, it is impossible to say whether any of them realised how dangerous the circumstances were. The undeniable fact remains that lifejackets were not worn.

Had they taken the precaution of wearing lifejackets on this occasion the lack of lights would have meant that the chances of them being seen in the water following the capsize were diminished.

The failure to carry a liferaft denied the crew any opportunity to survive beyond a few minutes. The lack of a statutory requirement to carry a liferaft and the low priority given by some under 12m fishermen to the advice that they should voluntarily carry a liferaft are serious shortcomings that require immediate attention. The MAIB believes all fishing vessels should carry a liferaft, fitted with a hydrostatic release and stowed in such a position on board that it does not obstruct the working area but will always float free. There must however be a major reassessment of what constitutes an approved liferaft in a small vessel which operates in coastal waters. It is further felt that every encouragement and practical advice should be given to the fishing community to overcome the perceived problems of carrying such essential equipment. Fishermen on their part must be receptive to such advice and take an active part in resolving such difficulties.

From experience gained investigating accidents at sea, the MAIB has no doubts that lifesaving equipment can, and does, save life providing it is carried, is in date and used properly. Familiarity with the equipment will greatly enhance the prospects of a satisfactory outcome. Fishermen must overcome their instinctive reluctance to don lifejackets, especially as a precautionary measure when confronted with a potentially hazardous situation. Waiting until the accident has actually occurred is invariably too late. GORAH LASS's heavy rolling in a confused sea with a full load on deck on the morning of 11 March was such a situation.

A number of under 12 metre vessels have been lost in recent years in similar circumstances to GORAH LASS including COPIA (1993), KATY (1994), KAREN MARIE II (1994) and MAY GIRL (1995). There has been a total loss of 12 lives in these accidents.

2.7 HUMANE AND ENVIRONMENTAL MATTERS

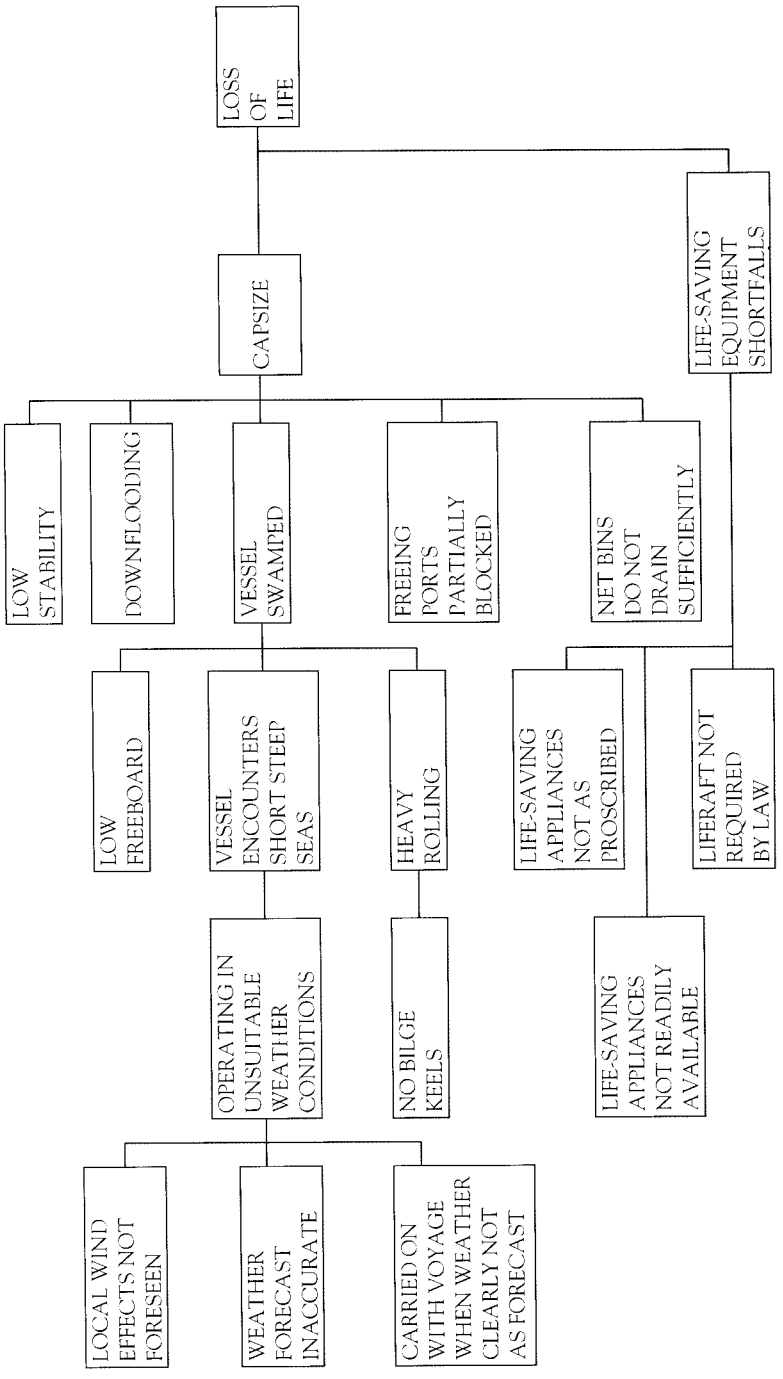
The very strong feelings of accident victims' next of kin who wish every effort to be made to search for, and recover, bodies from wrecks is regularly drawn to the attention of MAIB Inspectors.

Following the foundering, and subsequent recovery of another fishing vessel, SAPPHIRE, off Peterhead towards the end of 1997 and while this report was being prepared, Ministers have undertaken to produce a consultative paper on this difficult issue.

SECTION 3
Conclusions

3.1 ACCIDENT FACTOR DIAGRAM

The following figure indicates diagrammatically the main factors which culminated in the loss of the vessel and the consequent loss of life.



3.2 FINDINGS

1 The loss of three lives from GORAH LASS was as a direct result of the vessel foundering. [1.2]

2 The vessel was lost at 0455 on 11 March 1997 in position 50°17·92'N 05°19·75'W where the water depth was approximately 34 m. [1.2]

3 The Skipper and crew were experienced fishermen. [1.8]

4 GORAH LASS was lost rapidly, with little or no warning. [2.1]

5 The accident was not caused by a collision or flooding through the hull. [2.1]

6 The athwartships movement of bins containing nets and catch may have contributed to the vessel's loss. [2.1, 2.3]

7 Downflooding occurred through the open wheelhouse door and through open engine room vents. [2.1]

8 GORAH LASS took one or more waves on her after deck and as a result listed and capsized rapidly leaving no time in which to transmit a distress call, fire a distress flare or prepare lifejackets or lifebuoys. [2.1]

9 The fact that GORAH LASS did not have an operational engine-driven bilge pump was not a causal factor in the accident. [2.1]

10 The weight of load carried by GORAH LASS was not in itself a crucial factor in the loss of the vessel. [2.2]

11 GORAH LASS had a low freeboard of 0.226m and this contributed to her vulnerability. [2.2]

12 GORAH LASS was not fitted with bilge keels and was rolling heavily at the time of her loss. [2.2]

13 Plastic mesh strips positioned to cover the freeing ports reduced the vessel's capability to free the upper deck of water by about 80%. [2.2]

14 The use of plastic net bins with poor drainage on the upper deck assisted with the retention of water on deck. [2.2]

15 Water on the after deck and in the net bins reduced the vessel's stability and freeboard. [2.2]

16 The wind and sea conditions were a causal factor in the loss of the vessel. [2.2]

17 The weather forecast received by the Skipper of GORAH LASS, prior to sailing at 1530 on 10 March, was inaccurate. [1.9, 2.2]

18 Had he known, prior to sailing on 10 March, what the actual weather would be the following morning, it is probable he would have chosen to stay in port.

19 The Skipper's decision to put to sea on the afternoon of 10 March was understandable based on the weather forecast available. [2.2]

20 It is probable the Skipper did not obtain updated forecasts as they became available during the night. [2.2]

21 In the darkness – neither Skipper nor crew would have been able to judge the severity of the seas. [2.3]

22 The strength of the wind was probably temporarily enhanced by katabatic and funnelling effects off the coast near Portreath at the time of the accident. [1.9]

23 The strong wind acting partially against the strong tidal stream caused short steep seas of about 1.5m in height in the position where GORAH LASS was lost. In addition the vessel was being affected by the swell. [1.9]

24 GORAH LASS as she was designed, equipped and loaded on 11 March 1997, was not suitable for safe operation in the wind and sea conditions that prevailed that morning. [2.3]

25 The failure to carry a liferaft denied the crew any opportunity to survive beyond a few minutes. [2.6]

26 Four lifejackets, which were not fitted with lights, were recovered from the forepeak store still sealed in plastic bags. Nobody on board had been wearing a lifejacket. [1.11, 2.6]

27 Lifejackets with lights strategically stowed in the wheelhouse and ready for immediate use in an emergency might have contributed to the crew's chances of survival. [2.6]

28 The Skipper's next of kin were frustrated by the authorities' failure to search for and recover the Skipper's body from the wreck of the vessel. [1.12]

29 GORAH LASS had operated successfully for 20 years before this accident and although minor alterations had been made, her design characteristics had not substantially changed in that time. [1.6, 2.5]

30 Owners, Skippers and crews of under 12 metre fishing vessels do not generally read Merchant Shipping Notices or MAIB publications. [1.13]

3.3 CAUSES

Fundamental cause of the accident

1 The fundamental cause of the loss of GORAH LASS and consequently the loss of the lives of her crew was the capsize of the vessel due to a succession of waves breaking onto her afterdeck. The vessel had been at sea in weather conditions for which she was unsuited.

Underlying causes associated with the loss of the vessel

2 GORAH LASS had insufficient freeboard.

3 Water did not drain freely from the after deck because:

- her scuppers were partially blocked by plastic mesh strips;
- it was retained in the plastic net bins.

4 Downflooding to the forepeak and engine space occurred through the open wheelhouse door and through open vents situated on the after deck.

5 The stability of the vessel was insufficient to withstand the retention of a large quantity of water on the after deck.

Underlying causes associated with the loss of life

6 The vessel capsized rapidly, leaving little or no time to prepare lifesaving appliances or send a distress message.

7 Lifesaving equipment was not stowed so as to be readily available and lifejackets were not worn.

8 No liferaft was carried.

SECTION 4
Recommendations

An inquest held at Helston on 12 August 1997 returned a verdict of accidental death on the Skipper and two crew members. No recommendations were made.

The following Recommendations are made to:

4.1 THE MARITIME AND COASTGUARD AGENCY

i) To consider funding a research project into the behaviour of under 12m length fishing vessels in rough seas to establish how the risk of capsize or swamping is related to freeboard, freeing ports, static stability and bilge keels. The objective must be to identify unacceptable or limiting design characteristics for inclusion in the Code of Safe Practice for registered fishing vessels of less than 12m length.

ii) To re-examine the means of promulgating safety information to the owners, skippers and crews of under 12m fishing vessels.

iii) To inform and remind the under 12m sector of the industry about:

- the importance of maintaining clear freeing ports;
- properly securing fish and net bins when at sea;
- ensuring fish and net bins are capable of draining rapidly;
- the importance of keeping lifejackets and flares available for immediate use;
- how lives can be saved by ensuring that liferafts and hydrostatic release units are serviced and in date;
- the need to test and analyse the stability of vessels in order to fully understand their capabilities;
- the importance of keeping weather-tight doors and hatches shut at sea unless they are required for access.

iv) To consider, as a matter of urgency, a requirement for the fitting of liferafts to all under 12m fishing vessels, bearing in mind all MAIB's past recommendations on the same subject.

4.2 DEPARTMENT OF THE ENVIRONMENT, TRANSPORT AND THE REGIONS

i) To consult widely within the marine community to form a policy on the search for, and recovery of, bodies of seamen missing and presumed dead.

ANNEXES

ANNEX 1

Metfax Forecast Current at 1530 on 10 March

INSHORE WATERS FORECAST

MetFAX MARINE

THIS COVERS THE AREA HARTLAND POINT AROUND LANDS END TO LYME REGIS & 12 MILES OFFSHORE.
THIS FORECAST IS AVAILABLE ON 0336 400 458.

FOR FULL DETAILS OF METFAX MARINE SERVICES DIAL UP THE INDEX PAGE ON 0336 400 401. FOR FREE MARINE CARD FAX 01344 854018
CALLS ARE CHARGED AT 45P PER MINUTE CHEAP RATE, 50P PER MINUTE AT ALL OTHER TIMES.

FORECAST FOR TODAY AND TOMORROW ISSUED MONDAY 10/03/97

GENERAL SITUATION

A very large area of high pressure will be maintained over central, eastern and southern Europe. This will force a developing mid Atlantic depression to track northeast past south Iceland early tonight. Consequently, as pressure rises to the west of Scotland after the depression has passed, the centre of the large area of high pressure will transfer from Germany to the southern North Sea.

FORECAST UNTIL 7 AM TUESDAY

WIND: Calm or easterly force 1 becoming southeasterly force 2 or 3 by midday and locally touching force 4 for a while this afternoon around the Isles of Scilly and the headlands of south Cornwall as well as in areas more than a mile or two from the coast. The winds will fall calm in many areas close inshore again this evening, especially near the north coast of Cornwall.

WEATHER: Cloudy at times with perhaps a little light drizzle in places but otherwise dry. Extensive fog, thick in many areas especially during this morning and tonight. The fog may thin into mist at times this afternoon in some areas as sunny spells develop. This is equally likely to occur close inshore, especially near the northern coast of Cornwall, or well away from the coast out in the English Channel, but the fog will always be around and ready to roll back in.

VISIBILITY: Mainly 50 to 200 metres, perhaps improving to poor at times this afternoon in some areas.

SEA STATE: Smooth.

SURF: 2 to 4 feet on some south and west facing beaches but more generally less than 2 feet.

MAX AIR TEMP: 11 Celsius

SEA TEMP: 6 to 9 Celsius.

FORECAST FROM 7 AM TUESDAY UNTIL 7 AM WEDNESDAY

WIND: Southeast force 2 or 3 slowly veering to southeasterly, but calm in some inshore areas at times, more especially in the early morning off the north Cornish coast.

WEATHER: Dry. Extensive fog, thick in many areas, probably clearing to mist at any time after midday in places but with always a moderate risk of the fog reforming.

VISIBILITY: Mainly 100 to 400 metres probably improving to poor in most places after midday and perhaps locally moderate later in the west.

SEA STATE: Smooth

THE MET. OFFICE, SUTTON HOUSE, LONDON ROAD, BRACKNELL, BERKS RG12 2SY. FAX: 01344 854018
email: metfax@meto.govt.uk, INTERNET http://www.meto.govt.uk/

ANNEX 2

Inclining Trial Report

Vessel name/number	-	MFV 'Gorah Lass'
Trial location	-	The harbour basin, Portreath
Trial time and date	-	25th April,1997
Sea water SG	-	1.025 assumed
Weather conditions	-	Sunny, wind force 3 from North West
Sea conditions	-	Water movement due to swell
Vessel condition	-	Oil fuel and hydraulic oil tanks pressed full See tables of items to come off and go on
Freeboard forward	-	metres about stem head
Draft forward	-	0.990 metres about keel line
Draft midships	-	1.015 metres about keel line
Draft aft	-	1.039 metres about keel line
Mean draft at midships	-	1.015 metres about keel line
Trim on LBP	-	0.049 metres by stern
Forward pendulum length	-	2.17 metres
Aft pendulum length	-	2.22 metres
Inclining weights	-	6 in number, totalling 152.4 kg in weight
Personnel	-	Mr. K. Dixon - MAIB (forward pendulum) Mr. N. Beer - MAIB (aft pendulum) Assistant - from Falmouth Divers Co.

Pendulum deflection table

No.	Shifts Direction	Weight Tonnes	Distance metres	Deflections Fore - mm	GM metres	Deflections Aft - mm	GM metres
1	Port ⇒ Stbd	0.0254	2.35	34	0.439	31	0.482
2	Port ⇒ Stbd	0.0254	2.35	37	0.404	25	0.597
3	Port ⇒ Stbd	0.0254	2.35	20	0.747	25	0.597
4	Stbd ⇒ Port	0.0762	2.35	95	0.472	81	0.553
5	Stbd ⇒ Port	0.0254	2.35	22	0.679	34	0.439
6	Stbd ⇒ Port	0.0254	2.35	20	0.747	16	0.934
7	Stbd ⇒ Port	0.0254	2.35	26	0.574	18	0.830
8	Port ⇒ Stbd	0.0762	2.35	70	0.640	67	0.669
			Mean GM	Forward	0.588	Aft	0.638

Inclined condition

Displacement	-	8.672 tonnes
KMT	-	1.857 metres
GMT mean	-	0.613 metres
VCG	-	1.244 metres above Base Line

Items to come off to obtain lightship condition

Item	Weight Tonnes	LCG metres	Long'l moment T.metres	VCG metres	Vertical moment T.metres	FSM T.m
Oil fuel	0.496	5.124	2.542	0.851	0.422	0.000
Hydraulic oil	0.018	1.950	0.035	1.520	0.027	0.000
Inclining weights	0.152	4.672	0.710	3.032	0.461	0.000
Damping water forward	0.022	2.460	0.054	1.440	0.032	0.000
Damping water aft	0.022	6.900	0.152	1.440	0.032	0.000
Inclining equipment	0.005	4.680	0.023	2.300	0.012	0.000
Bilge water	0.090	3.750	0.338	0.150	0.014	0.004
1 person at weights	0.089	4.672	0.416	2.250	0.200	0.000
1 person at fwd pendulum	0.070	3.010	0.211	1.680	0.118	0.000
1 person at aft pendulum	0.089	6.350	0.565	1.680	0.150	0.000
Total items to come off	1.053	4.791	5.045	1.392	1.466	0.004
			VCG incl. FSM	1.396	1.470	

Items to go on to obtain lightship condition

Item	Weight Tonnes	LCG metres	Long'l moment T.metres	VCG metres	Vertical moment T.metres	FSM T.M
Missing part foremast	0.007	1.750	0.012	4.250	0.030	-
Personal gear	0.018	1.020	0.018	1.200	0.022	-
Total items to go on	0.025	1.200	0.030	2.080	0.052	-

Lightship summary

Item	Weight Tonnes	LCG metres	Long'l moment T.metres	VCG metres	Vertical moment T.metres	FSM T.m
Vessel as inclined	8.672	4.024	34.896	1.244	10.788	0.004
Items to come off	-1.053	4.791	-5.045	1.396	-1.470	-0.004
Items to go on	0.025	1.200	0.030	1.200	0.052	-
Lightship	7.644	3.909	29.881	1.226	9.370	0.000

Stability in Loaded Condition - FIGURE A

ANNEX 3

DEADWEIGHT TABLE

Vessel ..... FV 'GORAH LASS'
Condition.... Assumed accident loading
State..... Hull without added appendages
Water SG.. 1.025
*Compliance: Vessel fails requirements in this condition

Longitudinal dimensions about FP (Station 0) (+ve aft, -ve forward)
Vertical dimensions about USK midships (Stn.6) (+ve above, -ve below)
Transverse dimensions about centreline (+ve Port, -ve Stbd)

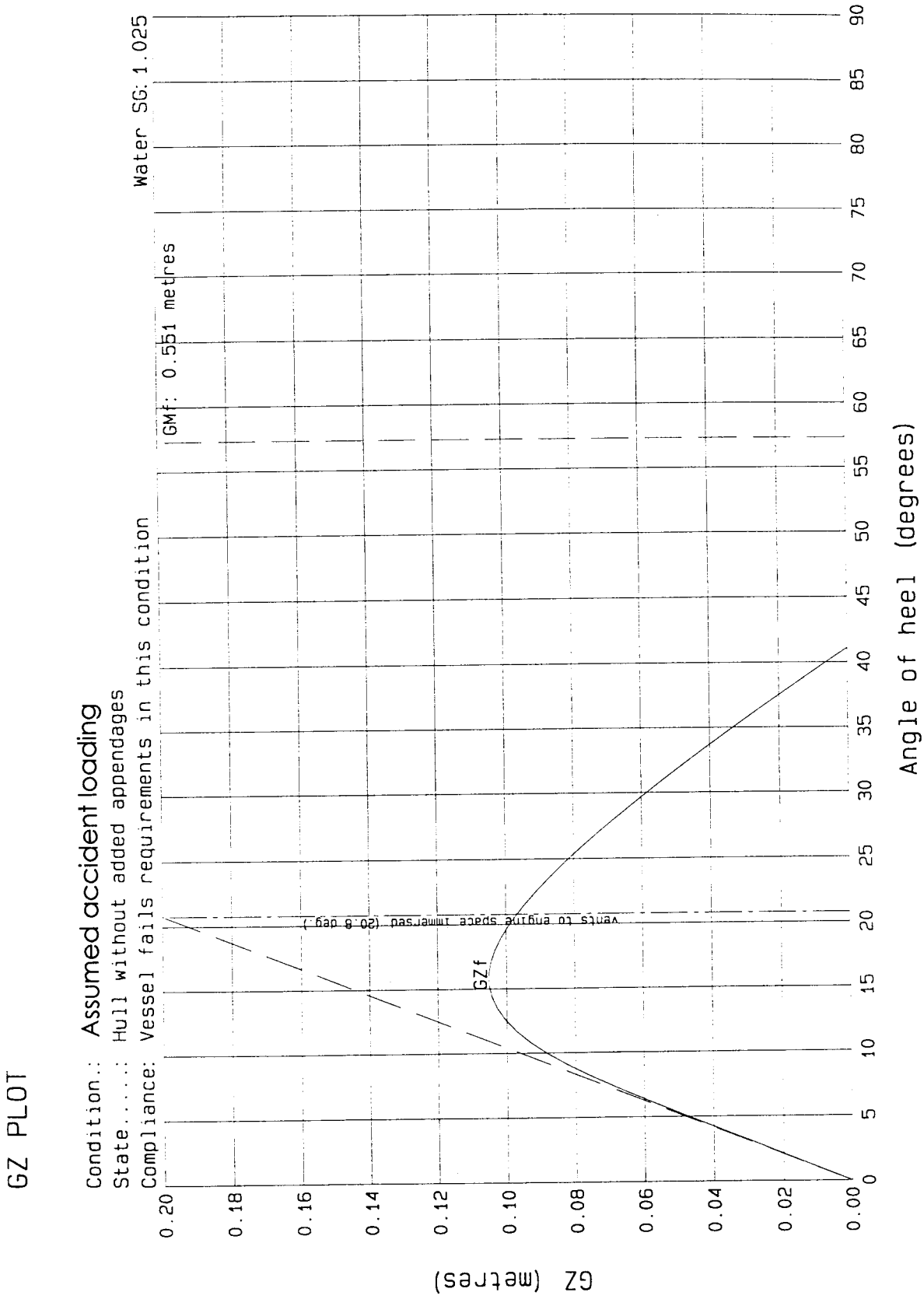
Deadweight Item	Weight tonnes	LCG metres	Longitudinal moment t.m	TCG metres	Transverse moment t.m	VCG metres	Vertical moment t.m	Free Surface moment t.m
Oil Fuel	0.203	5.124	1.040	0.000	0.000	0.711	0.144	0.046
Hydraulic Oil	0.018	1.950	0.035	0.000	0.000	1.520	0.027	0.000
3 Crew	0.225	1.980	0.445	0.000	0.000	2.420	0.544	0.000
Bin 1 - amidships	0.160	4.750	0.760	0.000	0.000	1.550	0.248	0.000
Bin 2 - amidships	0.160	4.750	0.760	0.000	0.000	1.550	0.248	0.000
Bin 3 - amidships	0.160	4.750	0.760	0.000	0.000	1.550	0.248	0.000
Bin 4 - aft	0.160	6.600	1.056	0.000	0.000	1.590	0.254	-
Bin 5 - aft	0.160	6.600	1.056	0.000	0.000	1.590	0.254	-
Catch	0.254	2.950	0.749	0.000	0.000	1.450	0.368	-
DEADWEIGHT TOTAL	1.500	4.441	6.662	0.000	0.000	1.558	2.337	0.046
LIGHTSHIP	7.644	3.909	29.880	0.000	0.000	1.226	9.372	-
DISPLACEMENT	9.144	3.996	36.542	0.000	0.000	1.280	11.709	0.046
Free Surface Correction (Total Free Surface Moment/Displacement)						0.005		
VCG fluid						1.286		

STABILITY SUMMARY

	Minimum* Requirement	Actual
Angle of immersion of vents to engine space (degrees)	-	20.778
Area under GZ curve between 0.00 and 20.78° (metre.radians)	0.055	0.027
Area under GZ curve between 0.00 and 20.78° (metre.radians)	0.090	0.027
Area under GZ curve between 30.00 and 20.78° (metre.radians)	0.030	0.000
Maximum GZ (metres)	-	0.106
Angle of heel at which maximum GZ occurs (degrees)	25.000	16.172
Maximum GZ between 30 and 90 degrees (metres)	0.200	0.000
Positive GZ heel range (degrees)	-	20.778
GM solid (metres) (upright)	-	0.556
Free Surface correction (metres)	-	0.005
GM fluid (metres) (upright)	0.350	0.551

*Minimum required for over 12 metre fishing vessels

FIGURE B


GZ PLOT
Condition.: Assumed accident loading
State.....: Hull without added appendages
Compliance: Vessel fails requirements in this condition
Water SG: 1.025
GMf: 0.551 metres
Vents to engine space immersed (20.8 deg.)
GZf
GZ (metres)
Angle of heel (degrees)
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90