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

NOTE

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

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Capsize while beam trawling **BETTY G** Lyme Bay 23 July 2012

SUMMARY

At approximately 0130 on 23 July 2012 (UTC+1), the 9.92m fishing vessel *Betty G* capsized while beam trawling¹. All three crew were rescued approximately 10 hours later.

The vessel capsized as a result of the load in the starboard trawl net releasing suddenly. *Betty G* then progressively flooded and sank. The crew acted swiftly and deployed the liferaft, which ultimately saved their lives. No distress

message was transmitted and no alarm was raised, even though the vessel was fitted with an emergency position indicating radio beacon (EPIRB) and a MOB Guardian.

A recommendation has been made to the owner of *Betty G* to assess and counter the risks associated with recovering fishing gear, and to improve crew emergency preparedness on any fishing vessel he may own in the future.

¹ Also known as “boom fishing”

Image courtesy of http://www.cimwch.com/blwyddyn%202009/betty_g_2.jpg



Betty G

FACTUAL INFORMATION

Vessel and equipment

Betty G (Figure 1) was built in 2001 at Newbury Engineering Ltd, Newhaven. She was a multipurpose vessel, being able to scallop dredge, and also beam and stern trawl. The vessel was fitted with a Cummins NT 855M 145kW main engine that provided propulsion and electrical power, as well as driving hydraulic pumps and a bilge/deck wash pump. The engine was overhauled in November 2011, and the 3.5 tonne main hydraulic winch was refurbished at the same time.

The vessel was fitted with a 4-man liferaft, mounted on the wheelhouse roof, and an EPIRB, which was kept in the wheelhouse. In addition to solid foam lifejackets stowed in the accommodation, two inflatable lifejackets were kept in the galley.

Although under 10m in length, and so not required by legislation to have undergone a stability assessment, *Betty G* was provided at build with a 'Stability Particulars' book. However, no further lightship checks had taken place since the original inclining experiment in 2001.

In January 2012, *Betty G*'s latest owner commenced the process of purchasing the vessel, though he did not take full legal ownership until June 2012. During this period he was the vessel's skipper, using the vessel for scallop dredging. The previous owner initially assisted with operating *Betty G*. From mid-July 2012, the new owner changed the method of fishing to beam trawling, using a pair of 4m beam trawls he had purchased second-hand. Although the beam trawls were 4 years old, they had been lightly used. A few days before the accident, the owner had tried operating the beam trawls, with no apparent problems.

The new owner had not conducted a formal risk assessment when he purchased the vessel, or when he changed the method of fishing.

Crew

The owner/skipper, who was 34 years old, started fishing in 1992 and worked

as crew on a variety of different types of fishing vessels based in Brixham. In 1997, he started studying for a Deck Officer (Fishing Vessel) Class 2 Certificate of Competency but did not complete the course. Around this time he starting acting as a mate and progressed to acting as skipper on a variety of small Brixham-based fishing boats. He had completed all the mandatory fishermen's safety training courses, including safety awareness. Although the skipper had not completed the voluntary stability awareness course, he had studied stability during his Class 2 Certificate of Competency training. *Betty G* was the first boat he had owned.

The elder of the two crew was 26 years old and had fished for nearly 5 years on a variety of Brixham-based vessels. He joined *Betty G* 6 weeks prior to the accident. The younger crewman, aged 22 years, had only recently returned to fishing. He had completed a few trips on a fishing vessel when he was aged 17, but had then decided to pursue a career ashore. He started work on

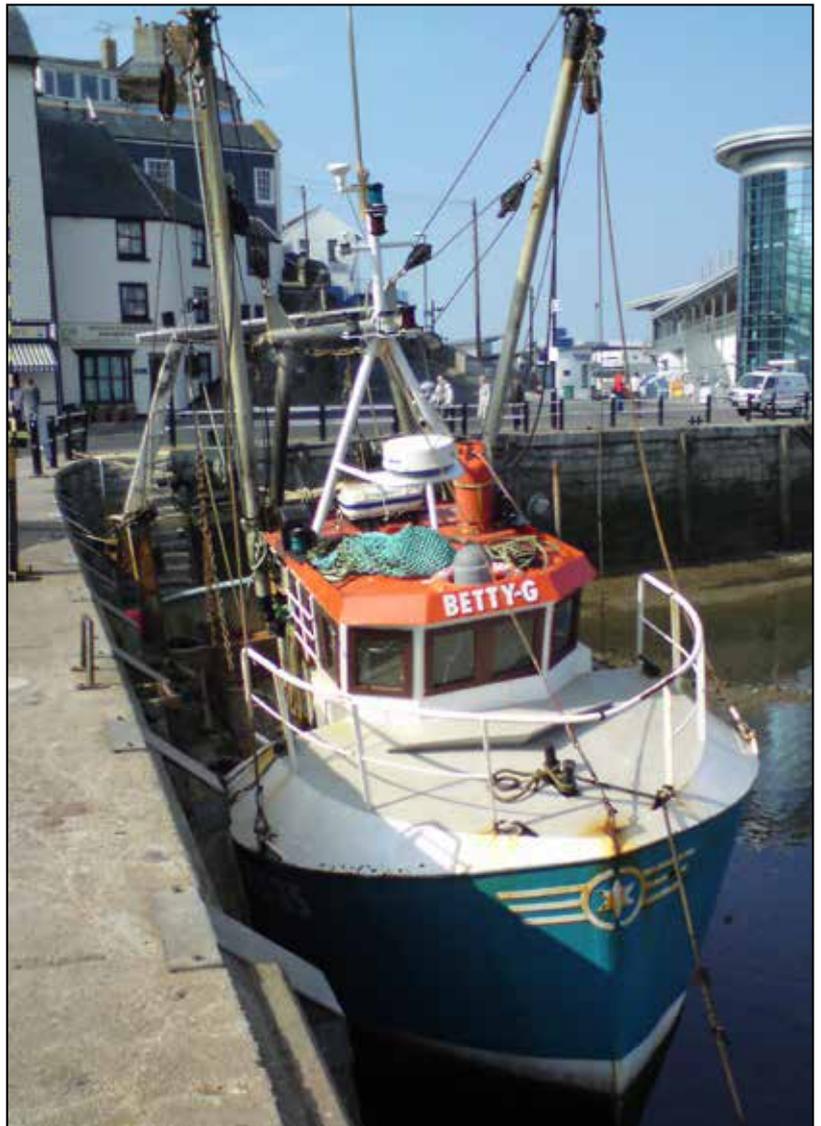


Figure 1: *Betty G*

board *Betty G* 3 weeks before the accident. Neither of the crew had completed the Basic Fire-Fighting and Prevention safety training course.

Narrative

During the afternoon of 22 July, the skipper and crew prepared *Betty G* for beam trawling in Lyme Bay. At 1830, the vessel departed Brixham and headed towards the skipper's preferred fishing grounds, arriving 2 hours later. The gear was then shot away.

The weather was ideal for beam trawling; the sea was calm with only a light breeze. The skipper hauled the gear after 30-40 minutes and found a lot of small shells clogging the nets. These were cleared and the nets were then shot again.

Two tows of 2 hours duration were then successfully completed before the nets were shot a fourth time at approximately 0100 on 23 July. One of the crew rested below while the others processed the catch. A short time later, the skipper concluded, from the vessel's speed and difficulty maintaining heading, that there was something heavy in the nets.

The skipper reduced *Betty G*'s speed, moved to the winch controls, engaged the dog clutches and released the winch brakes. He tried to haul both nets together without success. He then heaved one net at a time, and managed to bring both warps up to the 10- fathom mark. The off-watch crewman was now also on deck ready to help.

The skipper returned to the wheelhouse and drove *Betty G* ahead for 3-5 minutes to wash what he expected to be mud and sand out of the nets, but without success. He then returned to the winch and hauled the nets to the derrick blocks before driving ahead, again without success. He then raised the derricks to 45° before trying one last time to clear the nets by moving the vessel ahead.

At this time, *Betty G* had a slight port list and it was apparent that the nets were still clogged. The skipper took the engine out of gear and allowed the beams to turn, in preparation for shooting the gear upside down in an attempt to break out the blockage through the unprotected side of the nets.

Suddenly, the load in the starboard net released and *Betty G* rapidly capsized to port to an angle of about 90°. The skipper tried to pay out the port trawl wire but the main engine then stopped,

resulting in the loss of hydraulic power to the winch. The fishroom hatch and the door to the engine room were already shut, restricting the rate of progressive flooding.

The skipper instructed the crew to launch the liferaft. They released it from its cradle on the wheelhouse roof and one of the crew, who had managed to stand on the starboard side of the wheelhouse, pulled the painter. The skipper and other crewman were in the water. The liferaft started to inflate, but it had to be dragged clear to prevent it snagging on *Betty G*'s foremast.

By 0145, the three men had boarded the liferaft and were looking for the knife to cut the painter. From their sea survival training, they expected to locate the knife on one of the inflatable tubes near the entrance, but they could not find it. The younger crewman climbed out of the raft and made his way along the starboard side of *Betty G* to the gallows, where he retrieved a knife. He returned to the raft and cut the painter. Shortly afterwards, *Betty G* sank.

The crew found a torch and three hand flares in the liferaft emergency pack. The skipper saw the lights of a ship 3-4 miles away, and he ignited two of the hand flares. With no obvious reaction from the ship, he tried using the torch to flash 'SOS', again with no apparent response.

The crew huddled together to conserve heat and waited for daylight. After sunrise at 0530, they removed some of their wet clothing to dry it in the sun. During the morning, a small angling boat and several yacht sails were sighted, but no vessel approached them.

Later, the crew heard the sound of an engine. They looked out and sighted a small boat heading in their direction. The crew waved and the skipper set off the last hand flare as the boat continued towards them.

At 1255, the skipper of the dive boat *Blue Turtle* alerted the coastguard that he had recovered three men from a liferaft. The coastguard arranged for a helicopter to airlift them to Portland. They were examined by a paramedic, were considered not to require hospital treatment, and returned to Brixham the same day.

Liferaft and other safety equipment

The 4-man Eurovinil liferaft (**Figure 2**), that had been manufactured in May 2007, was included in the sale of *Betty G*. It had been serviced in June 2011 and its next service was not due for a further 3 years. The service record noted the raft was in very good condition. The liferaft was supplied with an Offshore Racing Congress (ORC) emergency pack. This standard pack did not include food, water, thermal protection aids, parachute flares or a heliograph (for attracting attention by reflecting the sun).

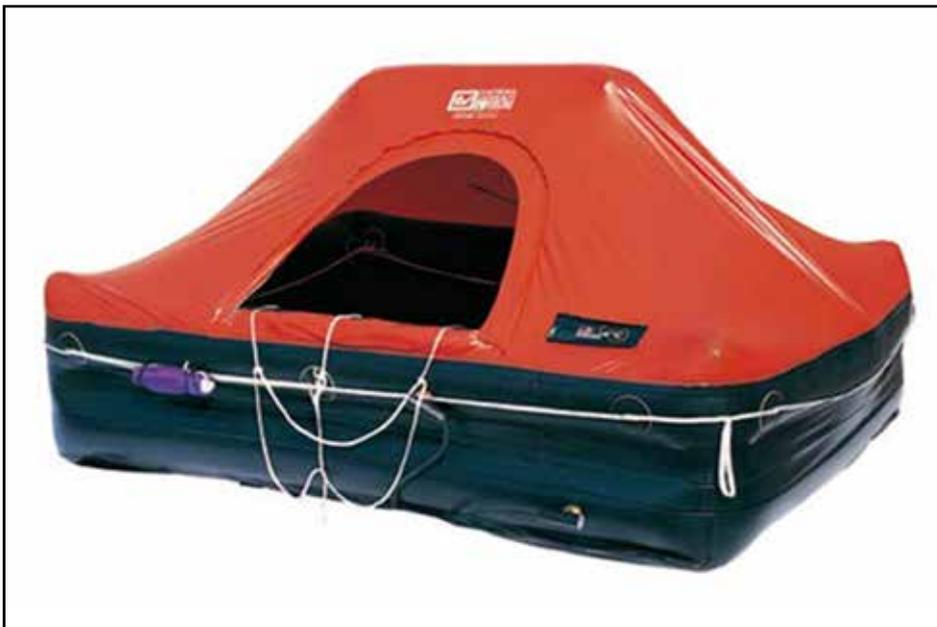


Figure 2: Four-man Eurovinil liferaft

Also included in the sale of *Betty G* were the EPIRB and a MOB Guardian system that was fitted on board. However, neither item of equipment had been registered to the new owner.

Survey and Inspection

Prior to the accident, *Betty G* was last inspected by the Maritime and Coastguard Agency in February 2011, when she was operated by the previous owner. Several deficiencies were listed, including the need for fire extinguishers to be fitted and serviced, smoke alarms to be fitted, risk assessments to be completed and the liferaft to be serviced.

In March 2012, the vessel was surveyed for the purposes of securing a mortgage. The survey report concluded the vessel was generally in sound condition and had previously been maintained to a good standard. However, a number of defects were listed which the surveyor recommended needed attention. One of the long-term recommendations

was to inspect and maintain the derrick goosenecks and, at the same time, assess the length of the derricks against the length of the gear and to shorten them if possible.

ANALYSIS

Mechanism of loss

Betty G capsized due to a significant weight imbalance between the beam trawls caused by the load in one net (starboard) suddenly releasing. The port trawl wire was not able to be released, resulting in the vessel progressively flooding and foundering.

It is most likely that the load in the starboard net led to that net failing. As the wreck has not been located and examined, it is not possible to clarify precisely what the nets contained or why the starboard net failed.

However, there are two factors that might have prevented the vessel foundering: a greater reserve of stability and more effective ways of releasing the load on fishing gear in an emergency.

Stability of beam trawlers

Beam trawling is recognised as particularly hazardous from a vessel loading perspective. To account for this, beam trawlers traditionally are required to have an additional 20% reserve of stability. This requirement is legislated for fishing vessels of 15m or more in length, but is only recommended for smaller fishing vessels.

When *Betty G* was constructed, a 'Stability Particulars' book was produced, suggesting that the vessel fully met the stability criteria required for a vessel of 15m or more in length. However, since build, no recorded lightship check had been conducted to establish if the vessel's weight or centre of gravity had altered.

If a vessel possesses stability information, it is essential that a regular lightship check is conducted (e.g. every 5 years) to verify the stability

information remains valid. It was highly beneficial that *Betty G* had stability information at build, but with no subsequent lightship checks, how much her stability reserves had been eroded was unknown.

However, the increased stability reserves required for beam trawlers may still not be sufficient to protect against all potential loading scenarios. One measure that can help is ensuring that derricks are no longer than necessary so as to limit the potential lever arm that can be exerted by the load in the nets. Warp tension-monitoring equipment can also provide early warning of significant loading. MGN² 415(F) provides further guidance on the hazards associated with beam trawling.

Emergency release of fishing gear

Heavy loads or snagged nets are a common hazard for vessels beam trawling and MGN 415(F) lists a number of measures to deal with these situations. Key to preventing capsize or foundering is the ability to release the trawl wires quickly to prevent the effect of sudden, uneven loading. Dog clutch winches are particularly problematic as they cannot be released easily when under load. To counter this, it is essential that dog clutches are engaged for the minimum amount of time possible so that, in the event of an emergency, only the winch brake has to be released.

At the time of the capsize, because the port dog clutch was still engaged, the skipper was left with only one option, which was to pay-out the main winch under power. However, the main engine stopped after *Betty G* had developed a large angle of heel, with the result that power to the hydraulics was lost. Employing a different type of winch clutch or having a reliable back-up for hydraulic power may provide alternative solutions.

Another measure, aimed at reducing the resulting heeling lever, would have been to activate the port

derrick head block emergency release (**Figure 3**). At the time of the capsize, the derricks were raised to 45°, meaning not only was the load acting 5m off the vessel's centreline but also over 5m above deck level, so raising the vessel's vertical centre of gravity (VCG). If the securing link had been released, the derrick head block would have been free to fall away, and the trawl wire would have then come to rest on the bulwark rail, dramatically reducing the heeling lever and lowering the VCG. There was no guarantee that this would have prevented the eventual foundering of *Betty G*, but it might have provided the crew more time in which to try to recover the situation.

To ensure the emergency derrick head block

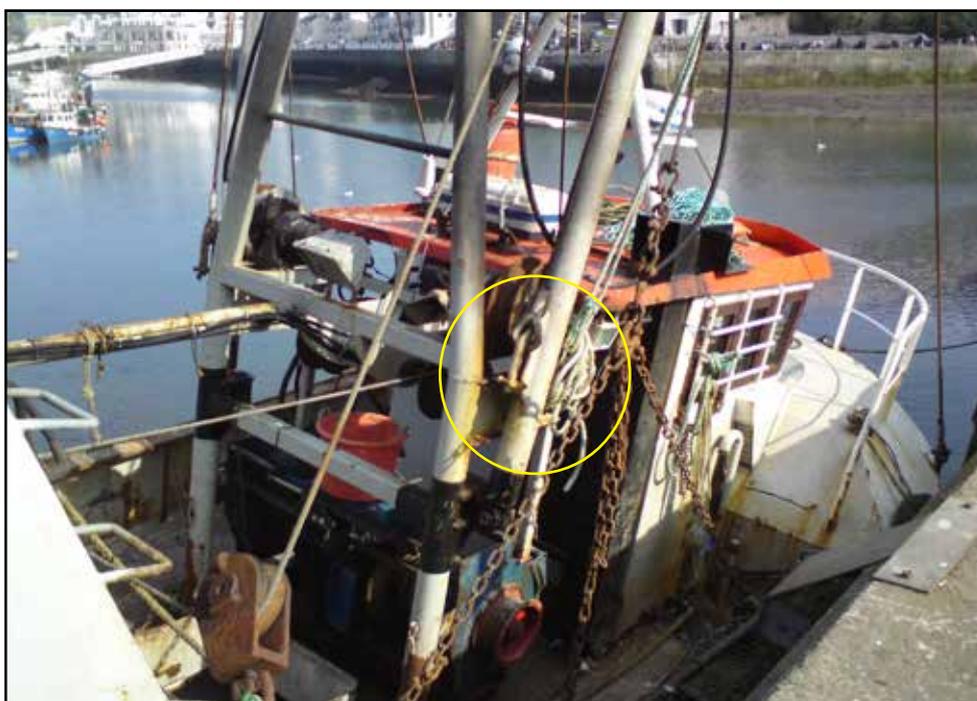


Figure 3: *Betty G* derrick head block release

release is effective, the system must be properly maintained and a crewman, fully conversant with its operation, must be ready to activate the release when instructed to do so by the skipper. Such steps must be considered during risk assessments and regularly practised to ensure the crew is prepared for such an emergency.

Liferaft and equipment

The liferaft undoubtedly saved the lives of the three crew, and this accident is a graphic reminder of the benefits of carrying such equipment. Although only recommended for fishing vessels under 10m in length, proposed legislation intends to mandate the carriage of a liferaft in the future.

² Marine Guidance Note

However, carriage of a liferaft alone will not guarantee crew survival following the loss of a vessel. To maximise the chance of saving lives, the liferaft must be:

- serviced regularly (as was the case with *Betty G's* raft);
- correctly positioned to maximise the likelihood of a successful deployment;
- fitted with a float-free or hydrostatic release system; and
- attached correctly with a weak link to ensure the raft will release from the vessel following inflation.

The liferaft should ideally be accessible so that the crew can manually release the raft, if there is time to do so. The mandatory sea survival training undertaken by *Betty G's* crew was invaluable and ensured they acted swiftly, in difficult conditions, to manually release the raft. Given the potential for a liferaft to become entangled in the rigging of a capsizing or foundering vessel, deploying the raft manually and pulling the painter to activate it will always be preferable to relying on automatic inflation.

However, the crew experienced some difficulties with the liferaft, the most significant of which was their inability to locate the painter-knife in the dark. This was due to the knife being stowed in a black pocket on the liferaft canopy (**Figure 4**) and not, as they had expected, on the inflation tubes near the entrance.

The quality of liferafts and the equipment supplied with them varies widely. The Eurovinil liferaft was aimed at recreational users and the ORC pack supplied with the liferaft reflected a minimum level of kit necessary to survive a few hours before being rescued. If the liferaft had been equipped with parachute flares, as required for a liferaft meeting ISO³ 9650 Part 1 or SOLAS⁴, there would have been an improved chance of earlier

detection. Also, although not critical in this accident due to the time of year, thermal protective aids would have reduced the risks of the crew suffering from hypothermia.

It is the responsibility of the owner to ensure he has an appropriate standard of both liferaft and survival pack for the intended activity and area of operation. Any foreseen shortage of survival equipment can always be supplemented by having a grab bag, suitably positioned, with items such as additional flares, food, water and a portable VHF radio.

Emergency distress alerting

Betty G was fitted with two items of safety equipment that could have enabled a swifter rescue.

The EPIRB could have transmitted an emergency message to alert the coastguard. However, the EPIRB on *Betty G* was not fitted so it would float-free as the vessel sank, and was not retrieved from the wheelhouse before the crew abandoned the vessel. To maximise effectiveness, an EPIRB should be registered, regularly checked and serviced, and fitted in a float-free canister with a hydrostatic release.

The MOB Guardian system is primarily intended for small fishing vessels and provides two main



Figure 4: *Betty G* liferaft painter-knife

³ International Standards Organisation.

⁴ International Convention of the Safety of Life at Sea 1974, as amended

functions: a man overboard alert system; and, a vessel overdue warning. The first function is accomplished by each crewman wearing a personal safety device so that if they are separated from the vessel an alarm will be raised. The second function transmits a signal ashore at least every 60 minutes. If a report is not received ashore when expected, an alarm will be raised. *Betty G's* system had not transmitted a report since 5 July 2012. In accordance with normal practice, as a report was not expected, the monitoring station had not conducted a follow-up call to the owner because 28 days had not yet passed. The skipper was unaware of the need to re-register the system on taking ownership and had not familiarised himself with the equipment. If he had done so, and ensured it was functioning correctly, the alarm would have been raised within an hour of the foundering.

Risk assessment and emergency preparedness

Lif jackets and personal flotation devices (PFD) were not routinely worn on board *Betty G*, primarily because the crew considered they were too bulky and a hindrance when working on deck. A suitable and sufficient risk assessment, as required by legislation, should have concluded that during hazardous operations, such as recovering heavy or snagged gear, PFDs or lif jackets should be worn. Such practice is recommended in MGN 415(F).

The Code of Practice for the Safety of Small Fishing Vessels requires a risk assessment to be undertaken when a fishing vessel changes ownership, and strongly recommends that it is written down. The Fishing Vessel Safety Folder, developed by Seafish, is a good template to use. Many of the issues discussed in this report could have been addressed had an appropriate risk assessment been conducted. While this holds true for all fishing vessels, beam trawling is particularly hazardous and crews must be better prepared for emergencies given the greater risk.

CONCLUSIONS

- *Betty G* capsized due to a significant imbalance between the beam trawls caused by the load in one net suddenly releasing.

- It is most likely that the load in the starboard net led to the net failing.
- The port trawl wire was not able to be released, resulting in the vessel progressively flooding and eventually foundering.
- There was no effective means of releasing the port trawl wire quickly with the winch dog clutch engaged.
- Activation of the port derrick head block emergency release would have reduced the heeling lever and lowered the vessel's VCG, which might have provided the crew with more time in which to try to recover the situation.
- Although *Betty G* was provided with stability information at build, the validity of the information was unknown as no subsequent lightship checks had been conducted.
- The crew's training undoubtedly assisted in the effective deployment of the liferaft, which ultimately saved their lives.
- The EPIRB, which could have alerted the coastguard, was not fitted so as to float-free, and it was not retrieved from the wheelhouse before the crew abandoned the vessel.
- The MOB Guardian system, which could have raised the alarm within an hour of the vessel foundering, was not functioning correctly.
- An effective risk assessment had not been conducted, leading to less than adequate crew emergency preparedness.

RECOMMENDATIONS

2013/201 Northwest Trawlers Limited is recommended to, with respect to any fishing vessels it may own or manage in the future, utilise available industry best practice guidance and advice to:

- Conduct an assessment of the risks associated with the vessel's mode of fishing and, in particular, to identify and counter the risks associated with the recovery of fishing gear.
- Ensure that procedures are established and drills conducted to train crews in the actions required to deal with foreseeable emergencies on board.

SHIP PARTICULARS

Vessel's name	<i>Betty G</i>
Flag	UK
Classification society	Not applicable – not subject to survey
IMO number/fishing numbers	E535
Type	Fishing vessel
Registered owner	Northwest Trawlers Limited
Manager(s)	Northwest Trawlers Limited
Construction	Steel
Length overall	9.92m
Registered Length	8.90m
Gross tonnage	13.96
Minimum safe manning	Not applicable
Authorised cargo	Not applicable

VOYAGE PARTICULARS

Port of departure	Brixham
Port of arrival	Brixham
Type of voyage	Other
Cargo information	Fish
Manning	3

MARINE CASUALTY INFORMATION

Date and time	23 July 2012, 01:30
Type of marine casualty or incident	Very Serious Marine Casualty
Location of incident	Lyme Bay
Place on board	Not applicable
Injuries/fatalities	None
Damage/environmental impact	Minimal pollution
Ship operation	Hauling fishing gear
Voyage segment	Mid water
External & internal environment	Wind: F1-2 Sea state: calm Visibility: good
Persons on board	3