ACCIDENT REPORT

Report on the investigation into

the capsize and foundering of the fishing vessel

Solstice (PH199)

resulting in one fatality

approximately 7 miles south of Plymouth, England

26 September 2017

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

VERY SERIOUS MARINE CASUALTY REPORT NO 20/2018 DECEMBER 2018

Extract from

The United Kingdom Merchant Shipping

(Accident Reporting and Investigation)

Regulations 2012 – Regulation 5:

"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2012 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of 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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CONTENTS

FIGURES

TABLES

ANNEXES

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AIS	-	Automatic Identification System
ALB	-	All weather lifeboat
°C	-	Degrees Celsius
CGOC	-	Coastguard Operations Centre
CoB	-	Centre of Buoyancy
CRT	-	Coastguard Rescue Team
DLA	-	Deputy Launch Authority
DSC	-	Digital Selective Calling
EPIRB	-	Emergency Position Indicating Radio Beacon
GM	-	Metacentric height
GPS	-	Global Positioning System
HMCG	-	Her Majesty's Coastguard
HRU	-	Hydrostatic Release Unit
IAMSAR	-	International Aeronautical and Maritime Search and Rescue (manual)
ILB	-	Inshore Lifeboat
IMO	-	International Maritime Organization
IT	-	Information Technology
LOA	-	Length Overall
LOLER	-	The Merchant Shipping and Fishing Vessels (Lifting Operations and Lifting Equipment) Regulations 2006
LOM	-	Lifeboat Operations Manager
LSA	-	Life Saving Appliances
m	-	metre
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MOO	-	Maritime Operations Officer
MRCC	-	Maritime Rescue Co-ordination Centre
MSN	-	Merchant Shipping Notice

N	-	Newton
nm	-	nautical mile
NMOC	-	National Maritime Operations Centre
OMS	-	Operational Management System
“Pan Pan”	-	The international urgency signal (spoken)
PFD	-	Personal Flotation Device
PLB	-	Personal Locator Beacon
PMLR	-	Post-Mission Learning Review
PUWER	-	The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006
RIPA	-	Regulation of Investigatory Powers Act 2000
RN	-	Royal Navy
RNLI	-	Royal National Lifeboat Institution
SAR	-	Search and Rescue
SARIS	-	Search and Rescue Information System
SMC	-	Search and Rescue Mission Co-ordinator
SMOO	-	Senior Maritime Operations Officer
SPoC	-	Single Point of Contact
UTC	-	Universal Co-ordinated Time
VCB	-	Vertical Centre of Buoyancy
VCG	-	Vertical Centre of Gravity
VHF	-	Very High Frequency

TIMES: all times used in this report are UTC+1 unless otherwise stated.

SYNOPSIS

At about 1938 on 26 September 2017, the 9.9m fishing vessel *Solstice* capsized about 7 nautical miles south of Plymouth. The skipper and crewman were rescued from the vessel's upturned hull about 5½ hours later, but the vessel's owner was trapped and drowned in the wheelhouse. *Solstice* foundered shortly after the owner's body was recovered from under the upturned hull.

The vessel had been converted from scallop dredging to stern trawling a few days earlier and its owner, skipper and crewman were in the process of hauling their second catch of the day on board over the stern when the capsize occurred.

Solstice capsized in benign sea conditions because it did not have sufficient transverse stability to safely lift the contents of its net on board over the stern. The weight in the net was clearly excessive; the cod-end was full of fish, moss and sand, and initial attempts to recover it on board caused the net drum to fail. Despite this, the crew were determined to haul the high value catch on board. The height of the lifting point, water on deck and the vessel's hull form aft all contributed to the capsize.

Following the capsize, the skipper and crewman managed to swim from under the vessel and clamber onto its upturned hull. The owner was trapped in the wheelhouse by the inrush of water, and drowned. Due to the rapid nature of the capsize, the crew were unable to raise the alarm, and as the vessel was not equipped with automatic distress beacons the coastguard was not alerted until an hour later, when *Solstice* was reported overdue.

The search and rescue mission was successful in locating the upturned hull and rescuing the two survivors. However, the investigation identified issues relating to HM Coastguard staffing levels, search and rescue mission command and control, and levels of communication between the Coastguard Operations Centre and RNLI lifeboat staff.

The MAIB has previously made a number of recommendations to the Maritime and Coastguard Agency, all designed to improve the stability of small commercial fishing vessels. These recommendations have been accepted but have yet to be fully implemented.

Actions have been taken by HM Coastguard to help ensure its suggested staffing levels are maintained at its Coastguard Operations Centres and to improve standards of remote network support. Actions have also been taken by HM Coastguard and the RNLI aimed at improving levels of understanding and communications between Maritime Operations Officers and RNLI crews.

HM Coastguard has been recommended to conduct an impact assessment to determine the effectiveness of the actions the organisation has taken, as a result of the lessons learned from the *Solstice* investigation, to improve its network operations.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *SOLSTICE* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	*Solstice*
Flag	UK
Classification society	Not applicable
IMO number/fishing numbers	PH199
Type	Scalloper/trawler
Registered owner	Mr C A Jones
Manager(s)	Not applicable
Construction	Steel
Year of build	2000
Length overall	9.9m
Registered length	9.33m
Gross tonnage	9.23
Minimum safe manning	Not applicable
Authorised cargo	Not applicable
VOYAGE PARTICULARS	
Port of departure	Plymouth
Port of arrival	Not applicable
Type of voyage	Coastal
Cargo information	Fish
Manning	3
MARINE CASUALTY INFORMATION	
Date and time	26 September 2017 at about 1938
Type of marine casualty or incident	Very Serious Marine Casualty
Location of incident	Approximately 7 miles south of Plymouth
Place on board	Ship
Injuries/fatalities	1 fatality; 1 injury
Damage/environmental impact	Vessel lost. No harm to the environment
Ship operation	Hauling fishing gear
Voyage segment	Mid-water
External & internal environment	Wind: slight Sea State: south-south-westerly groundswell Visibility: 3 - 4nm Night
Persons on board	3

1.2 BACKGROUND

The 9.9m fishing vessel *Solstice* **(Figure 1)** was equipped to work as either a scallop dredger or a stern trawler. Until September 2017, the vessel's owner, Clive Anthony Jones (Tony), had worked *Solstice* out of Sutton harbour, Plymouth, as a scallop dredger. At the beginning of September, Tony and his son, who was the vessel's permanent skipper, decided to re-rig *Solstice* and trawl for cuttlefish. This was to increase the vessel's earning capacity and reduce the crew's workload.

On 24 September, Tony, his son and a crewman took *Solstice* to a local fishing ground to test the vessel's trawl gear. Almost immediately, they encountered problems with the net warps and had to return to harbour. They returned to the fishing grounds the following day and completed one successful trawl. That evening, Tony decided to accompany his son and his crewman one more time to satisfy himself that they could work *Solstice* safely and efficiently as a stern trawler.

Figure 1: *Solstice*

1.3 NARRATIVE

1.3.1 The accident

At about 0415 on 26 September 2017, Tony was collected from his home by his son (from here on referred to as *Solstice*'s skipper) and driven to Sutton harbour, where they met their crewman and boarded *Solstice*. The skipper also took his partner's dog on board with him. At about 0430, the skipper manoeuvred *Solstice* out of the harbour and headed for fishing grounds 4 miles east of Eddystone Lighthouse **(Figure 2)**.

Solstice arrived at the fishing grounds about 1½ hours later and the fishing gear was shot away. Shortly afterwards the crewman went below to the crew cabin to sleep. At about 0800, the skipper spoke to his partner on his mobile phone and told her that they intended to complete two trawls during the day and that he would be home sometime between 1800 and 1900.

After about 4 hours of trawling in a southerly direction, the crewman was woken, and the gear was retrieved. The catch, which amounted to two boxes of bass and a box of cuttlefish, was landed on to the vessel's stern deck and carried forward to the fish hold. *Solstice* was then brought around on to a near reciprocal northerly track **(Figure 3)** and its gear was shot away for the second time. The skipper took his turn to rest in the cabin below. At 1440, the crewman sent a text message to his partner to say he would call her when he was free.

At about 1620, the skipper was woken to start the second and final haul. Using the forward deck winch, the skipper hauled in on the trawl warps[1] until the trawl doors[2] were clear of the water and secured to the vessel's gunwale[3]. The net drum[4] was then used to haul in the net. At about 1700, the net's cod-end[5] emerged on the surface of the water **(Figure 4)** and the load on the net drum began to fluctuate as *Solstice* pitched in the swell. As the crewman went to attach a gilson[6] rope to the lazy-deckie[7], the net drum suddenly released and the net ran back into the water.

Tony and the skipper visually inspected the net drum and concluded that its hydraulic motor or gearbox had probably failed. Realising that they could not repair the net drum, Tony decided to attach a hook to the gilson rope and use the main deck winch to haul in the net and land the catch.

The skipper went forward to operate the winch while Tony and the crewman stayed aft to recover the net. The crewman attached the lifting hook to the net and the skipper hauled in on the gilson rope. Each time the lifting hook reached the pulley block at the top of the aft gantry **(Figure 5)**, the net was secured by a rope to the handrail at the stern of the wheelhouse and the hook lowered. The loose section of net was then laid on the deck behind the wheelhouse. This process was repeated many times. As the cod-end started to rise out of the water the rope used to tie off the net parted and the weight of the catch pulled the net overboard for a second time. The process of recovering the catch was started again.

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1 Trawl warps – steel wires for hauling the trawl nets.

2 Trawl doors – shaped steel plates used to keep the mouth of the trawl net open.

3 Gunwale – the top edge of the side of a boat.

4 Net drum – Used to store the fishing net.

5 Cod-end – the narrowed end of a tapered trawl net.

6 Gilson is a generic term for winches, blocks and ropes used to lift and move fishing gear around the deck of a fishing vessel.

7 A lazy-deckie is a line attached to the net that is used to lift or manoeuvre the cod-end.

Reproduced from Admiralty Chart 1613-0 by permission of HMSO and the UK Hydrographic Office

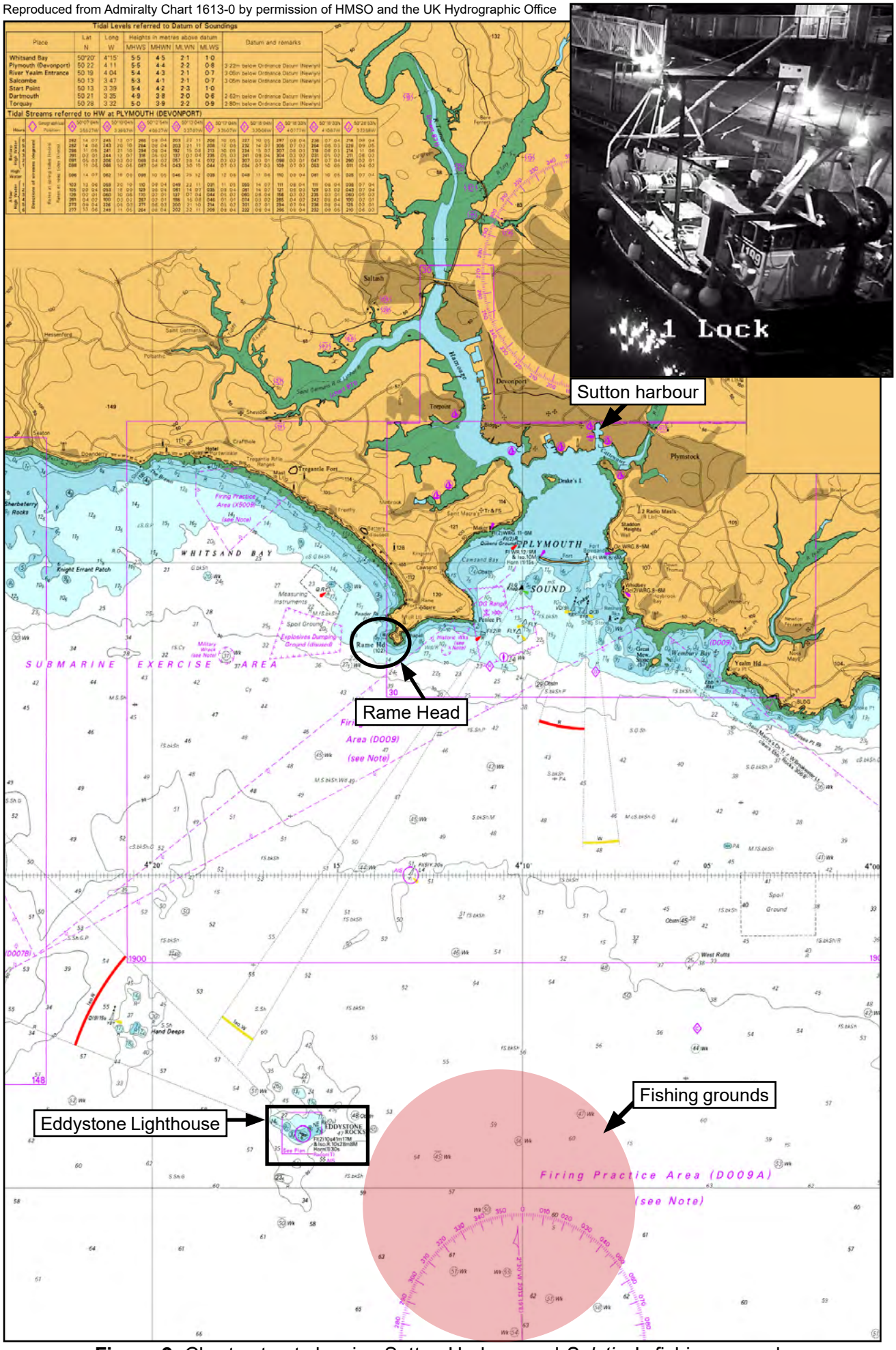

Figure 2: Chart extract showing Sutton Harbour and *Solstice*'s fishing grounds

Reproduced from Admiralty Chart 1613-0 by permission of HMSO and the UK Hydrographic Office

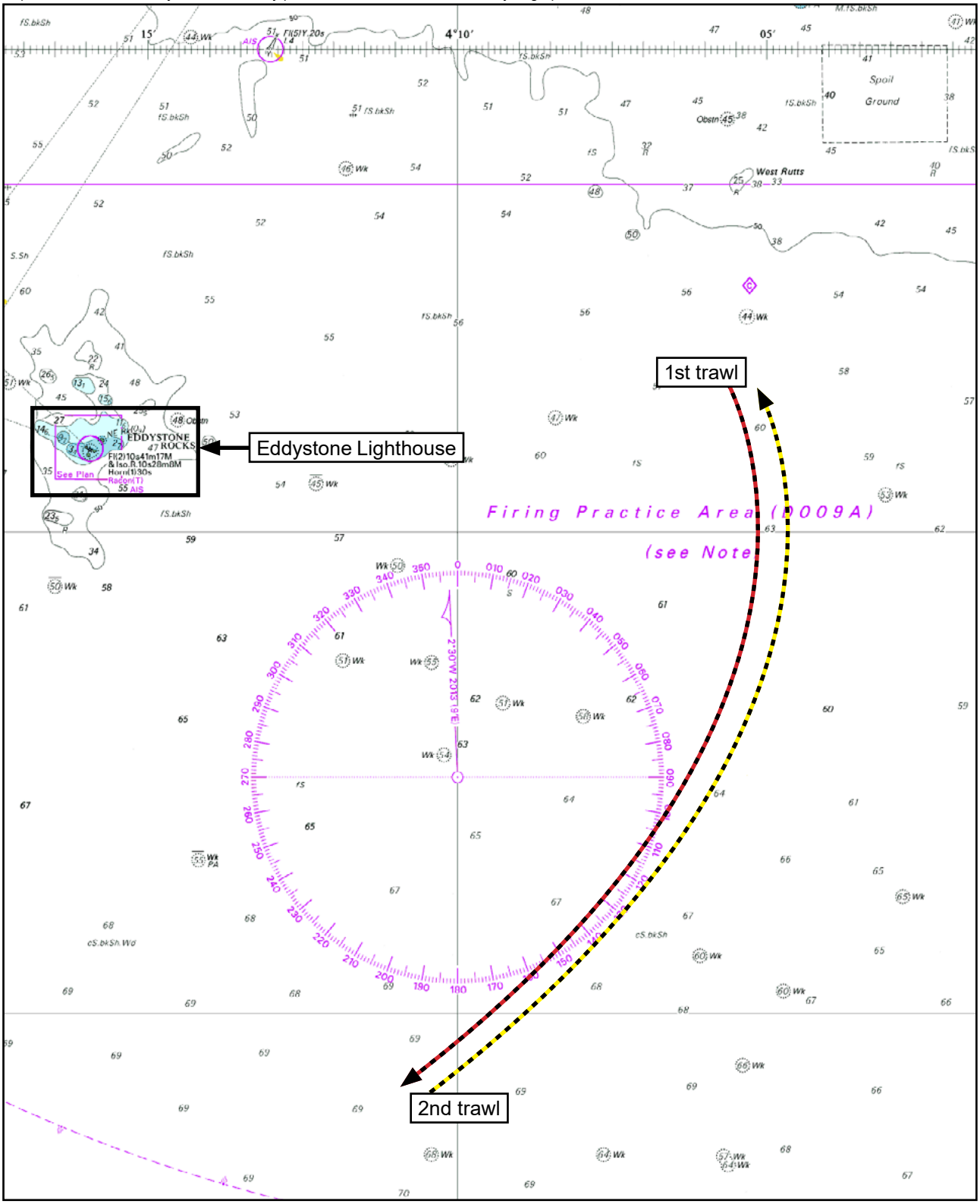

Figure 3: Approximate tracks taken by *Solstice* when trawling

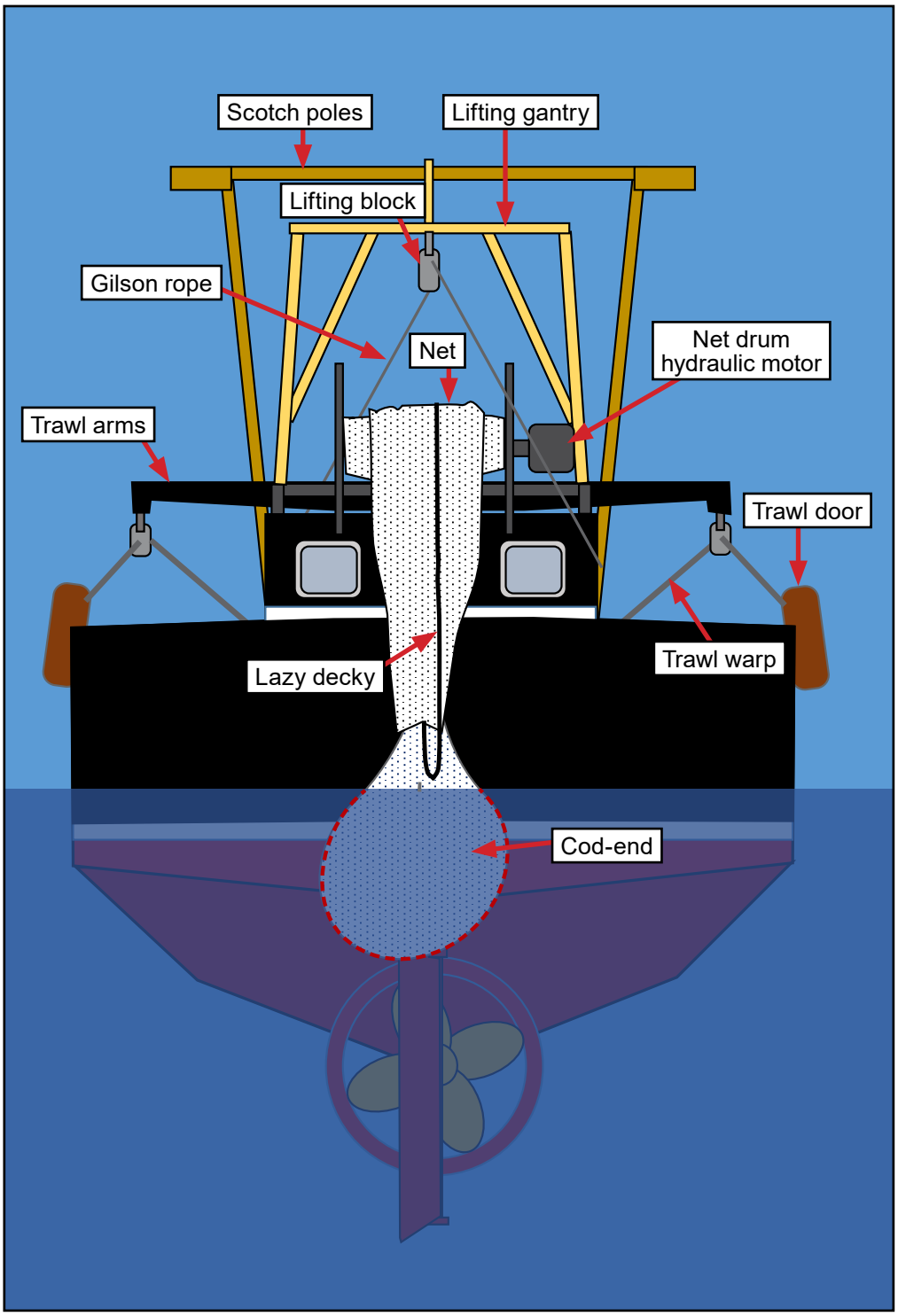

Figure 4: Recovery of cod-end – view from astern

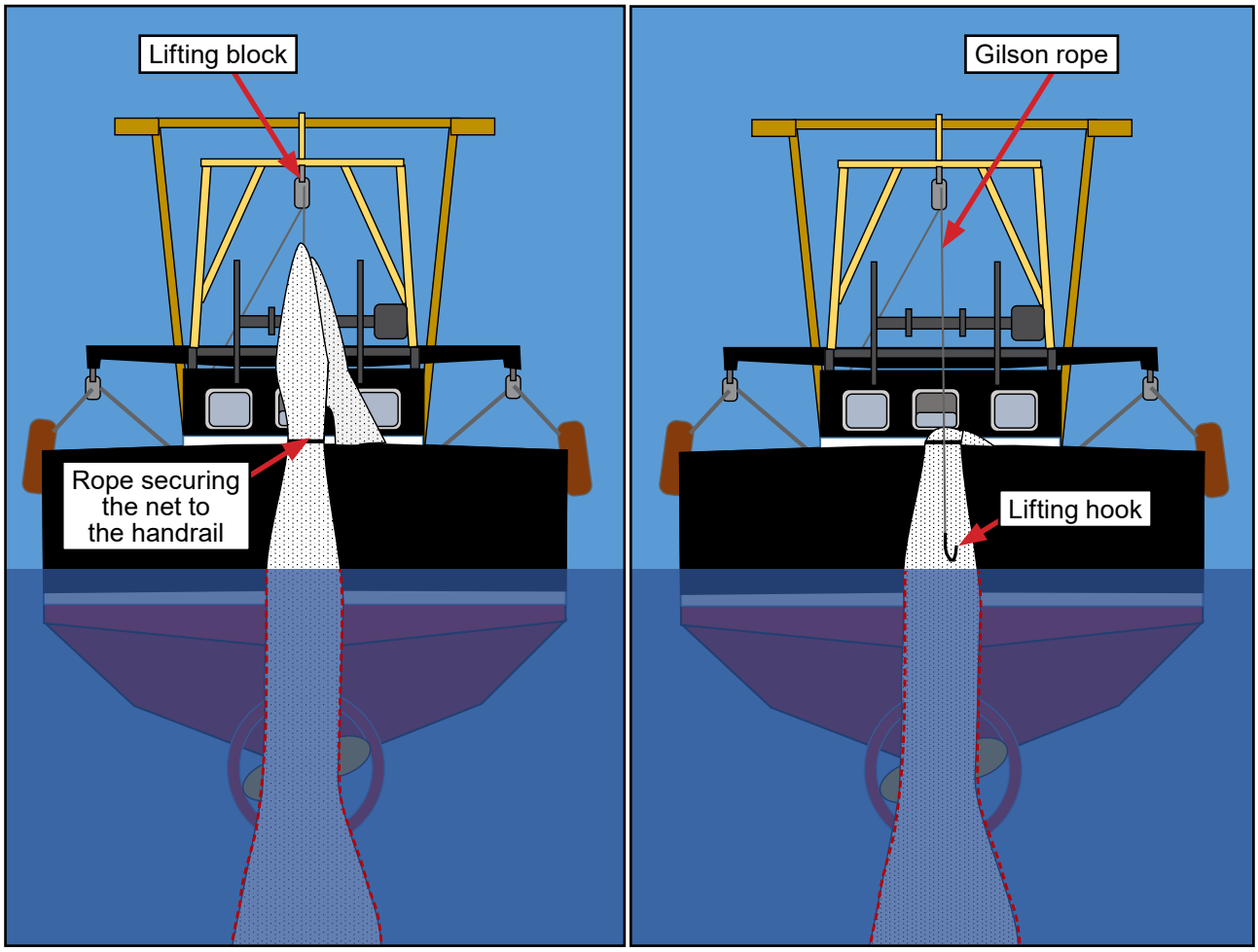

Figure 5: Recovery of net following net drum failure – view from astern

As the fishermen struggled to land the catch, the skipper's partner tried several times to contact her husband on his mobile phone. The skipper heard his phone ringing but was too busy to answer it.

At about 1930, the cod-end was lifted clear of the water **(Figure 6)**; it was full of fish, sand and moss. With the weight of the catch suspended from the gantry block, *Solstice* started to roll more heavily and the cod-end began to roll along the top of the transom. As the vessel rolled to port, the gilson rope and net slipped over the net drum cheek[8] plate. As the cod-end swung further from the centreline it caused *Solstice* to list heavily to port **(Figure 7)**.

Realising the danger, the crewman shouted out to Tony that they needed to cut the cod-end away, and asked him for a knife. Tony went in to the wheelhouse, grabbed a knife and passed it to the crewman through the aft wheelhouse window. As the crewman began slashing at the cod-end, the skipper rushed aft to help. As the skipper moved aft and water started to flood through the freeing ports on to the deck, the skipper shouted "the boat is going over".

At about 1938 *Solstice* capsized to port. The skipper and crewman tried to climb up to the high side of the deck, but the boat rolled on top of them; Tony was still in the wheelhouse. The crewman, who had been hit on the head by the starboard trawl door, pushed himself away from the upturned deck and swam to the surface. As he did so he looked through the wheelhouse windows and saw Tony floating motionless inside. Moments later, the skipper pulled himself clear and swam to the surface.

[8] Cheek plates – the side plates of the net drum to contain the net on the drum.

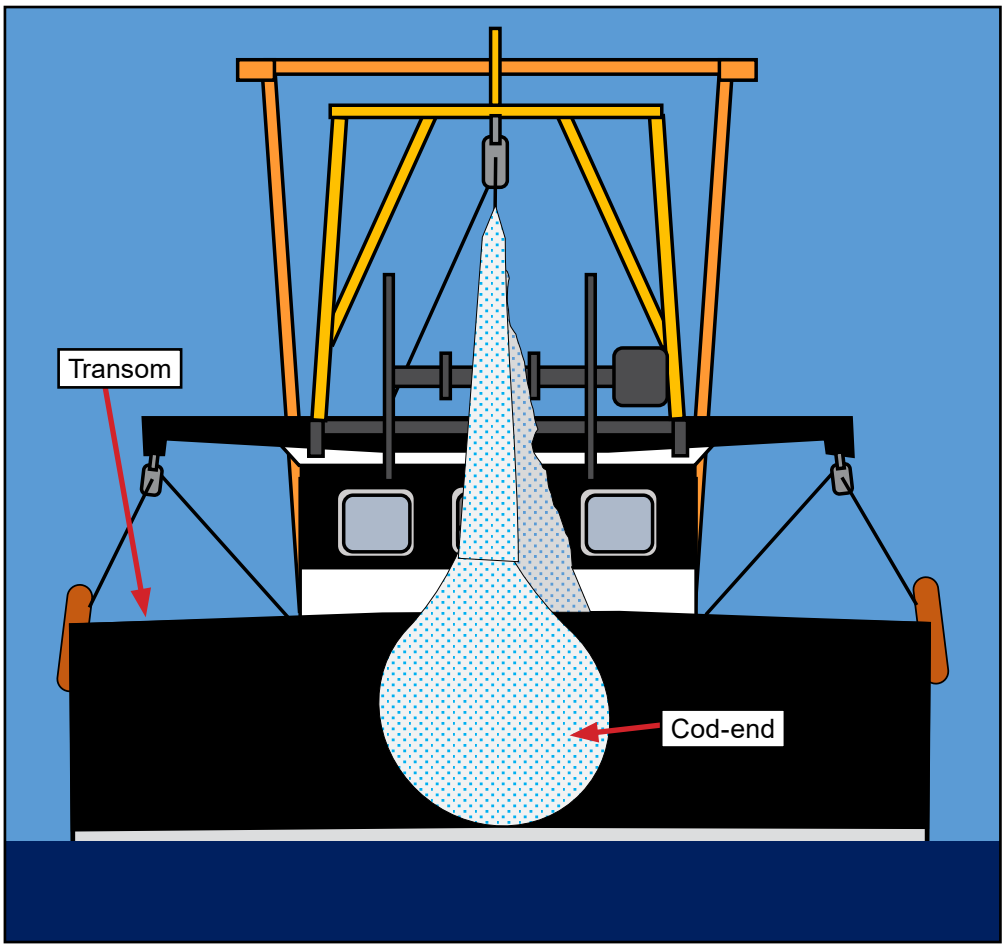

Figure 6: Cod-end out of the water, resting on the transom – view from astern

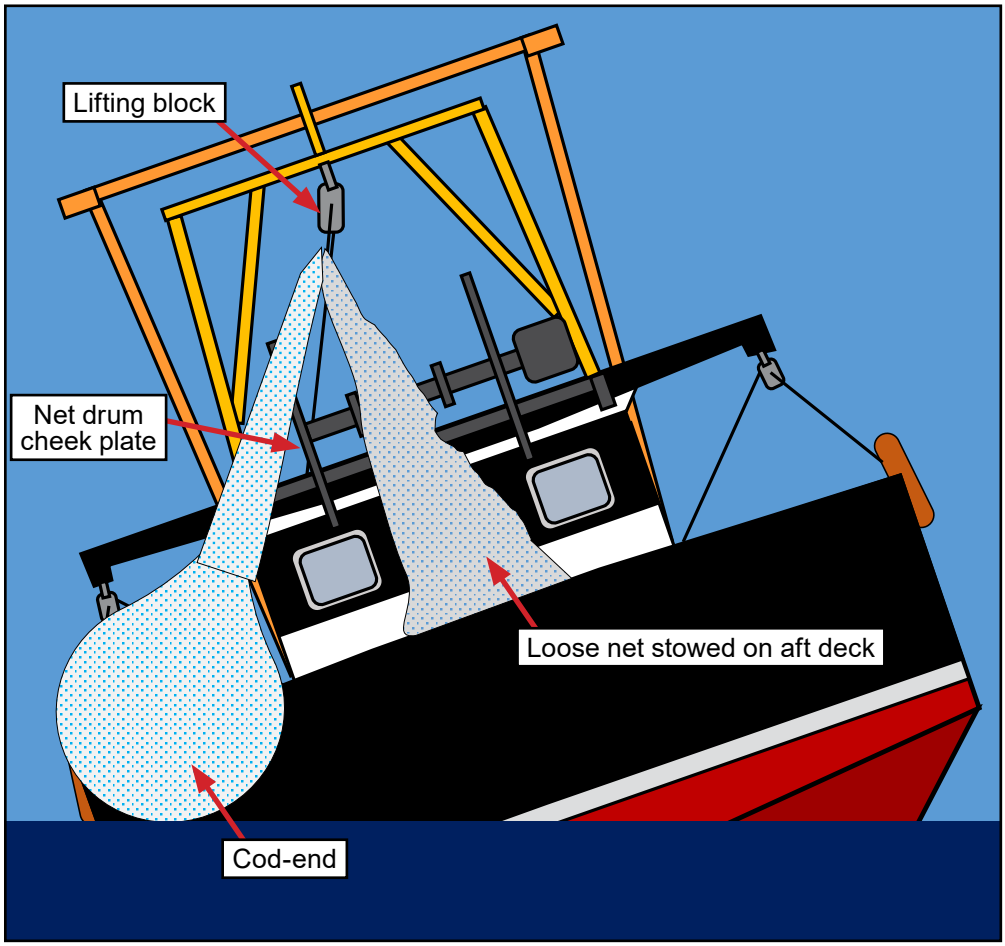

Figure 7: Cod-end on port quarter, heavy list to port as cod-end rolled across the transom – view from astern

Solstice remained afloat with its upturned hull protruding out of the water **(Figure 8)**. The crewman helped the skipper swim to *Solstice*'s hull and using the exposed scupper drains and engine cooling pipes, he climbed out of the water onto the upturned hull. He then took off his waterproof leggings and used them to help pull the skipper out of the water. Without any means of raising an alarm, the two men lay against the engine's keel cooling pipe for warmth.

As *Solstice* drifted in a north-westerly direction under the influence of the tide, the men tried to reassure each other and hoped they would be spotted by a passing vessel.

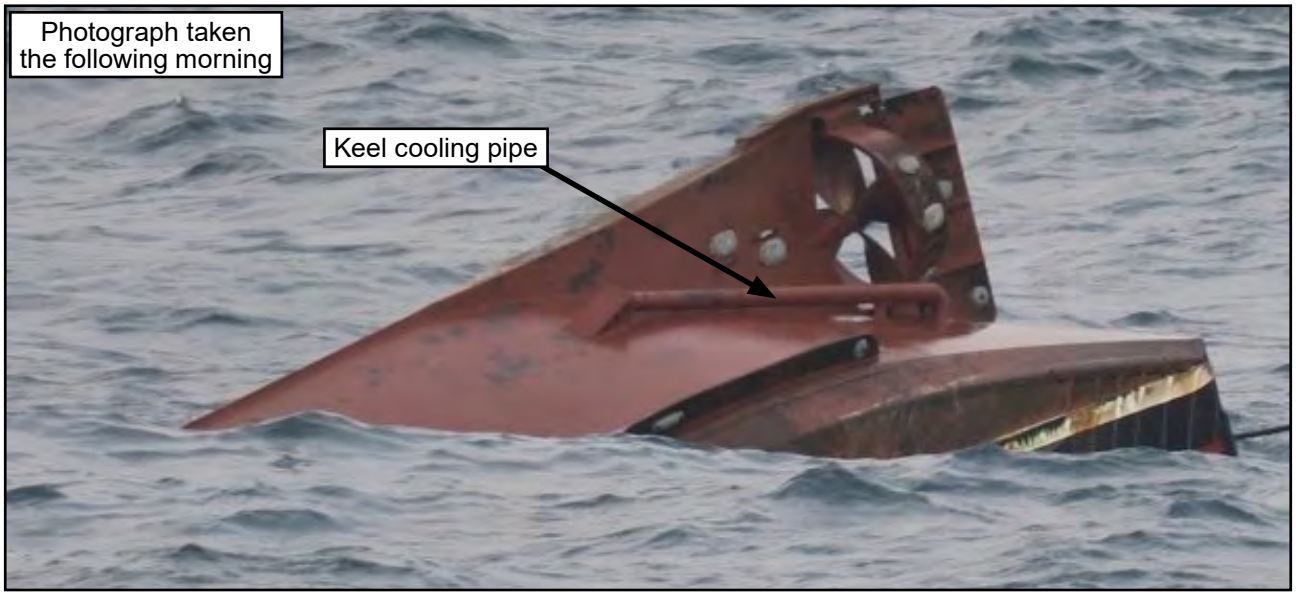

Figure 8: Upturned hull floating on surface

1.3.2 The emergency response

When the fishermen did not return home at the time they were expected their partners began to worry. As time passed, the skipper's partner became increasingly concerned because it was unusual for her husband to be so late without having contacted her. Furthermore, his mobile phone was going straight to answer phone. At about 2000, the skipper's partner went to Sutton harbour with her father to see if *Solstice* had returned. When they arrived at the harbour they found the skipper's car parked on the quay, but *Solstice* was not there.

At 2038, the skipper's partner's father contacted the coastguard by telephone and reported *Solstice* overdue. His initial call was taken by the duty Maritime Operations Officer (MOO) at the Falmouth Coastguard Operations Centre (Falmouth coastguard). After about 5 minutes, the phone was passed to the skipper's partner, who continued to supply information to the MOO about the vessel and its crew. When asked where the vessel had been fishing, the skipper's partner explained that it had only been trawling for a couple of days and that she did not know. The coastguard officer tried to reassure the skipper's partner and told her to stay where she was and that help would be on its way.

At 2106, the Falmouth coastguard Senior Maritime Operations Officer (SMOO), who was also the designated Search and Rescue Mission Co-ordinator (SMC[9]), attempted to contact *Solstice* on very high frequency (VHF) radio channel 16.

[9] SMC – the coastguard officer who co-ordinates a response to an actual or apparent distress situation.

During this time the MOO spoke to the crewman's partner, and was told that *Solstice* had been trawling to the south of Eddystone Lighthouse. At 2115, having received no response from *Solstice*, Falmouth coastguard issued a "Pan Pan"[10] broadcast, alerting vessels in the area that *Solstice* was overdue and requesting reports of any sightings. At 2116, a coastguard rescue team (CRT) was despatched to Sutton harbour to provide support to the skipper's partner and gather more information.

The first response to the "Pan Pan" broadcast was received at about 2127 from the master of the UK Border Force patrol vessel *Vigilant*. He offered his vessel's support to the search and rescue (SAR) mission and asked for *Solstice*'s last known position. The MOO explained that the coastguard had no last known position, but that reports indicated the vessel had been fishing to the south of the Eddystone Lighthouse. *Vigilant* was about 3nm south-west of Bolt Head, Salcombe, and heading west towards Plymouth.

At 2136, the skipper's partner called Falmouth coastguard and advised that she had received a message from the skipper of the fishing vessel *Kenavo* telling her that he had seen *Solstice* fishing to the south-west of the "coal boat". Unable to explain what or where the coal boat was, the skipper's partner said she would find and pass on the contact details of *Kenavo*'s skipper. By that time, efforts were also being made by the coastguard to retrieve the communications and positional data from the fishermen's mobile phone service providers.

At about 2150, the MOO called *Kenavo*'s skipper. The skipper advised that he had been fishing alongside *Solstice* during the afternoon and last saw the vessel between 1700 and 1730 hauling its gear 7 miles south of Plymouth and 8 miles east of the Eddystone Lighthouse. When asked about the coal boat, *Kenavo*'s skipper explained that it was a wreck known as the Western Coal Boat[11] and *Solstice* had been 2 miles south-west of it. Shortly afterwards, the coastguard's duty Maritime Operations Controller (Duty Controller[12]), based at the coastguard's National Maritime Operations Centre (NMOC), suggested that a lifeboat and possibly a helicopter should be deployed to begin a search centred around the Eddystone Lighthouse.

At 2202, the Deputy Launch Authority (DLA) at the Plymouth RNLI lifeboat station called Falmouth coastguard and advised the SMC that he was going to launch his all weather lifeboat (ALB) and begin a search for *Solstice*. The SMC acknowledged his intention and tasked the ALB to proceed to the Eddystone Lighthouse and conduct an expanding square search.

Over the following couple of hours, the SAR effort was escalated, with the coastguard drawing on additional resources from other RNLI lifeboat stations, SAR helicopters and ships operating in the area.

At 0053 (27 September), *Solstice*'s skipper and crewman were spotted on the vessel's upturned hull by the crew of SAR helicopter R924 **(Figure 9)**. The Looe RNLI inshore lifeboat (ILB) arrived on the scene 8 minutes later and recovered the survivors on board. The survivors were then transferred ashore while the search for Tony continued.

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[10] The international radiotelephony urgency signal. "Pan Pan" repeated three times, indicates uncertainty or alert, followed by nature of urgency.

[11] Western Coal Boat wreck is not charted.

[12] The duty controller provides tactical command for coastguard SAR missions.

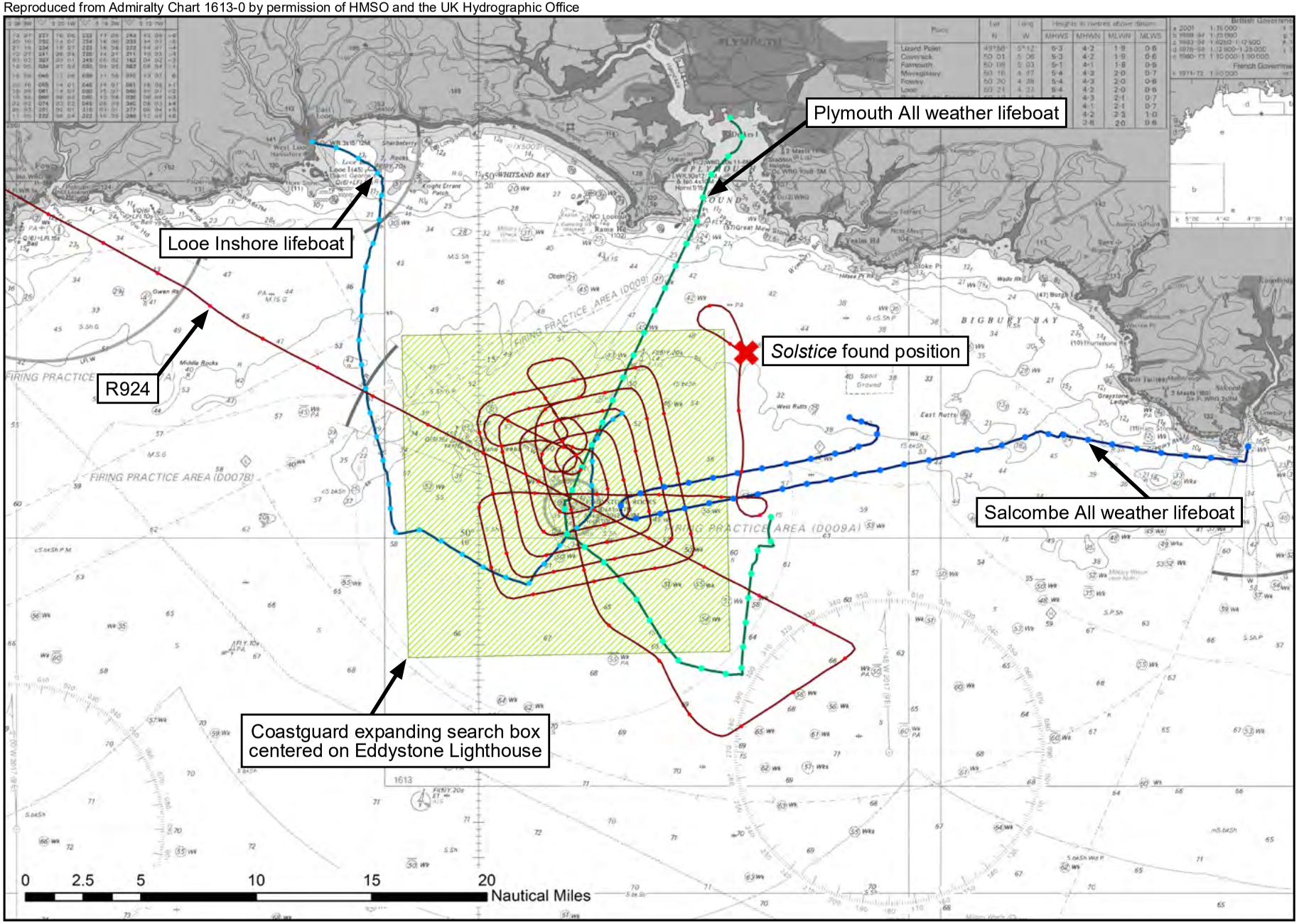

Figure 9: SAR plan showing routes taken by SAR assets

The Royal Navy (RN) warship HMS *Argyll* was requested to stand-by *Solstice* overnight. At 0830, the Plymouth-based RN dive tender *Datchet* was tasked to attend and assist **(Figure 10)**. By that time, *Solstice* had drifted about 1nm from Rame Head and HMS *Argyll*'s crew had connected a towline to the hull to prevent the vessel going aground. At 1020, two RN divers entered the water, and about 8 minutes later they found Tony's body floating against the deck on the port side of *Solstice*'s wheelhouse. He was recovered and taken ashore.

About 1½ hours later, *Solstice* foundered in position 50° 18'.408N 004° 12'.396W, about 0.5nm south of Rame Head in 26m of water. As the vessel foundered, it turned upright and its liferaft came to the surface and inflated.

The postmortem examination report gave the cause of Tony's death as drowning. Bruising was noted on the left side of his face and there were cut injuries to the back of his head.

Figure 10: RN dive team preparing to dive on *Solstice*

1.4 CREW

Tony Jones was 63 years old and had over 40 years' experience working in the fishing industry. He had owned several fishing boats during that time, including scallop dredgers and stern trawlers, and he had owned *Solstice* since December 2016. Tony held a Seafish[13] 16.5m fishing vessel skipper's certificate, which included

[13] Seafish is an executive non-departmental public body sponsored by the Department for the Environment, Food and Rural Affairs.

both bridge and engine room watchkeeping and Intermediate Stability Awareness endorsements. He had also completed the mandatory safety courses for UK fishermen in sea survival, elementary first-aid, fire-fighting, health and safety, and safety awareness. Tony had occasionally taken *Solstice* to sea but his main role was to manage the vessel.

The 34 year old skipper had been a fisherman for about 12 years. His experience was mostly on scallop dredgers but had included work on potting vessels and trawlers, including working on board his father's boats and co-owning one of them. He had obtained the same qualifications as his father and had completed the mandated safety courses.

The crewman was 25 years old and had worked on board five different fishing vessels in the 3-year period prior to this accident. Before that, he had worked in the fish industry ashore. He had been a crewman on board *Solstice* since Tony bought the vessel, and he had worked with the skipper on a previous vessel. He had undertaken the mandated sea survival, fire-fighting and first-aid safety courses but had not completed the health and safety, and safety awareness courses.

1.5 ENVIRONMENTAL CONDITIONS

Solstice capsized shortly after sunset. It was dark, the visibility was moderate to good, the sea state was slight to moderate with little or no wind. The air and water temperatures were 15°C and 16°C respectively. The depth of water at the fishing grounds was 60m and the seabed was fine sand and broken shells with areas of sea moss.

1.6 VESSEL AND OPERATION

1.6.1 Vessel description

Solstice was built in 2000 at the Offshore Steel Boats shipyard in Barton, Humberside. It had an all steel construction, with an aft wheelhouse, all-round bulwark and a raked and curved transom. It had a conventional single screw propeller and blade-type rudder, and its hull had an aft skeg and was fitted with bilge keels **(Figures 11, 12** and **13)**. Below deck from fore to aft was a forward store, insulated fish hold, engine room, full width cabin, and aft peak space that contained the steering gear. Access to the engine room and cabin space was via the wheelhouse, and access to the fish hold and forward store was via hatches on the forward working deck. The wheelhouse door was on the port side.

The vessel had a 2t working load limit multi-purpose, four-barrel, double-drum hydraulic winch on the forward deck and a hydraulic net drum on top of the wheelhouse roof. It also had a landing derrick on the foremast, scotch poles amidships, an aft gantry with trawl arms and port and starboard hinged outriggers for scalloping **(Figures 14** and **15)**.

The wheelhouse was equipped with a radar, echo sounder, two global positioning system (GPS) receivers, an autopilot and a digital selective calling (DSC) enabled VHF radio.

Figure 11: Pre-purchase survey – hull form forward port side

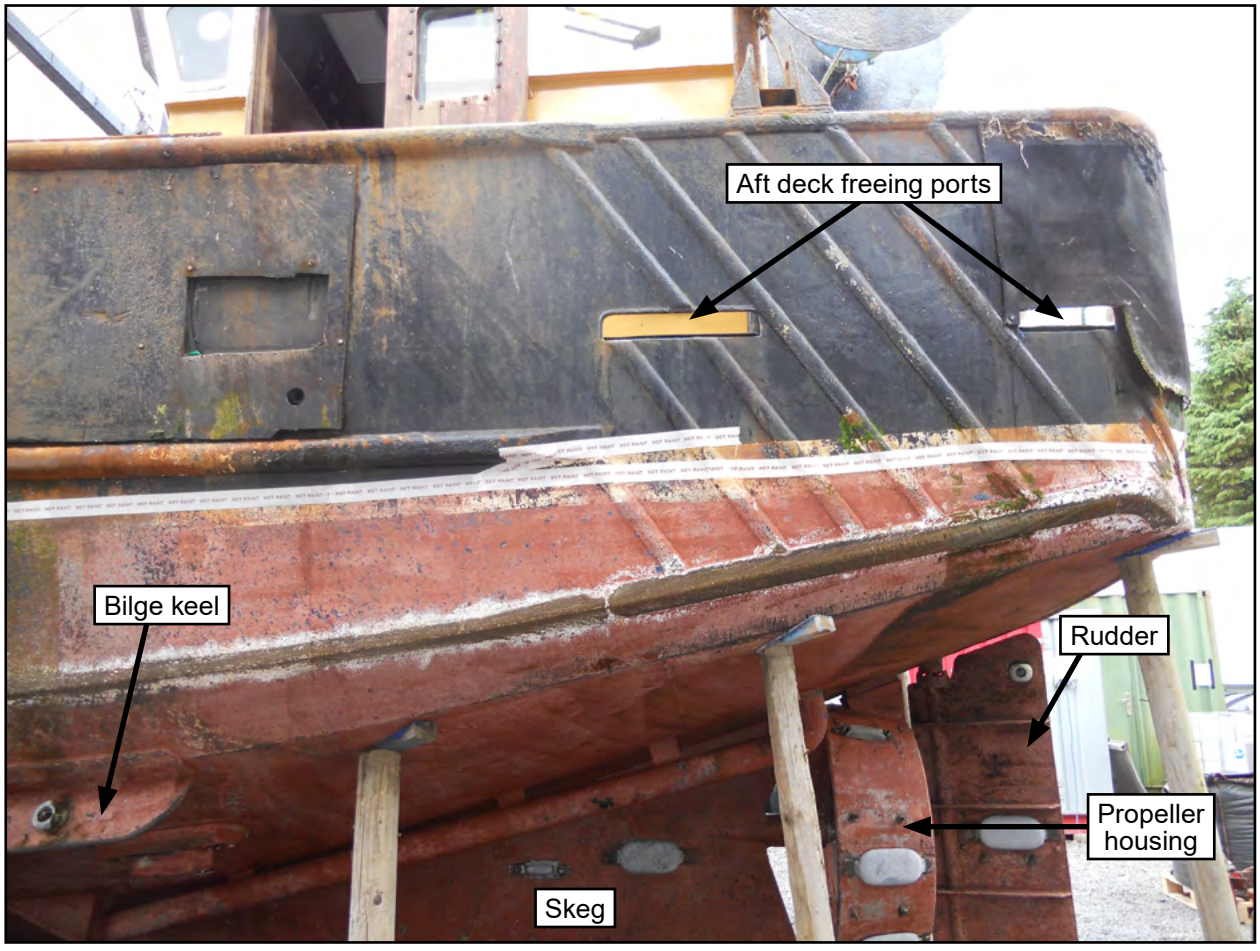

Figure 12: Pre-purchase survey – hull form aft end port side showing aft skeg design

Figure 13: Pre-purchase survey – hull form aft

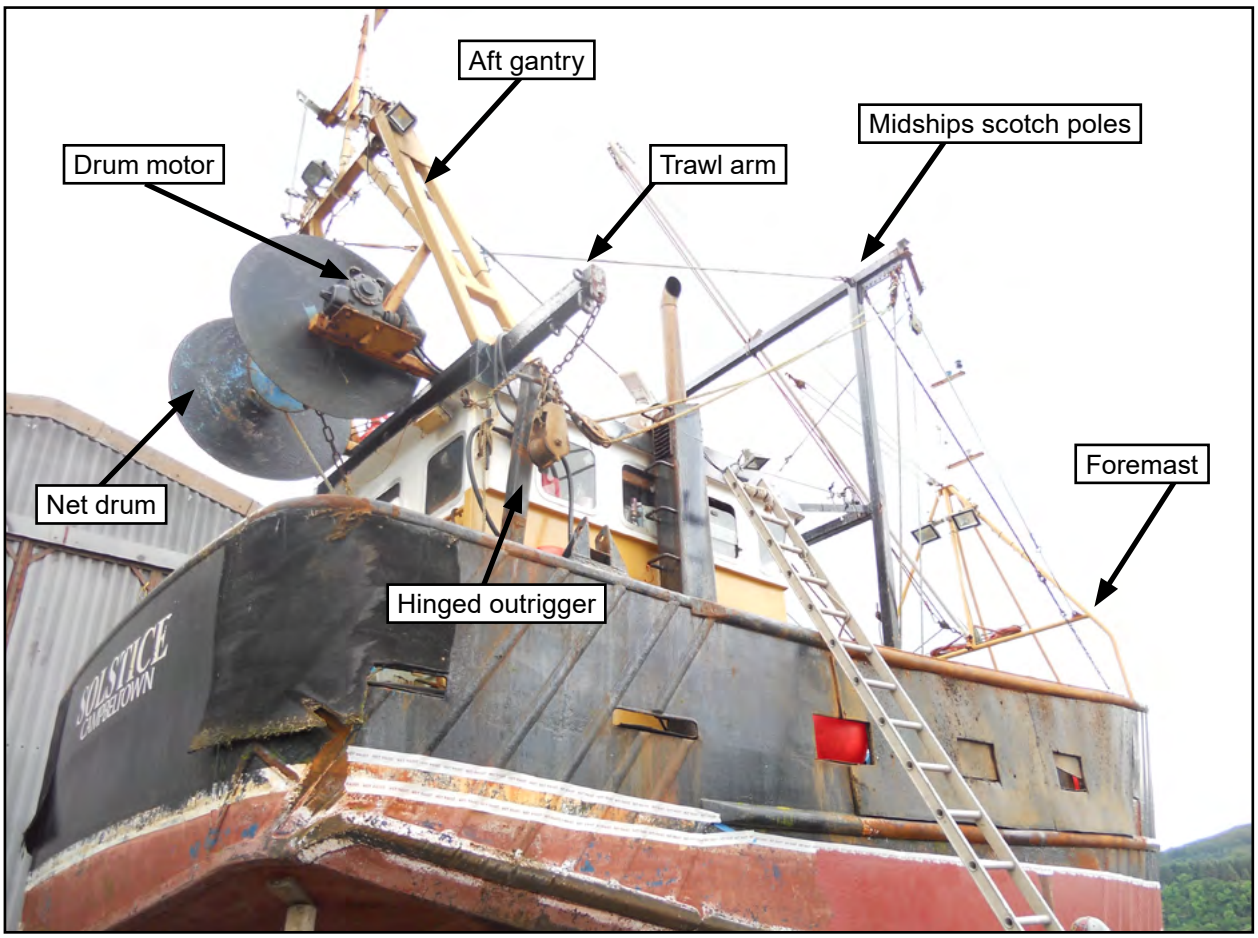

Figure 14: Pre-purchase survey – upper structural components

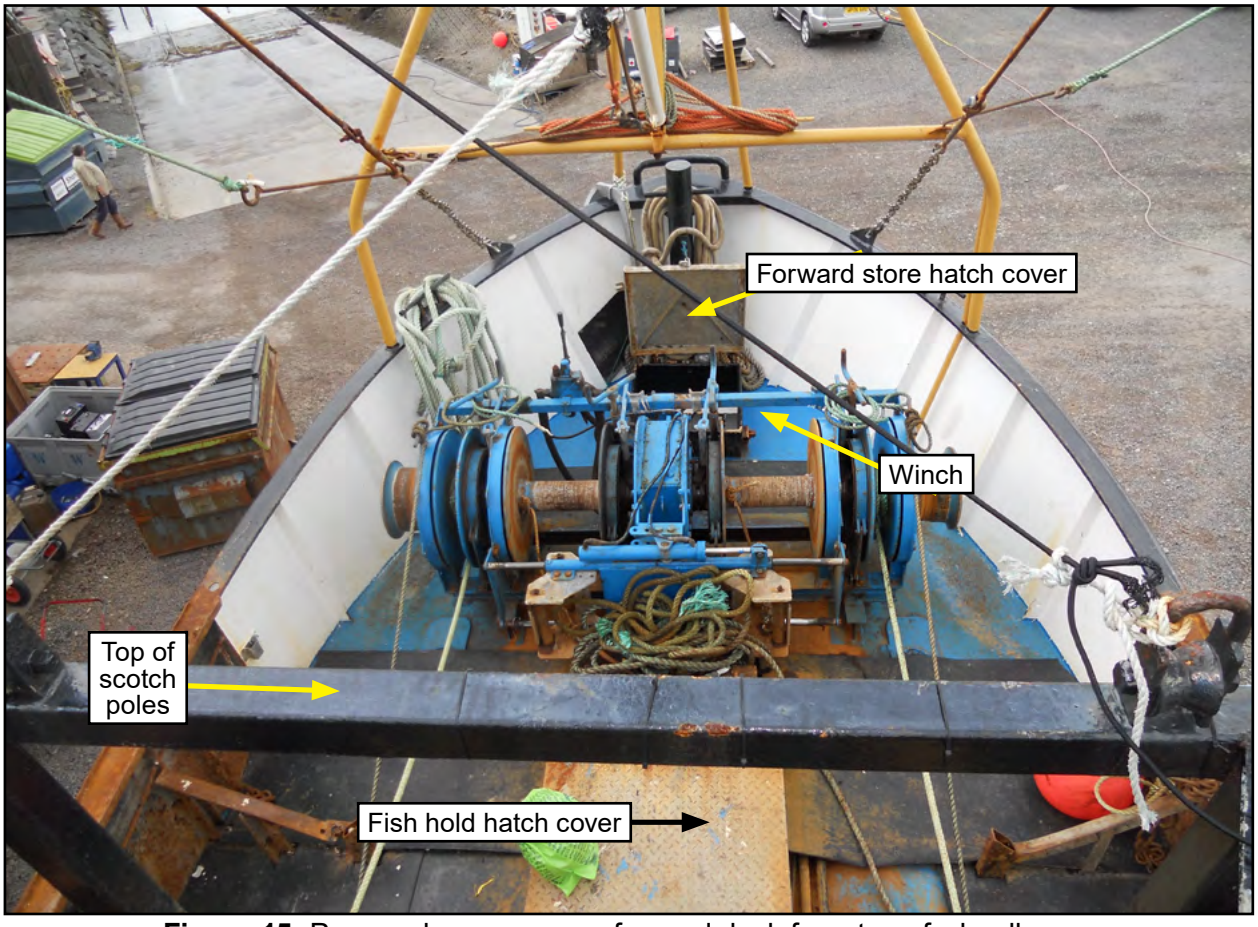

Figure 15: Pre-purchase survey – forward deck from top of wheelhouse

1.6.2 Vessel alterations

Solstice was initially fitted out in Maldon, Essex, as a beam trawler, but it was subsequently re-rigged for scallop dredging and stern trawling. It had had several owners and had previously been operated as a scallop dredger and a stern trawler off the south coast of England and the west coast of Scotland. The net drum was fitted in 2006 and the deck winch was fitted in 2007. No other structural alterations were made before it was sold to Tony.

Between 23 May and 18 June 2017, modifications were made to *Solstice*'s bulwarks and dredge gear to improve working methods and increase the vessel's catch. Longer dredge beams with five bags instead of four were fitted and larger steel trays for landing the dredge bags were welded to the top of the forward deck gunwales **(Figure 16)**.

In September 2017, further alterations were made in preparation for trawling. These included:

- Removal of the dredge gear and hinged dredge warp outriggers.
- Stowage of the dredge beam toothed bars in the fish hold as ballast to increase forward visibility by trimming the bow down.
- Rigging of a gilson line block at the top of the aft gantry and two trawl warp blocks at the ends of the trawl arms.
- The addition of trawl doors and a 10-fathom net.

Solstice was equipped with 260 fathoms of trawl warps; prior to that it had operated with 100 fathoms of dredge warps.

1.6.3 Method of catch recovery

Solstice did not have a written risk assessment or safe system of work for trawling. The method **(Figure 17)** used by Tony to land the catch involved recovering the net over the stern and emptying the cod-end onto the deck area aft of the wheelhouse. To do this, the forward winch was used to haul in the trawl warps and sweeps. Once the trawl doors were secured, the net drum was used to haul the cod-end to the surface. The cod-end was then lifted over the stern deck bulwark using the deck winch and a gilson rope. The gilson rope was rigged through the block at the top of the aft gantry. The cod-end was emptied onto the aft deck between the pound boards **(Figure 18)**. Once landed, the catch was processed, boxed up and taken forward to the fish hold.

The trawl recovery method adopted by Tony differed from that of *Solstice*'s previous owners, who had landed the catch on the main deck. To achieve this, the trawl warps and doors were recovered as described above. The vessel was then put into a slow steady turn and a gilson rope, rigged through a block at the top of one of the scotch poles, was attached to the lazy-deckie and used to pull the cod-end forward. The cod-end was then hoisted on board and emptied onto the main deck.

Figure 16: Modifications carried out to *Solstice* in 2017 to improve dredging method

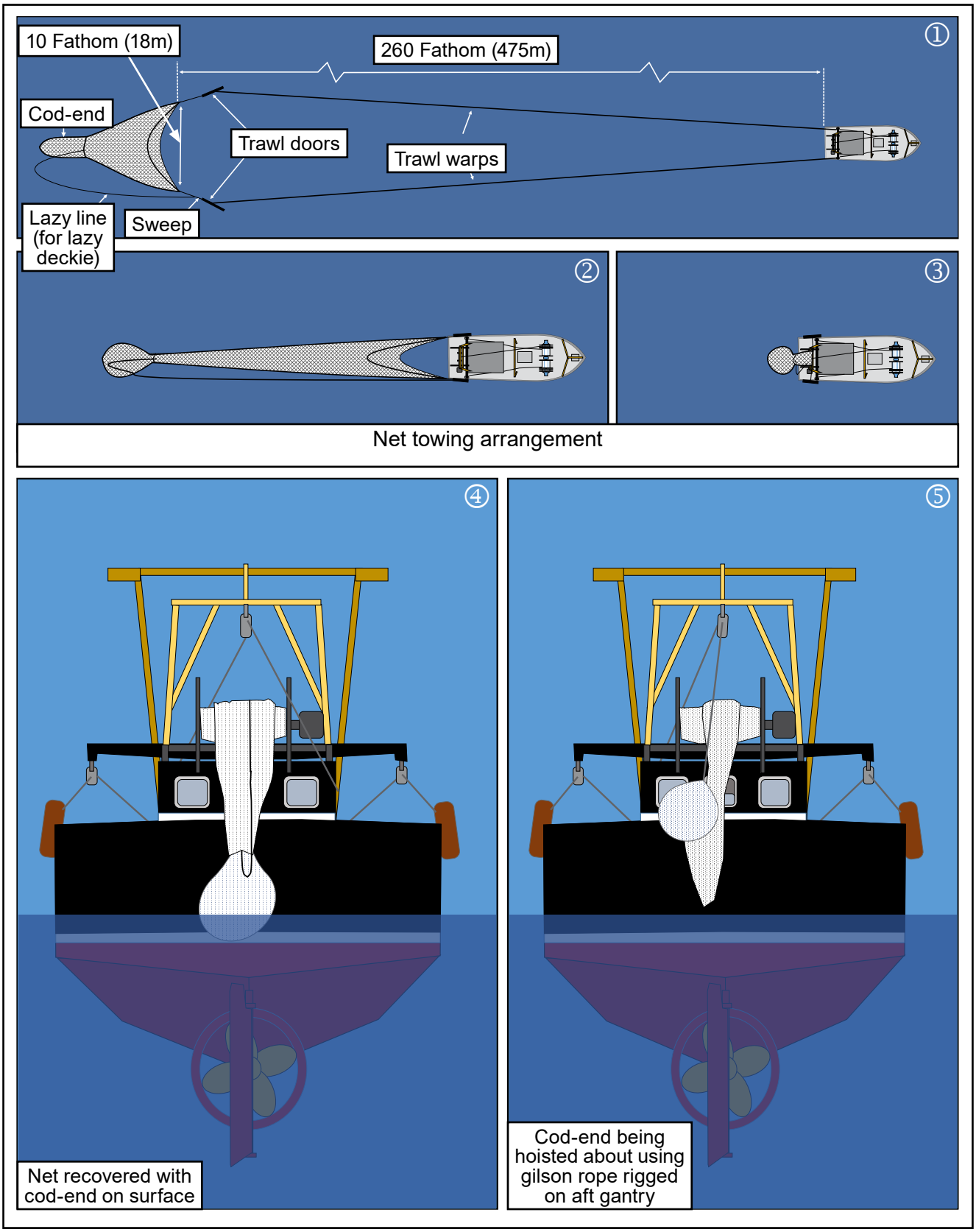

Figure 17: *Solstice* net towing and catch recovery method

Figure 18: Aft deck

1.6.4 Lifesaving appliances and safety equipment

In accordance with the *Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations 2001*, *Solstice* had to comply with the requirements set out in Merchant Shipping Notice (MSN) 1813 (F) *The Code of Practice for the Safety of Small Fishing Vessels* (SFV Code). The aim of the SFV Code was to improve safety standards on board UK registered fishing vessels of less than 15m length overall and raise safety awareness of all those involved with the construction, operation and maintenance of such vessels.

The SFV Code listed the lifesaving appliances (LSA) and safety equipment that owners were required to carry on board their vessels. The mandatory equipment listed in the Code differed according to the length and construction of the vessel. The list for decked vessels of less than 10m registered length, such as *Solstice*, included:

- Lifejackets – 1 per person.
- Two lifebuoys (one with 18m buoyant line attached) or one lifebuoy (fitted with 18m buoyancy line) + one buoyant rescue quoit.
- VHF radio – fixed (DSC) or hand-held.

The SFV Code emphasised that its lists represented the minimum safety equipment requirements and encouraged owners to consider carrying additional safety equipment such as *a liferaft with release mechanism* and an emergency position indicating radio beacon (EPIRB).

Solstice carried five personal flotation devices[14] (PFDs), three solid-filled (inherently buoyant) lifejackets for emergency use and two *Mullion Compact* 150N inflatable lifejackets for working on deck. All were stowed in the wheelhouse. The inflatable lifejackets had not been used and were still in their original packaging.

Solstice had two lifebuoys, one each side of the wheelhouse; the starboard lifebuoy had an 18m buoyant line. The vessel also had a four-person *Seago Offshore* liferaft that was stowed in a cradle on top of the wheelhouse roof **(Figure 19)** and secured in place by a hydrostatic release unit (HRU). The liferaft was on board when Tony purchased the boat and was overdue its periodic service (the service due date was May 2017).

Figure 19: Liferaft on top of wheelhouse

[14] There are two main classes of PFD: those that provide face up in-water support to the user regardless of physical conditions (lifejackets), and those that require the user to make swimming and other postural movements to keep their face out of the water (buoyancy aids).

In October 2017, the *Fishing Vessels (Code of Practice for the Safety of Small Fishing Vessels) Regulations 2001* were superseded by the *Fishing Vessels (Code of Practice) Regulations 2017* and MSN 1813 (F) was replaced by MSN 1871 (F) *The Code of Practice for the Safety of Small Fishing Vessels of less than 15m Length Overall*. The findings of MAIB investigation reports were considered during the drafting of the revised SFV Code. Of note, a requirement to carry EPIRBs was introduced for all vessels of 10m registered length and over. Vessels of less than 10m, such as *Solstice*, were permitted to carry personal locator beacons (PLBs) with a GPS receiver for each crew member in lieu of an EPIRB. A requirement to carry liferafts was also introduced for all vessels over 7m. These new requirements came into force immediately for new vessels and existing vessels were required to comply by 23 October 2019 **(Annex A)**.

1.6.5 Automatic identification system

EU Directive 2002/59/EU required all fishing vessels over 15m in length registered with an EU state to be fitted with a Class A Automatic Identification System (AIS) transceiver. AIS is a navigational safety system used by watchkeepers and navigation authorities to identify vessels and monitor their movements. Many small craft, including small commercial fishing vessels, voluntarily fit AIS transceivers as a safety measure. *Solstice* did not have an AIS transceiver.

1.7 VESSEL SURVEYS AND INSPECTIONS

1.7.1 Pre-purchase survey

On 13 June 2016, an out of water pre-purchase survey of *Solstice* was conducted in Campbelltown, Scotland by S.C. McAllister & Co. Argyll **(Figures 11, 12, 13** and **14)**. The survey report concluded that *Solstice* was in good structural condition and there were no areas of concern that could have affected its seaworthiness.

1.7.2 Small Fishing Vessel Certificate inspections

The SFV Code required owners to present their vessels to the Maritime and Coastguard Agency (MCA) for inspection on first registration, at intervals not exceeding 5 years, and at change of ownership. In addition, owners had to ensure that their vessels were inspected annually by a competent person.

The most recent inspection of *Solstice* carried out by an MCA surveyor took place on 2 January 2017 in Plymouth. The inspection was triggered by the vessel's change of ownership and resulted in the renewal of its Small Fishing Vessel Certificate. During the inspection, the MCA surveyor raised 28 deficiencies. These included:

- One red parachute flare missing.
- Lifejackets overdue service and light expired.
- Forward and fish hold hatches securing arrangements seized.
- LOLER/PUWER[15] assessment of gear to complete.
- Lifebuoys to ensure float free.

[15] PUWER means *The Merchant Shipping and Fishing Vessels (Provision and Use of Work Equipment) Regulations 2006*. LOWER means *The Merchant Shipping and Fishing Vessels (Lifting Operations and Lifting Equipment) Regulations 2006*.

All 28 deficiencies were rectified to the satisfaction of the MCA surveyor within 3 months of the inspection.

1.7.3 Post-accident dive survey

On 9 October 2017, a dive survey of *Solstice*'s wreck identified that:

- *Solstice* was lying upright on the seabed at a depth of 26m **(Figure 20)**.
- Its hull was intact.

Figure 20: *Solstice* wreck lying upright in 26m of water

- The gilson rope used to haul the net out of the water was 24mm diameter and was connected to the outer drum on the port side of the forward winch **(Figure 21)**. The rope was rove through a block on the port side of the scotch poles to the lifting block at the top of the aft gantry.
- The forward store deck hatch was closed and secured in position by one of its two locking dogs.
- The fish hold hatch cover was in the closed position but was not locked shut.
- The wheelhouse controls **(Figure 22)** indicated that:
    - the forward winch was clutched in;
    - the propeller was de-clutched; and
    - the engine was operating at above idle speed.
- The starboard lifebuoy was still in its cradle **(Figure 23)**.
- The aft deck freeing ports were closed and wedged shut **(Figure 24)**.
- The mid and forward deck freeing ports were open.

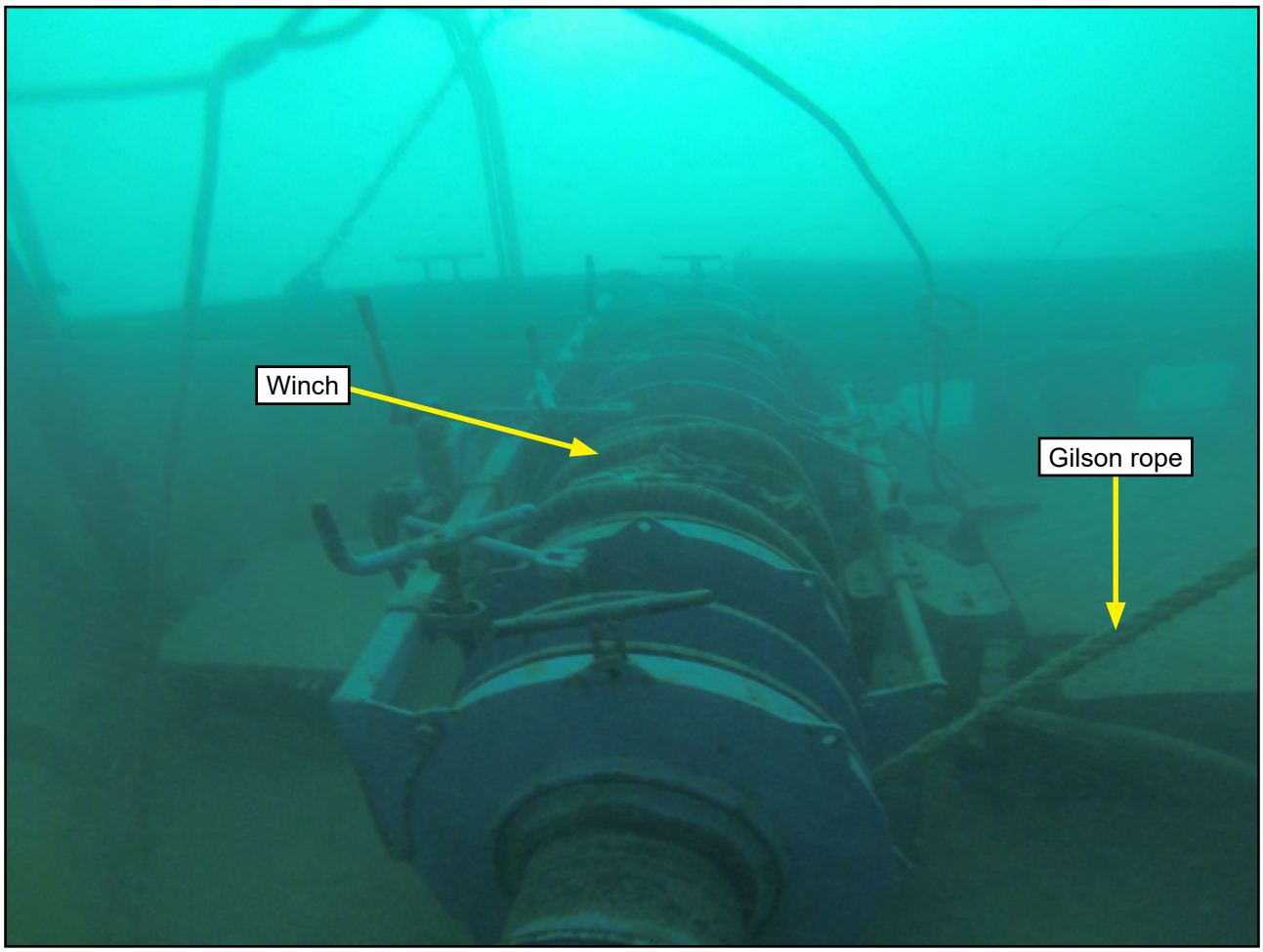

Figure 21: Wreck showing winch and gilson rope

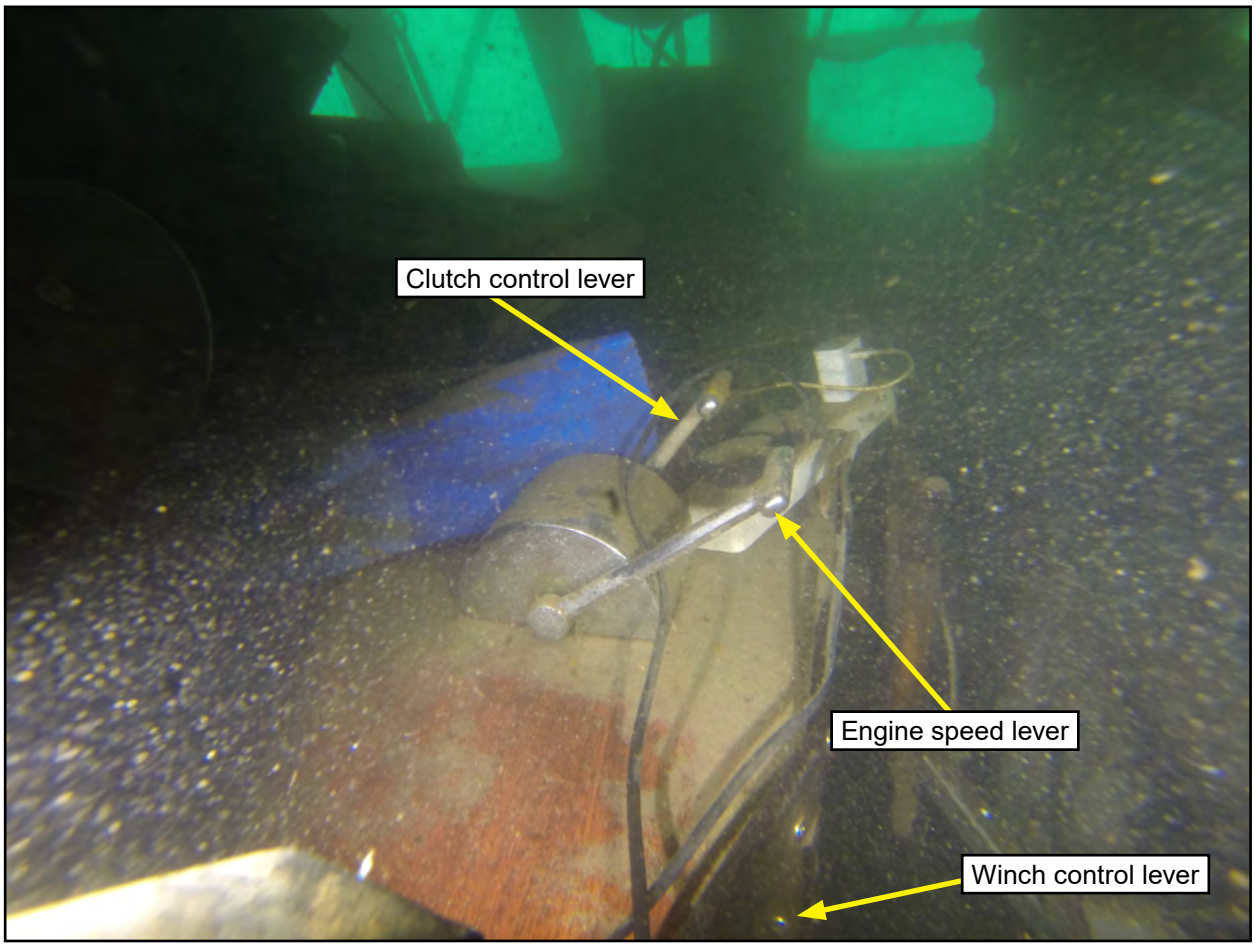

Figure 22: Wreck showing wheelhouse engine control

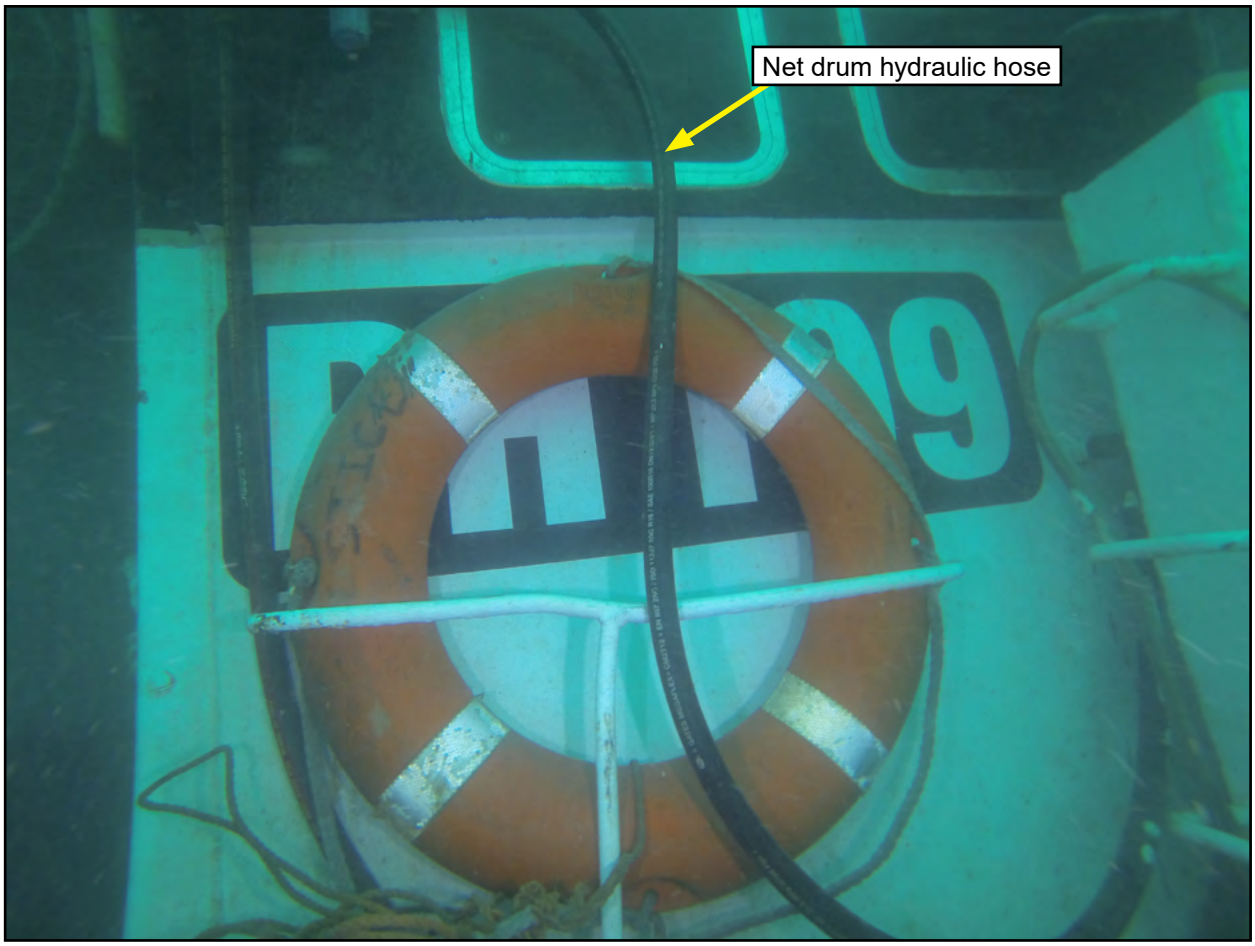

Figure 23: Wreck showing starboard lifebuoy

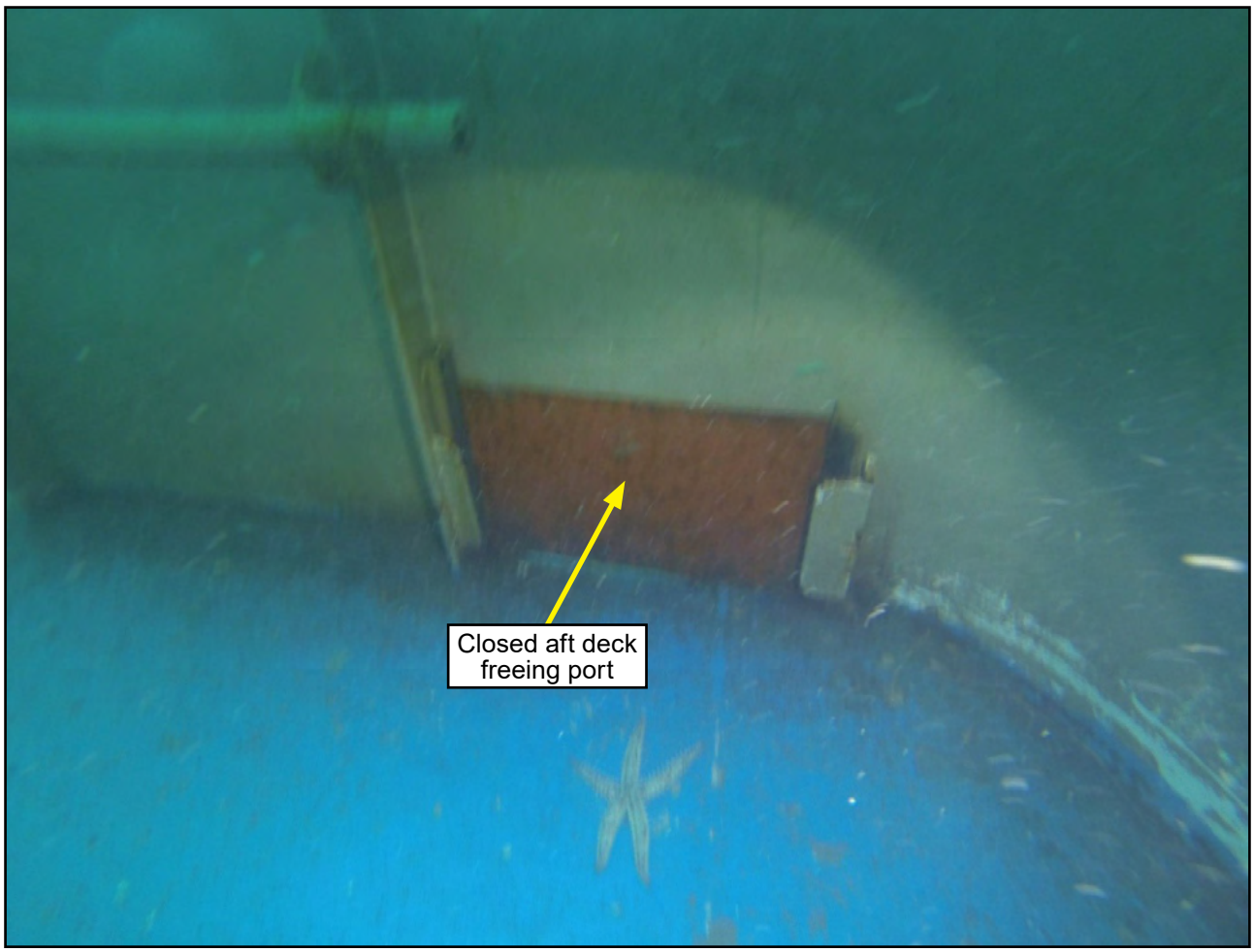

Figure 24: Aft freeing ports, closed and wedged shut

1.8 VESSEL STABILITY

1.8.1 The requirement

There was no statutory requirement for fishing vessels under 15m overall length, such as *Solstice*, to have approved stability or meet any intact stability criteria. In the absence of compulsory requirements, advice on stability was provided for fishing vessel owners and skippers by the MCA in its Marine Guidance Note (MGN) 427 (F), *Stability Guidance for Fishing Vessels of under 15m Overall Length*.

The MGN, published in December 2010, warned that it is not acceptable to assume a vessel's stability is satisfactory and reminded owners, skippers and others of their general duty under the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997 to ensure that:

- Systems of work were, so far as is reasonably practicable, safe and without risk to health.

- The necessary levels of information, instruction, training and supervision needed to ensure the health and safety of workers and other persons were provided.

The MGN stated:

> *In the absence of specific statutory requirements for stability and its subsequent approval of stability, owners may use other methods to assess stability and support skippers and fishermen to meet their health and safety general duties and responsibilities.*

The MGN described the following five methods for assessing the stability of small fishing vessels:

1. Full stability method (mandatory for all vessels over 15m overall length). This requires stability data to be calculated following an inclining experiment.

2. Small Commercial Vessel Code standard (known as the heel test). Applies to vessels carrying less than 1t of cargo and requires a heel test resulting in a heel angle less than 7º and sufficient freeboard.

3. Small passenger vessel heel test. An alternative to the Small Commercial Vessel Code heel test standard, which also requires a resulting heel angle less than 7º and specified minimum freeboard, but which can be used for vessels carrying more than 1t of cargo.

4. IMO roll period approximation. A simple method to determine whether a vessel is stiff or tender. If the roll period, in seconds, is less than a vessel's beam in metres, the vessel is considered to be stiff. If the roll period, in seconds, is greater than the vessel's beam, the vessel is considered to be tender.

5. Wolfson guidance[16]. Wolfson guidance was developed following a research project sponsored by the MCA. Based on the vessel's breadth and length, the method produces a stability notice that provides guidance on how certain loading and lifting operations will reduce the safety of the vessel, and on the limiting sea states in which such operations should be conducted. Three zones are defined on the stability notice to represent relative levels of safety: green, amber and red.

The IMO roll period approximation method was highlighted in the MGN as being particularly useful for skippers to assess changes that can affect stability during the life of a vessel.

MGN 502 (F) – *The Code of Practice for the Safety of Small Fishing Vessels – Standards which can be used to prepare for your MCA Inspection*, published in 2014, recommended that vessel owners notify the MCA of any proposed structural modifications prior to work taking place.

Solstice's Small Fishing Vessel Inspection Certificate described *Solstice* as a scallop dredger and included the following comment:

> *Owner to consider stability with any changes to fishing methods.*

[16] The guidance information described by the Wolfson stability notice and mark is intended to provide fishermen with some indication of their level of safety in terms of their loading and lifting, and in relation to the sea state.

In addition, the MCA's covering letter to the owner included the following comments:

> *No alterations which may affect the vessels stability or seaworthiness should be carried out.*
>
> *No changes to any work equipment should be carried out unless it has been suitably risk assessed.*
>
> *This office is to be notified in the event of…… Any planned modifications to the vessel before they are implemented.* [sic]

Solstice had been modified and its fishing methods changed several times by Tony and its previous owners. The vessel had no stability data and the MCA was not made aware of the modifications carried out in 2017 or the recent change in fishing mode.

1.8.2 Fishing vessel stability guidance

In addition to the MGNs discussed in the previous paragraphs, the MCA and fishing industry bodies provided a variety of booklets that contained stability information and guidance.

The MCA's booklet, *Small Fishing Vessel Inspection: It Pays to be Prepared, Quick Guide to Preparing for Inspection* provided the following advice about vessel modifications.

> *If you are considering modifying your vessel by the addition of new fishing equipment, net drums, winches, shelter decks etc., you are strongly advised to discuss the possible effects on the stability of the vessel with a consultant before you commence any work.*

The booklet's section on vessel operation specifically warned of the dangers associated with the installation of new powerblocks and net drums, and the lifting of excessive loads. The importance of being able to jettison gear quickly in an emergency was also emphasised.

Similar guidance was provided by Seafish in its *Guidance Booklet for the Fishing Vessel Safety Folder*. It warned that unexpectedly heavy loads in the cod-end can endanger crew members and vessel, and attempting to lift them on board may result in loss of vessel stability, risking capsize. The Seafish booklet went on to advise that the net should be cut open to clear it if the load is too great.

In March 2018, the MCA published a booklet titled *Fishing Vessel Stability Guidance*. The aim of the booklet was to help fishermen understand the principles of stability, the associated risks and hazards, and what can be done to minimise them. The booklet contained guidance on the risks associated with suspended loads and the importance of keeping freeing ports open and clear.

1.8.3 Post-accident stability assessment of a similar vessel

On 29 September 2017, a fishing vessel with an identical hull design **(Figure 25)** and similar rigging to *Solstice* was roll and heel tested by the MCA at the port of Brixham. The vessel was predominantly engaged as a stern trawler and recovered its catch over the stern.

Figure 25: Similar vessel with identical hull design

The roll test identified that the vessel met the requirements for the 'depart port' condition and met the freeboard standards[17], but was deficient when measured against the Heel Test standard.

The report noted that the results did not take account of the type of fishing being undertaken or the loads "seen" by the axis of the net drum or gantry when hauling. The measurements also did not consider the ability of the hull form to provide sufficient reserve buoyancy or stability.

The attending surveyor's observations included:

> *Although not viewed out of water there appears to be little underwater profile at the stern.*

Following the roll test, the vessel owner made several alterations to reduce weight high up. The MCA surveyor recommended the vessel owner to seek additional advice to verify the loadings and limits to the working of fishing gear aft.

[17] Small Commercial Vessel Code.

1.9 THE SEARCH AND RESCUE MISSION

1.9.1 Local concerns

Following the accident, two of the experienced RNLI coxswains involved in the SAR mission spoke to media journalists about concerns they had with the performance and effectiveness of Her Majesty's Coastguard (HMCG). This, coupled with long-standing local concerns about the perceived effects of HMCG's recent modernisation programme and coastguard performance in the south-west of England, led to questions being asked in the Houses of Parliament.

In response, the government's Shipping Minister wrote to the Chief Inspector of Marine Accidents and asked him to investigate if the lessons identified in the MAIB's *Louisa* accident report (see section 1.12.1) had been acted upon by the MCA, HMCG and the RNLI. The Chief Inspector was also asked to investigate if there was a pattern with response times in other incidents. Separately, the MCA requested the Irish Coast Guard to undertake a review of the *Solstice* SAR response.

This section of the report will provide a detailed SAR mission narrative, background information about the HMCG procedures and protocols, and the key findings of the separate MAIB and Irish Coast Guard investigations.

1.9.2 Her Majesty's Coastguard

HMCG is the section of the MCA that has responsibility for the initiation and co-ordination of all maritime SAR missions within the UK.

In 2010, the MCA published its plans for the modernisation of the HMCG, and in 2015 the implementation of its *Future Coastguard* programme was completed. This represented a significant change to its ways of working, with increased reliance on information technology and remote network support. The changes involved reductions in HMCG staffing levels and the closure of several of its Maritime Rescue Co-ordination Centres.

HMCG has a network of 10 area CGOCs and 1 National Maritime Operations Centre (NMOC) **(Figure 26)**. The NMOC is an operation centre in its own right and the strategic command for operational activities across the network. Although the regional CGOCs have the ability to function autonomously, the system is designed to operate collaboratively with each CGOC receiving support from within the network to meet its operational needs. Whenever practicable, SAR activity is co-ordinated by the CGOC within whose geographical area the incident has occurred.

Activity levels across the network are monitored constantly by a Duty Controller, and oversight is provided by the on-call National Maritime Operations Commander (Duty Commander). The Duty Controller matches the available resource to meet operational demands. The role of the Duty Controller expands to monitor the progress of ongoing operations and to assist, or to direct other operators to assist, as a situation develops. The Duty Controller is often based at NMOC, but could operate from any of the CGOCs.

HMCG SAR Seasonal Staffing Levels Medium/weekday/daytime		
Operations Centre	**Suggested staffing**	**Actual staffing**
NMOC	7	12
Falmouth	3	2
Milford	3	2
Holyhead	3	3
Belfast	3	3
Stornaway	3	3
Shetland	3	3
Aberdeen	3	2
Humber	3	3
London	1	1
Dover	4	4
Total on the Network	34	38
	Duty Commander	On call

Figure 26: Locations of regional CGOCs and suggested staffing levels

1.9.3 Coastguard operational staffing levels

To ensure there were sufficient SAR operations officers available to meet predicted fluctuations in demand, HMCG developed an operational rationale that set out the suggested number and distribution of staff required in the network for both daytime (1000 to 2200) and night-time (2200 to 1000) hours based on historical periods of activity. The suggested staffing levels also altered seasonally to meet periods of low, medium, high and peak demand.

Solstice capsized during the medium demand period and was reported overdue during the daytime shift. According to HMCG's suggested staffing levels **(Figure 26)**, the minimum number of coastguard officers available for SAR on the network and on duty at Falmouth CGOC should have been 34 and 3 respectively. When the report was received, there were 38 coastguard officers on duty across the network and 2 coastguard officers in the Falmouth CGOC. The Milford Haven and Aberdeen CGOCs were also staffed by two operators; one below their suggested seasonal staffing levels.

HMCG has calculated that a minimum of 320 coastguard officers are needed in order for the network to function effectively, with 340 considered the ideal. Since the implementation of the Future Coastguard programme, the recruitment and retention of coastguard officers has been an issue, with an average 10% shortfall being the norm. This shortfall, coupled with sickness, leave and training commitments, meant that the suggested staffing levels at individual CGOCs were not always achieved.

1.9.4 Overdue vessel response procedures

HMCG's Operational Management System (OMS) provided guidance to its coastguard officers and procedures to follow in response to various emergency scenarios. The guidance **(Annex B)** for overdue vessels reflected the protocols set out in the International Aeronautical and Maritime Search and Rescue manual (IAMSAR) manual [18]. The IAMSAR manual explained that, while no two SAR operations follow exactly the same pattern, SAR incidents do generally pass through the following five defined stages:

1. Awareness stage
2. Initial stage
3. Planning stage
4. Operational stage
5. Conclusion stage

The coastguard usually receives distress alerts from ships or ships' crews via VHF radio or electronic distress transmitters, but also receives over 150 reports of overdue vessels each year. The majority of overdue vessels are later found or return to port without the need to deploy SAR assets.

[18] The primary purpose of the three volumes of the IAMSAR manual is to assist States in meeting their own search and rescue needs, and the obligations they accepted under *the Convention on International Civil Aviation*, *the International Convention on Maritime Search and Rescue* and *the International Convention for the Safety of Life at Sea* (SOLAS). The IAMSAR manual is published jointly by the International Maritime Organization (IMO) and the International Civil Aviation Organization.

Reports of overdue vessels are typically received by telephone call from vessel owners, family members and friends of the crew. Once the coastguard is made aware that a vessel or persons might be in distress, it is the role of the coastguard officer to gather the information required to assess the level of danger.

The OMS contained a list of information that should be sought from the first informant, but emphasised the need to try to contact the vessel by any possible means as soon as practical (e.g. VHF radio, satcomms, mobile phone, electronic tracking devices, ports and harbours etc). This is often referred to as the 'communications search'. The recovery of mobile phone data is also regularly used during the initial communications search.

The coastguard officers record the information, as it is received, by typing it into the coastguard's electronic incident log. The incident log can be monitored across the coastguard network after the incident has been created on the system.

After evaluating the available information and taking into account the degree of urgency, the SMC should declare the appropriate emergency phase and, when appropriate, alert all appropriate SAR asset managers. The IAMSAR manual describes three emergency phases for classifying the status incidents. These are:

- Uncertainty phase - *An uncertainty phase is said to exist when there is knowledge of a situation that may need to be monitored, or to have more information gathered, but that does not require dispatching of resources*.

- Alert phase - a situation wherein apprehension exists as to the safety of a vessel or craft, and of the persons on board.

- Distress phase - *a situation wherein there is reasonable certainty that a vessel or other craft, or a person, is threatened by grave and imminent danger and requires immediate assistance*.

Depending on how the situation develops, the emergency phase may have to be reclassified.

The planning stage of a SAR mission is the period in which an effective operations plan is developed. The SAR operations stage encompasses all activities that involve searching for the distressed vessel or survivors, providing assistance, and removing them to a safe place. During this stage, the SMC assumes a monitoring and guidance role, ensuring that the search plan is received, understood, and followed by SAR assets.

SAR operations enter the conclusion stage when either:

- It is confirmed that the vessel or persons thought to be in danger are not in distress.

- The vessel or persons for whom SAR assets are searching have been located and the survivors rescued.

- During the distress phase, the SMC determines that further search would be to no avail because there is no longer any reasonable probability of survival of the persons on board.

The HMCG OMS explained that reports of overdue vessels may be made because the vessel failed to make a scheduled call or because of its non-arrival at a port or harbour. It also made a distinction between leisure and commercial vessels, and warned that overdue fishing boats are often due to distress situations. The guidance also explained that the 'alert' phase may be entered immediately based on the level of information available or follow on from the 'uncertainty' phase.

Between March 2017 and March 2018, 169 vessels or watercraft were reported overdue. Of these, 18 were fishing vessels and most of the rest were leisure yachts and kayaks. Seventeen of the fishing vessels were found, the other was *Solstice*. Ten of the fishing vessels were found during the initial communications search using VHF radio, telephone, or electronic positional devices.

1.9.5 Mobile phone data recovery

Mobile phone communications data can be used during SAR missions to identify when persons in distress last used their phones and when signals were lost. Communications data can also be used to help locate them[19] **(Figure 27)**. The gathering of mobile phone communications data was subject to the *Regulation of Investigatory Powers Act 2000* (RIPA). Requests for the release of data from mobile phone service providers could be made only by an authorised Single Point of Contact (SPoC).

The SPoC had to request approval from a Designated Person who would consider the necessity, proportionality and any collateral intrusion emerging from the request. For HMCG SAR purposes, the Duty Controller was the authorised SPoC and the Duty Commander was the Designated Person.

The Duty Controller was unable to submit his RIPA request to the service provider because of a problem he had in accessing the internet-based software. This was a known problem that forced the Duty Controller to ask the police to request the data on the coastguard's behalf. To do this, the Duty Controller had to make several phone calls and engage in prolonged conversations. The upturned vessel was found before all of the mobile phone data was provided by the police.

1.9.6 Local knowledge

One of the concerns raised during the public consultation period for Future Coastguard proposals was the loss of local knowledge among CGOC staff. To mitigate this, SAR operations officers were provided access to the Ordnance Survey FINTAN database.

FINTAN was a vernacular place-name database that referenced local names for various features and areas and allowed HMCG staff to add local names for beaches, rocks, waterways and other features with nicknames onto the existing mapping data. Information on shipwreck sites around the UK coastline was not included in the database.

[19] Mobile phones should not be relied upon at sea where mobile phone mast coverage is variable, nor can they be relied upon to provide locational information for SAR purposes.

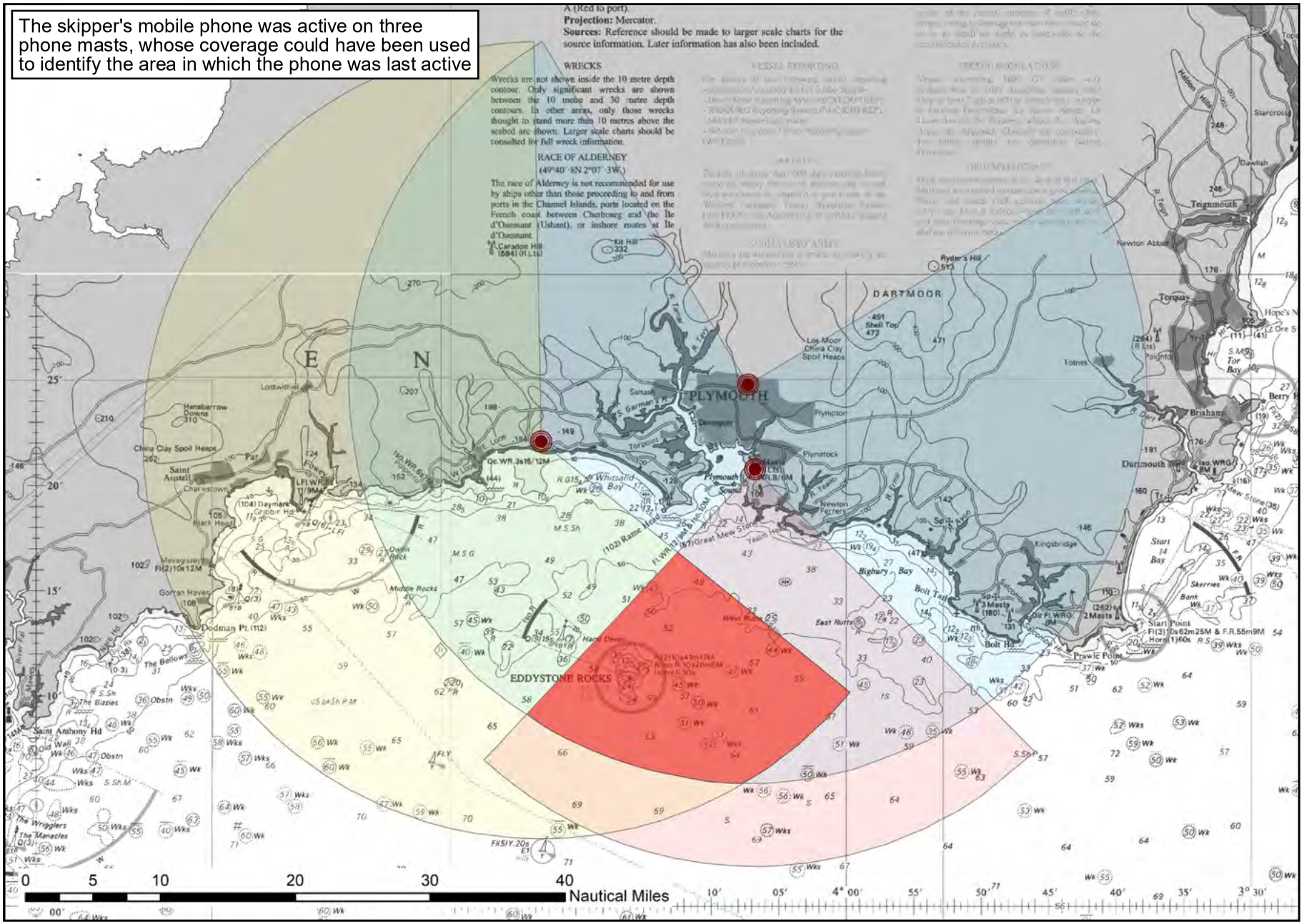

Figure 27: Skipper's mobile phone signal area

1.9.7 Coastguard Operations Officers

When *Solstice* was reported overdue the Falmouth CGOC was staffed by two coastguard officers, the SMOO and the MOO. The Duty Controller was based at the NMOC.

The SMOO had worked for HMCG for 12 years, primarily at Falmouth, and had been a SMOO for 4 years. The SMOO was one of seven officers on the network during the incident who were qualified to fulfil the SMC role.

The MOO had joined the coastguard in January 2015 and qualified as a MOO in 2016. The role of the MOO included being a mission co-ordinator with general operational SAR responsibilities and vessel traffic monitoring duties.

The Duty Controller had worked for HMCG for 21 years and had been a Maritime Operations Controller at NMOC for 2 years. He had also been an RNLI helmsman for 20 years.

1.9.8 Search and rescue mission timeline

The *Solstice* incident log was created on the coastguard network system at 2100. At this time, the Duty Controller was engaged in a network conference call and was delivering the daily evening brief. He was not aware of the incident. During his brief, Milford and Falmouth CGOCs were identified as needing network support, and were tasked to provide mutual support for each other. The Duty Controller also advised that he would provide SMC cover for the NMOC and the Dover and London CGOCs.

At 2115, the first “Pan Pan” broadcast was made. At 2121, the SMC at Falmouth produced an initial quick mission plan and declared an alert phase. The first RNLI lifeboat was launched at 2227 and the SAR helicopter was in the air at 2231. The SAR mission status was upgraded to the distress phase at 2251. The aircrew of R924 found the upturned hull at 0053. The pilot had overheard a reference to the *Stanhope* wreck during a VHF call, and diverted to the area during his return to base for refuelling.

During the 1½ hour period between the start of the alert phase and the distress phase, some RNLI staff became increasingly concerned for the crew of *Solstice*, and were frustrated at what they perceived to be a lack of action by the Falmouth CGOC. This led to some heated exchanges and decisions to self-launch. A detailed summary of SAR communications is set out in **Table 1**.

Time[20]	Event	Remarks/Actions
26 September 2018		
2038	Coastguard made aware that *Solstice* was overdue.	Initial call lasted 17 minutes 26 seconds. The MOO typed details provided by the skipper’s partner into coastguard’s electronic incident log.
2100	The incident was created by the MOO on coastguard’s network system.	At this time the Duty Controller was engaged in a network conference call.

[20] Times given in the table are based on those recorded in the coastguard incident log and converted to local time.

Time	Event	Remarks/Actions
2106	SMC attempted to contact *Solstice*.	Various VHF radio channels.
2111	Crewman's partner reported that *Solstice* had been fishing to the south of Eddystone Lighthouse and advised the MOO that her last communication with her partner was at 1440 **(Figure 28)**.	The communication was a text message sent by the crewman.
2115	"Pan Pan" broadcast.	
2116	Plymouth CRT tasked to meet skipper's partner at Sutton harbour.	CRT tasked to provide support and gather information.
2121	Initial Quick Mission Plan produced, and alert phase declared.	Possible need for SAR assets recorded.
2126	Falmouth SMC called Duty Controller and requested network support for VHF channel 16 and initiation of RIPA request for communications data for Tony's and crewman's mobile phones.	Duty Controllwer advised SMC that he would give VHF Ch16 to either Milford CGOC or the NMOC. SMC pointed out that Milford only had two coastguard officers on duty. Duty Controller also advised SMC that he could not initiate RIPA request because he was unable to log in to the system, and asked SMC to request details of the mobile phone providers.
2127	First response to "Pan Pan" received from BF *Vigilant*, which was 3 miles south-west of Bolt Head. 20nm east of Eddystone Lighthouse.	
2134	Skipper of FV *Swiftsure* reported seeing *Solstice* 8 miles south-south-east of Eddystone Lighthouse trawling in a south-westerly direction between 1030 and 1100 **(Figure 28)**.	The skipper attempted to pass additional information but the MOO cut his call short due to other calls coming in.
2135	SMC called duty controller and advised that the mobile phone provider details had been requested and asked if VHF channel 16 had been requested .	Duty controller told SMC to contact NMOC and ask it to take channel 16.
2136	Partner of *Solstice*'s skipper reported that the skipper of FV *Kenavo* had sighted *Solstice* to the south-west of the *Coal Boat* at 1700 **(Figure 28)**.	MOO and skipper's partner did not know what or where the *Coal Boat* was.
2137	Authorisation given by Duty Commander for RIPA request.	

Reproduced from Admiralty Chart 1613-0 by permission of HMSO and the UK Hydrographic Office

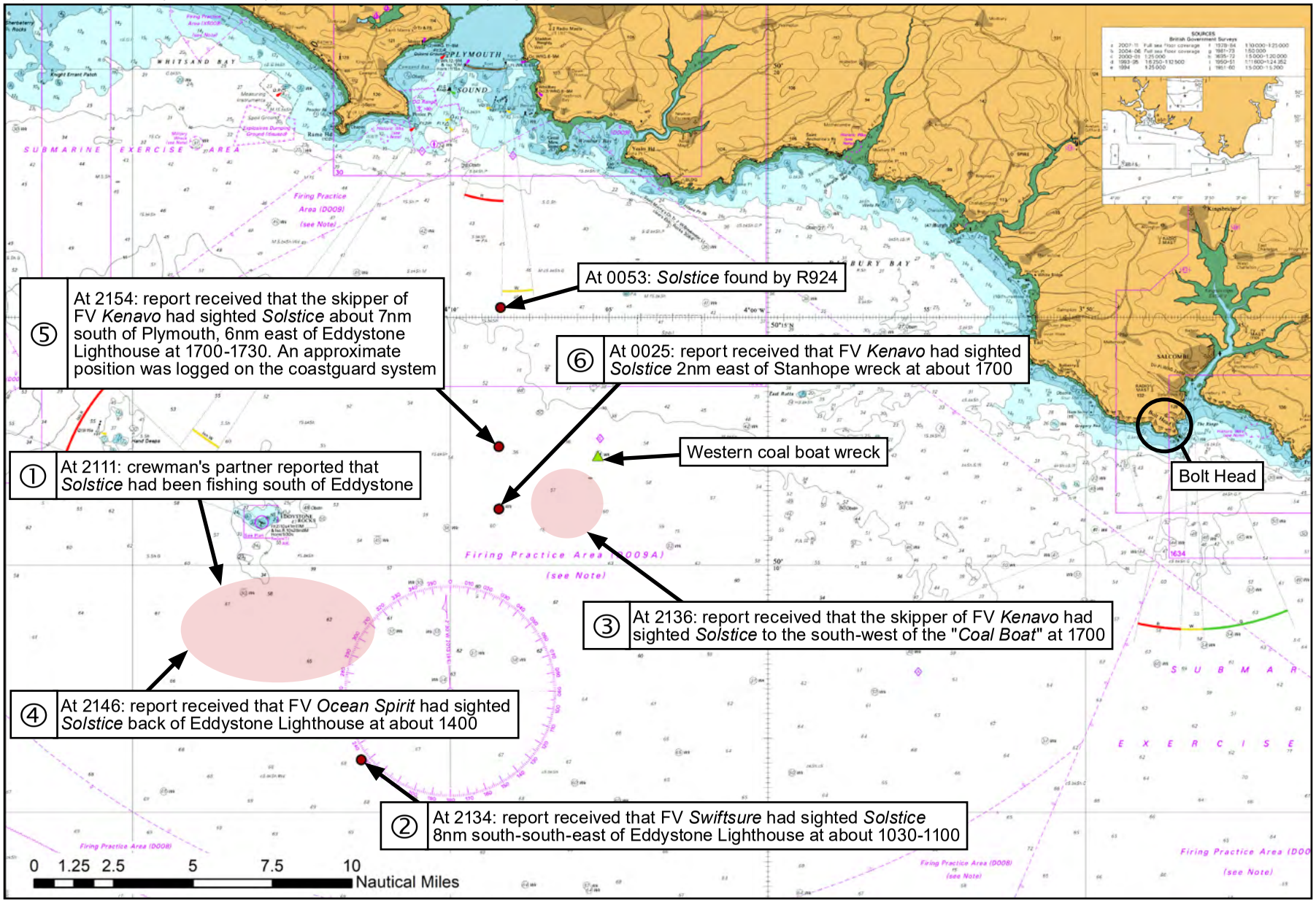

Figure 28: *Solstice* sightings

Time	Event	Remarks/Actions
2137	Plymouth lifeboat operations manager called MOO and asked if he would be requiring the lifeboat to be launched. MOO said it may be needed shortly but they were trying to identify a location or area to search.	The LOM[21] had been contacted by the ALB coxswain who had been monitoring the "Pan Pan" broadcasts. The MOO told the LOM that there were only two of them in the CGOC and that they were *"up to their eyeballs at the moment"*.
2146	*Ocean Spirit* reported seeing *Solstice* trawling at 'back of Eddystone' at 1400 heading south-west **(Figure 28)**.	
2150	MOO called *Kenavo*'s skipper. Skipper stated that at 1700-1730 Kenavo was about 7 miles south of Plymouth and Solstice was 1 - 1½ miles east of him. Also explained that Solstice was 7 miles south of Plymouth, 6 miles east of Eddystone Lighthouse and 2 miles south-west of Western Coal Boat wreck **(Figure 28)**.	*Solstice* was hauling gear and looked like it was going to start towing south. FV *Diligent Joe* nearby. Weather was calm. The approximate position was logged as 50° 12.42N 004° 08.54W on the CG system.
2156	Plymouth CRT asked MOO if lifeboats had been tasked yet. MOO explained that they did not have a position yet and were building a picture.	CRT query was in response to request from families for information.
2202	Plymouth RNLI station LOM called SMC and advised he was going to self-launch.	SMC advised that they were about to be tasked.
2206	Looe ILB helm called MOO and asked if they could be of assistance.	Conversation was strained; MOO explained that there were only two people on duty.
2210	SAR helicopter R924 tasked.	Helo notice for take-off had increased from 15 to 45 minutes at 2200.
2227	Falmouth MOO advised by Plymouth ALB coxswain that he was about to launch and that the Looe ILB intended to self-launch.	Fractious conversation between coxswain and coastguard MOO.
2227	Plymouth ALB launched.	
2231	R924 airborne.	Estimated time of arrival 2245. Initially tasked to carry out a sector search then redirected to conduct an expanding search using Eddystone light as the datum.
2240	Plymouth ALB appointed on-scene commander.	
2244	Looe ILB launched.	
2251	SAR mission upgraded to distress phase.	First "Mayday" broadcast made.

[21] LOM – Lifeboat Operations Manager.

Time	Event	Remarks/Actions
2301	Salcombe ALB tasked to assist.	
2331	Salcombe ALB launched.	
27 September 2018		
0025	*Kenavo*'s skipper called MOO and explained that *Solstice* was 2 miles east of the *Stanhope* wreck at about 1700 and advised him to contact FV *Maxine's Pride* as they would know where this was **(Figure 28)**.	
0053	R924 found upturned hull with two survivors.	Helo crew heard reference to *Stanhope* wreck and decided to fly over it on its way back to base to refuel.
0110	Casualties recovered to Plymouth ALB.	
1046	Tony's body was recovered from upturned vessel by Royal Navy divers.	
1109	*Solstice* sank.	

Table 1: Summary of key SAR times and events

1.10 POST-INCIDENT REVIEWS

1.10.1 HM Coastguard Post-Mission Learning Review

Shortly after *Solstice*'s SAR mission was concluded, the SMOO and MOO completed a Post-Mission Learning Review (PMLR) form and sent it to coastguard headquarters. The aim of the coastguard's PMLR process was to identify lessons from SAR missions and act as necessary to improve performance.

The *Solstice* PMLR identified areas which went well and areas which did not. The shortfalls identified by the SMOO and MOO included:

- *The lack of a real-time time line of information, developed by an independent person at Falmouth CGOC, meant that the last known position given early was not initially acted upon;*
- *Lack of open communications and information exchange between RNLI, LB's, FV's and CGOC with too many channels to cover;*
- *Management and oversight of the wealth of information received was difficult while both Falmouth CGOC officers were working as SAR operators;*
- *Access to mobile phone records was not possible due to SPoC identification problems with the service providers resulting in a time-consuming delay and an eventual request to the police to undertake the work.*

1.10.2 Irish Coast Guard review

The Irish Coast Guard's review of the *Solstice* SAR mission was based on evidence provided in the incident log; discussions with the Duty Commander and selected recordings of incident co-ordination conversations, phone calls and radio transmissions. The main body of the Irish Coast Guard report focused on the information gathering (uncertainty) and alert phases.

The review concluded that no actions could have been taken during the SAR that would have saved Tony's life. However, the review identified several lessons that, if acted upon, would improve the likelihood of saving lives in the future. The report findings included:

- Staffing levels – the MCA was recommended to review the suitability of a two-person watch at a CGOC during potentially busy periods and consider a requirement to have three persons on watch during daytime hours.

- Initial emergency call - the initial emergency call took over 20 minutes to complete and no attempt was made to contact the vessel during that time. The essential elements of information needed to initiate a communications search, particularly on VHF channel 16, could have been collected in half that time.

- Last known position – the focus of the search did not take account of *Solstice*'s last known position.

- Tasking of SAR assets – based on the information gathered during the initial call and VHF radio transmissions, SAR assets should have been alerted and tasked much earlier. The SMC's initial Quick Mission Plan, recorded in the incident log at 2121, noted that helo, lifeboat required to search. However, the tasking authorities for the SAR assets were not alerted to the developing situation. The report noted that:

    - The notice period for coastguard helicopters changed from 15 to 45 minutes at 2200 (the request to task a helicopter was made at 2210).

    - Had the Aeronautical Rescue Co-ordination Centre been forewarned of the potential requirement, R924 could have been brought to immediate notice at an earlier stage.

    - Early contact with the RNLI might have enabled an earlier launch and might have elicited some additional information on the casualty's last known position, likely intentions and the *modus operandi* of such vessels. It is recommended that the tasking process for declared assets be reinforced with all officers.

  It was also noted that, given Solstice's last known position, the Border Force vessel Vigilant was well placed to be tasked as on-scene commander, and the Salcombe ALB should have been tasked to assist much earlier once the 2154 location was provided.

- Mobile phone communications request - the decision to conduct a mobile phone positioning search under the RIPA process might have been considered earlier, once the 2154 location was provided[22].

- Communications between HMCG and RNLI – the report noted the strained nature of the communications between the Falmouth CGOC and RNLI staff, and recommended that the MCA review the recorded conversations.

1.10.3 MAIB coastguard response study

To establish if there were any patterns in HMCG response times, the MAIB conducted a review of the investigation reports it had published between 1 January 2012 and 1 December 2017. Of the 171 reports examined, 46% (78) involved HMCG SAR operations. A delay in commencing SAR operations was adjudged to have occurred in 31% (24) of these cases. The most common reason for delays was found to have been the time taken to alert the coastguard, i.e. lack of EPIRB or PLB and delayed or no “Mayday” broadcast. HMCG actions or omissions potentially contributed to a delay in 8% (6) of the cases that involved SAR operations.

The MAIB study found no discernible pattern that might suggest there is an enduring systemic problem with the way HMCG responded to incident reports, and concluded that most delays were the result of late reporting. In the few cases where the HMCG response contributed to a delay, the common contributing factors included CGOC staffing levels, operator training, operational procedures and IT problems.

1.11 RNLI LIFEBOAT LAUNCHING PROTOCOLS

The launching of RNLI lifeboats is authorised by each individual RNLI station’s Lifeboat Operations Manager (LOM) or its DLA. Over 80% of all lifeboat launches are initiated by a request from a CGOC.

The standard protocol for tasking RNLI assets is for the CGOC to contact the LOM or DLA, explain the circumstances of an incident and request the launch of a lifeboat. Once the LOM or DLA agrees and authorises that RNLI assets should be tasked, the lifeboat crew will be assembled, and a lifeboat launched. The SAR mission is co-ordinated by the CGOC.

If RNLI ALB coxswains or ILB helmsmen receive information from any other source intimating that lives are in danger at sea, they are required to report this information to their LOM or DLA unless, in their opinion, delay would result in danger or loss of life. If this is the case, they should assemble their crew, launch their lifeboat and proceed to the assistance of the casualty. These are classed as self-launches. The final decision concerning whether to launch always rests with the SAR unit’s commander, who has ultimate responsibility for the safety of the crew and the craft while at sea.

According to RNLI records, its launch authorities approved 42,181 lifeboat launches between 2012 and 2017; about 8500 each year. About 85% of these were in response to requests received from the CG network. Other requests came from police forces, medical authorities, harbour authorities, direct from casualties,

[22] It should be noted that R924 was airborne within 21 minutes and on-scene 14 minutes later.

other vessels, members of the public and lifeboat station personnel. About 3% of authorised launches were in response to requests received from RNLI station personnel. During the same period, RNLI lifeboat coxswains self-launched 1766 times; about 350 times each year. Self-launches accounted for about 4% of all lifeboat launches.

A review of the delivery of the SAR co-operation between RNLI and HMCG staff carried out in November 2017 identified a range of areas that were assessed as needing improvement. These included:

- *Operational liaison (at all levels).*
- *Joint training opportunities.*
- *Mutual understanding of each other's roles and working environments.*
- *Personalities becoming blockers to engagement/joint working.*
- *Physical distance between RNLI stations and CGOCs.*
- *Operational communication.*
- *Proactive SAR mission debrief.*
- *HMCG and RNLI staff still coming to terms with wide-reaching changes following implementation of the Future Coastguard programme.*

1.12 SIMILAR ACCIDENTS

1.12.1 *Louisa* (SY30)

On 9 April 2016, the fishing vessel *Louisa* foundered, with the loss of three lives, while anchored close to the shore in Mingulay Bay in the Outer Hebrides, Scotland.

The skipper and crew, who had been working long hours before anchoring late the previous evening, had woken suddenly as the vessel was sinking rapidly by the bow. They made their way to the stern of the vessel, activated its EPIRB and donned their lifejackets. They also released the liferaft from its cradle and pulled on its painter, but it failed to inflate before the vessel sank and they entered the water. One of the crewmen managed to swim ashore, but the other three drowned before help arrived.

The investigation report[23] identified issues relating to CGOC staffing levels, network effectiveness and OMS procedures that contributed to the delayed tasking of SAR assets. The report's conclusions included:

- *Inconsistent terminology for EPIRB positions used by UKMCC and CGOC Falmouth, coupled with insufficient knowledge of the Cospas-Sarsat system, caused confusion and resulted in an unnecessary delay in prosecuting SAR action.*

[23] MAIB report 17/2017 – Report on the investigation of the foundering of the fishing vessel *Louisa* SY30 while at anchor off the Isle of Mingulay in the Outer Hebrides on 9 April 2016 resulting in three fatalities.

- *HMCG's omission to use all available tools suggests insufficient training and manpower resource for its CGOCs to act autonomously.*

- *A lack of network interaction and supervision meant that the network was ineffective in supporting the SAR operation to the extent of eliminating confusion and ensuring a timely response to the EPIRB alert.*

The report included a recommendation to the MCA aimed at improving the functionality and reliability of the HMCG network through the training of personnel and provision of equipment.

1.12.2 *JMT* (M99)

During the afternoon of 9 July 2015, mobile phone contact was lost with the skipper and crewman on board the 11.4m scallop dredger *JMT*, which was fishing 4 miles to the north of the Eddystone Lighthouse. At 2008, the skipper's father informed the Falmouth CGOC that *JMT* was overdue and that he was unable to contact its crew. The CGOC issued a "Pan Pan" urgency broadcast and attempted to locate the vessel; the Plymouth CRT was also tasked to assist. At 2125, prompted by uncertainty about the vessel's intentions to return to Plymouth that day, the CGOC stood down the CRT, but continued its attempts to contact the vessel.

At about 0830 the following morning, a lifebuoy was sighted floating close to where *JMT* had been fishing and a SAR operation was initiated. The body of the crewman was later found floating in a lifebuoy; he was not wearing a lifejacket. The skipper's remains were found some time later.

The investigation report[24] concluded that:

- *JMT almost certainly capsized suddenly and without warning, and sank very quickly.*

- *The crew's likelihood of survival was reduced by not having the opportunity to broadcast a distress message or release the vessel's EPIRB from its stowage.*

- *The vessel's stability had been adversely affected by structural modifications and by aspects of the vessel's operation.*

Recommendations were made to the MCA and fishing industry aimed at improving the stability of under 15m fishing vessels and the stability awareness of their owners and skippers (see section 4.1).

1.12.3 *Ocean Way* (FR349)

At 1056 on 2 November 2014, the 17m trawler *Ocean Way*, with a crew of five on board, capsized and sank 100nm off the north-east coast of England. Two of its crew were rescued, and the body of the skipper was recovered. The remaining two crew were not found.

[24] MAIB report 15/2016 – Report on the investigation of the capsize and foundering of the fishing vessel *JMT* (M99) resulting in two fatalities, 3.8nm off Rame Head, English Channel on 9 July 2015.

At 1058, a transmission from *Ocean Way*'s EPIRB was received, but this did not give the vessel's position. At 1145, the position of the EPIRB was confirmed and at 1155 a helicopter was tasked to proceed to that position. Two survivors were located at 1354 and the skipper's body was recovered a short time later.

The MAIB investigation report[25] concluded that the vessel had broached and capsized in heavy following seas when its stability had been reduced by the adverse effect of retained water on deck.

The investigation report also identified issues relating to CGOC communication procedures, tasking of SAR assets and technical capabilities that contributed to the delayed tasking of SAR assets. The report's conclusions included:

- *Although accurate positional information for the vessel became available, this was not initially recognised by the SAR authority due to its cognitive bias towards information that placed the vessel further inshore.*

- *It is important that procedures are followed to avoid essential information being overlooked when staff are engaged in demanding situations. The opportunity to task a rescue helicopter at an earlier stage of the incident was missed.*

- *The efficient conduct of SAR missions would be more effective if all UK MRCCs were equipped with computer systems capable of gaining access to essential information from all available databases.*

- *The opportunity to task a vessel to the search area to co-ordinate surface SAR operations in that area was not taken.*

- *The availability of contemporaneous VMS information to MRCCs would prove of great value in identifying, locating and assisting fishing vessels in distress.*

- *If the vessel's EPIRB had been fitted with an integral GNSS it is probable that a helicopter would have been tasked about 50 minutes sooner.*

The MCA was recommended to take action to ensure that the EPIRBs required to be carried on board UK registered fishing vessels are equipped with integral Global Navigation Satellite System receivers.

1.12.4 *Stella Maris*

On 28 July 2014, the 9.9m trawler *Stella Maris* capsized and sank while attempting to lift a heavy cod-end over the stern from the top of its aft gantry. The two crew successfully abandoned the vessel and were later rescued, uninjured, from their liferaft.

The skipper recognised that the weight of the cod-end was excessive and attempted to lower it back into the sea. Unfortunately, the netting became ensnared on a net drum guide pole and the gilson winch was unable to re-lift the cod-end to clear this obstruction. The vessel's list continued to increase, causing the starboard quarter bulwark to become submerged, prompting the crew to abandon the vessel.

[25] MAIB report 23/2015 – Report on the investigation of the capsize and foundering of the fishing vessel *Ocean Way* (FR349) 100 miles north-east of Tynemouth on 2 November 2014, resulting in three fatalities.

Stella Maris had been significantly modified and no calculations had been required or carried out regarding the effects of this work on the vessel's stability. The investigation report[26] concluded that the vessel capsized because of insufficient stability due to an overly high gantry and an overweight cod-end. The MCA was recommended to introduce intact stability criteria for all new and significantly modified decked fishing vessels of under 15m in length (see section 4.1).

1.12.5 *Amy Jane*

On 4 December 2013, a recreational sea angler went to sea from Cadgwith beach, Cornwall, in his 3.9m open boat *Amy Jane* and failed to return later that day. Although he had not given his likely return time, he was reported to the coastguard as being overdue in the early evening as concern for him grew.

The coastguard initiated a search with local SAR assets and issued a "Pan Pan" broadcast. An hour later, a vessel spotted and recovered the semi-conscious sea angler from the water. He was airlifted to hospital but did not recover consciousness. It is unknown why or when he fell out of the boat, but he did not have a killcord attached. Although he was wearing a lifejacket, he was not carrying a VHF radio or PLB with which to raise the alarm.

Local concerns were raised about the effectiveness and timeliness of the SAR response. The MAIB investigation report[27] conclusions included that:

- *Once in the water, the casualty had no means of raising the alarm, and his chances of survival were solely dependent on friends or family realising that he had not returned, and informing the coastguard.*

- *Had he given a more precise time for his return and instructions on what to do if he was overdue, it is likely that the coastguard would have been alerted several hours earlier.*

- *Had he been wearing a PLB, and been able to activate it on entering the water, it is highly likely that he would have survived.*

1.12.6 *Purbeck Isle*

On 17 May 2012, the 11.64m wooden potting vessel *Purbeck Isle* foundered with the loss of its skipper and two crewmen about 9 miles south of Portland Bill. The vessel went down so suddenly that the skipper and crew were unable to raise the alarm, collect their lifejackets or manually release and inflate the vessel's liferaft.

Purbeck Isle was in a poor condition and was heavily loaded. It probably sank at about 1000 because of rapid flooding following the catastrophic failure of its hull fastenings. At 1735 a friend of its skipper reported to the coastguard that *Purbeck Isle* was overdue.

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[26] MAIB report 29/2015 – Report on the investigation of the capsize and foundering of FV *Stella Maris* 14 miles east of Sunderland 28 July 2014.

[27] MAIB report 26/2014 – Fatal man overboard from the recreational fishing boat *Amy Jane* near Cadgwith, Cornwall, 4 December 2013.

The MAIB investigation report[28] concluded that the skipper and his crew were lost because:

- *they were unable to raise the alarm before entering the water*
- *they were not wearing PFDs*
- *their liferaft did not deploy when the vessel capsized.*

The alarm was not raised at the time of capsize because the vessel sank suddenly and an automatic radio distress signalling device was not carried.

The report included a recommendation to the MCA that it introduce a requirement for the carriage of EPIRBs on board all commercial fishing vessels, regardless of length.

[28] MAIB report 7/2013 – Report on the investigation of the foundering of the fishing vessel *Purbeck Isle* 9 miles south of Portland Bill, England on 17 May 2012 resulting in the loss of her three crew.

SECTION 2 - ANALYSIS

2.1 AIM

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

2.2 OVERVIEW

Solstice had been operated as a scallop dredger and stern trawler without incident for over 16 years, and its previous owners considered it to be a sturdy and stable boat. It had recently been surveyed out of the water and its hull was found to be in sound condition. Tony and his son, the vessel's skipper, were both experienced fishermen and had received stability awareness training. Despite these factors, the vessel capsized rapidly in benign sea conditions.

In this section of the report, the factors that contributed to *Solstice*'s capsize and the loss of its owner's life will be analysed. The crew's working practices and levels of emergency preparedness, and the effectiveness of the SAR operation, will also be discussed.

2.3 THE CAPSIZE

2.3.1 Transverse stability

The MCA's *Fishing Vessel Stability Guidance* booklet defined stability as *a measure of a vessel's ability to get back on an even keel after having suffered a heel*[29]. It also explained that stability is greatly affected by a vessel's weight and its buoyancy. The vessel's weight being the combined mass of the vessel itself, its equipment and what is taken on board, such as fuel, oil, water and catch (fish) acting downwards, and buoyancy being the force resulting from the displaced water acting upwards.

Transverse stability is determined by the relationship between the vertical centre of gravity (VCG), and the vertical centre of buoyancy (VCB). The VCG is the total of all weights acting through one point, and the VCB is the resultant of all the buoyant forces acting through one point **(Figure 29)**. The transverse VCG does not move when a vessel heels over, but will move when weights are changed or moved. As a rule of thumb, the VCG tends to move towards any weights that are added and away from any weights that are removed. Unlike the VCG, the transverse VCB will move as the vessel heels over and its underwater volume changes.

As a vessel heels, a righting lever (referred to as GZ) will be created between the forces acting through the VCG and VCB **(Figure 30)**. This righting lever creates a restoring moment to bring the vessel upright. The righting lever will increase with the angle of heel up to the point when the deck edge becomes immersed, and then reduces as the vessel heels further **(Figures 31)**. As a rule, a low VCG combined with a wide beam and high freeboard will provide good stability.

[29] A vessel heels when external forces (such as wind and swell) displaces it from the upright.

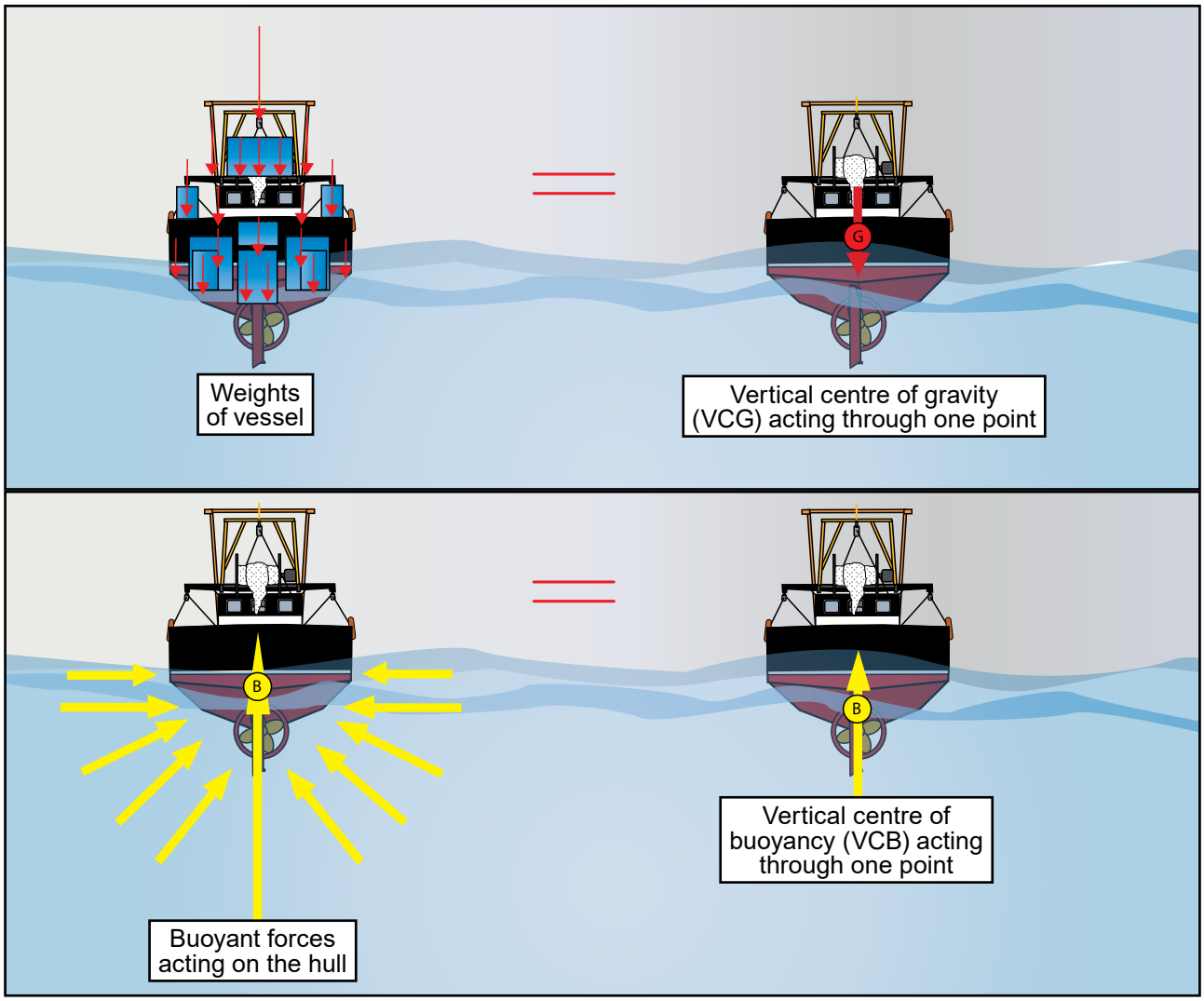

Figure 29: Transverse stability – vertical centres of gravity and buoyancy

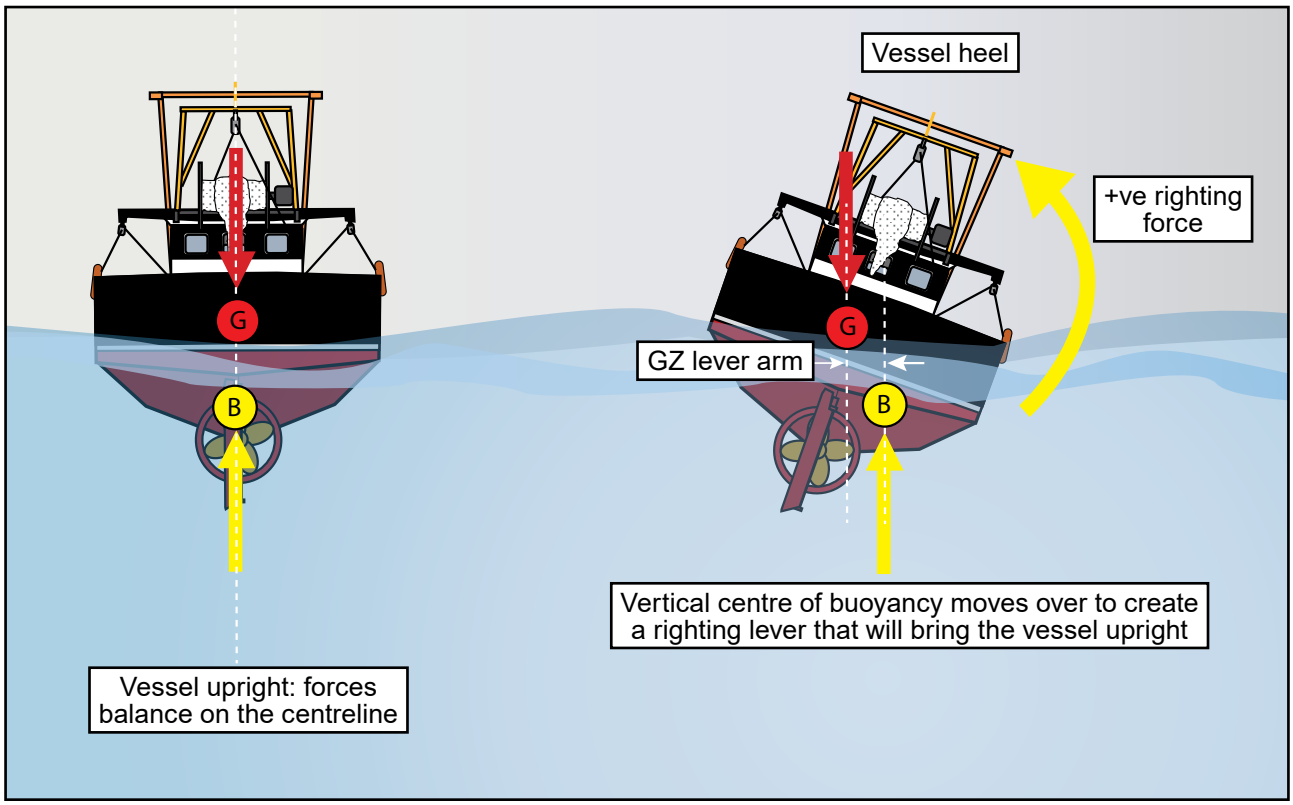

Figure 30: Transverse stability – righting lever

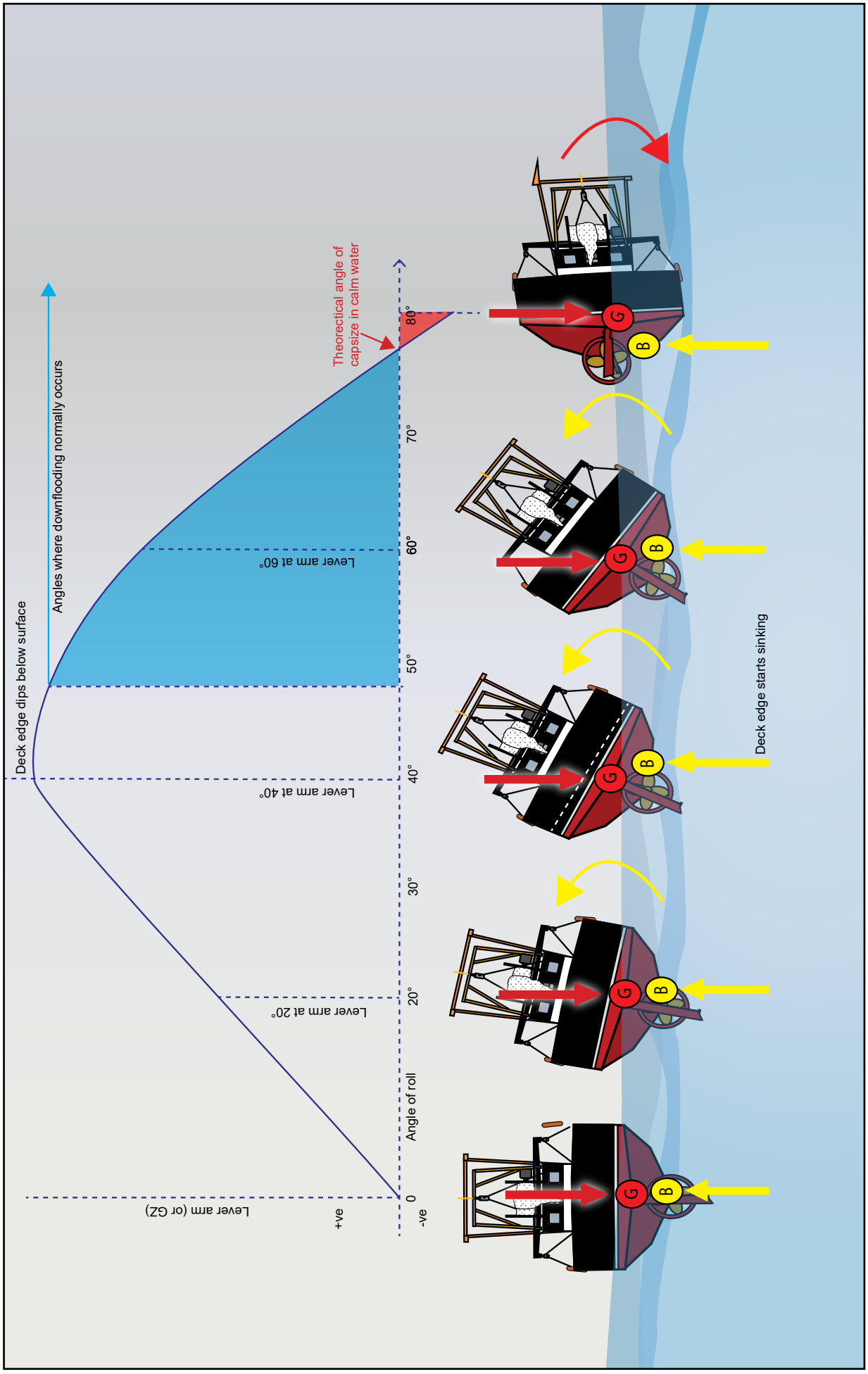

Figure 31: Transverse stability – stability curve

2.3.2 The mechanics of the capsize

The weight contained in the cod-end when *Solstice* capsized was unknown. However, the size of the catch was much bigger than those successfully landed earlier that day and during the previous 2 days. In addition, the presence of a large amount of moss and sand would have significantly increased the weight in the net.

If not already apparent, the crew should have realised the weight they were trying to lift was excessive when the net drum failed. A further indicator was the parting of the rope used to hold the weight of the net during the subsequent attempts to recover the catch.

The weight in the net alone would have significantly reduced the vessel's freeboard aft and therefore affected its stability. Using the lifting block rigged at the top of the gantry magnified the problem because the weight of any object acts through the point of suspension. As soon as the cod-end was lifted clear of the water, its VCG and the effect of its full weight would have shifted to the top of the gantry block **(Figure 32)**. This would have caused *Solstice*'s VCG to move even further upwards, making the vessel dangerously unstable.

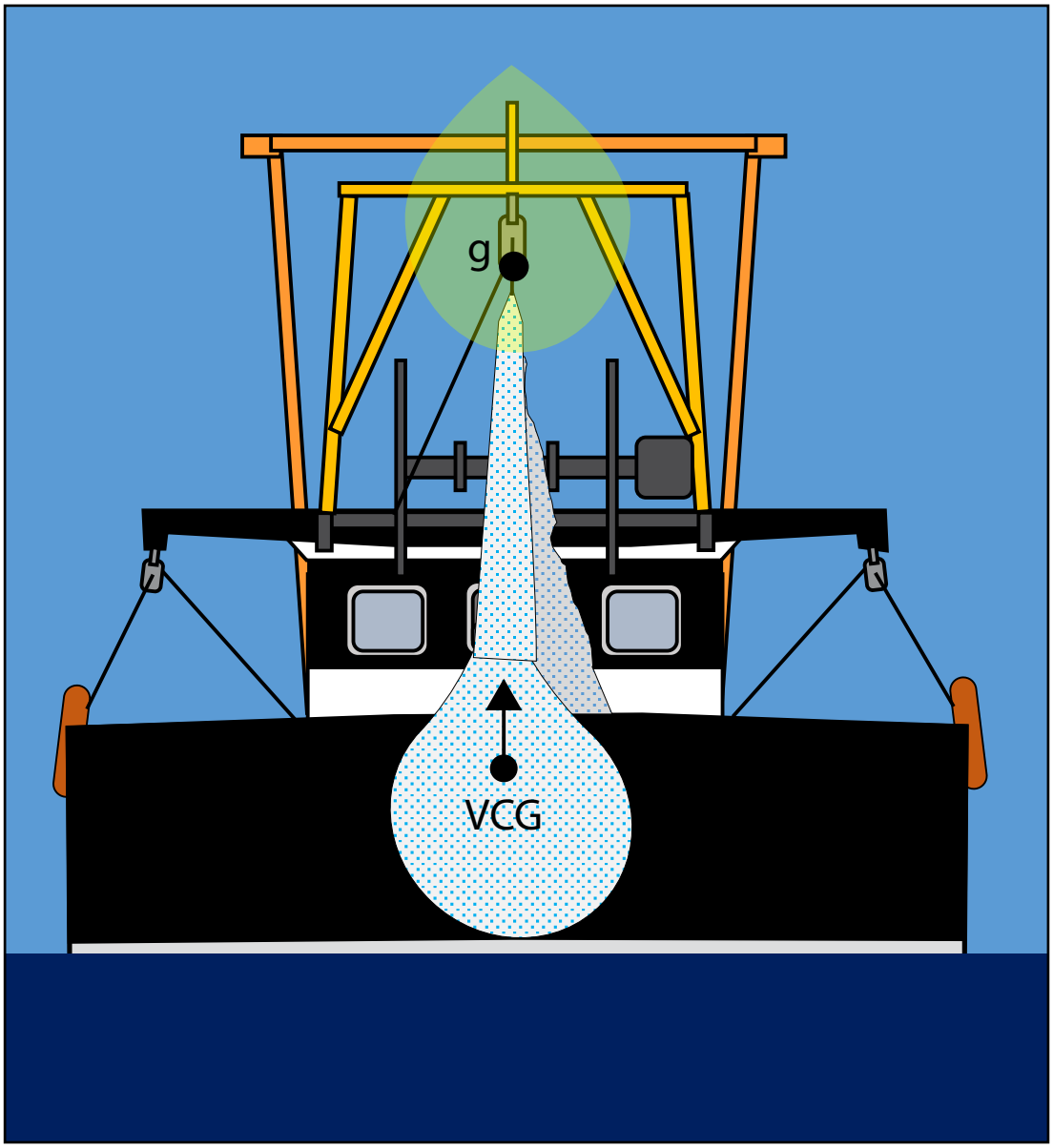

Figure 32: Effect on vessel stability when lifting a weight from a high point

When a suspended load swings outward in the direction of any heel, it pulls the vessel further over to that side, increasing the heel and the risk of capsize. If the righting moment is insufficient, the vessel cannot correct the heel and it will capsize. This is what happened when the cod-end started to roll across *Solstice*'s transom.

It was evident that *Solstice* did not have sufficient transverse stability to safely lift the weight of its net on board over the stern. It was also clearly apparent that the method adopted to recover the catch was fundamental to the capsize.

2.3.3 Landing the catch over the stern

Solstice did not have written risk assessments or documented procedures and safe systems of work for stern trawling. Tony chose to land the catch over the stern and was on board because he wanted to assure himself that his son and his crewman were confident with the fishing method they had developed over the previous 2 days.

The vessel's previous owners had landed the catch over the side onto the main deck. This had several advantages. Not only did it provide a larger working area and easier access to the fish hold, but it also provided a clearer indication of the effect of the load on the vessel's stability. The reason for this is that a vessel will start to list steadily towards the load as the catch is lifted, which provides a better opportunity to identify the risk and stop hauling. When lifting the catch on a vessel's centreline, over the stern, it is harder to judge the effect of the load on the vessel's stability, and therefore the risk of capsize is greater.

2.3.4 Free surface effect

It was not unusual for water to wash onto *Solstice*'s deck through its aft freeing ports when towing its dredge gear. This was due to the reduction of freeboard aft as the vessel trimmed by the stern **(Figure 33)**.

Water on deck presents a serious stability hazard. Not only will the weight of the water reduce the vessel's freeboard and raise its VCG, but it will also introduce a 'free surface effect' as it sloshes across the deck **(Figure 34)**. It is therefore essential that water is moved off the deck as quickly as possible. This is achieved by the provision of freeing ports in the bulwarks. Freeing ports must be of sufficient size and should never be closed or blocked, especially during critical fishing operations and in bad weather.

The wreck dive survey identified that the freeing ports on *Solstice*'s aft deck had been wedged shut **(Figure 24)**. The crew's reasoning for this was understandable as water on the aft deck would have been more problematic to the crew because that was their working area. Furthermore, the likelihood of the aft deck freeing ports being immersed would have been higher when stern trawling. This was because the trawl arms were positioned higher than the hinged dredge warp outriggers, which would have caused the vessel to trim further by the stern and therefore reduce the freeboard aft **(Figure 35)**.

It is unlikely that the blockage of the aft freeing ports was a significant factor in this case, given the proximity of *Solstice*'s other freeing ports. Nevertheless, any trapped water would have contributed to the capsize.

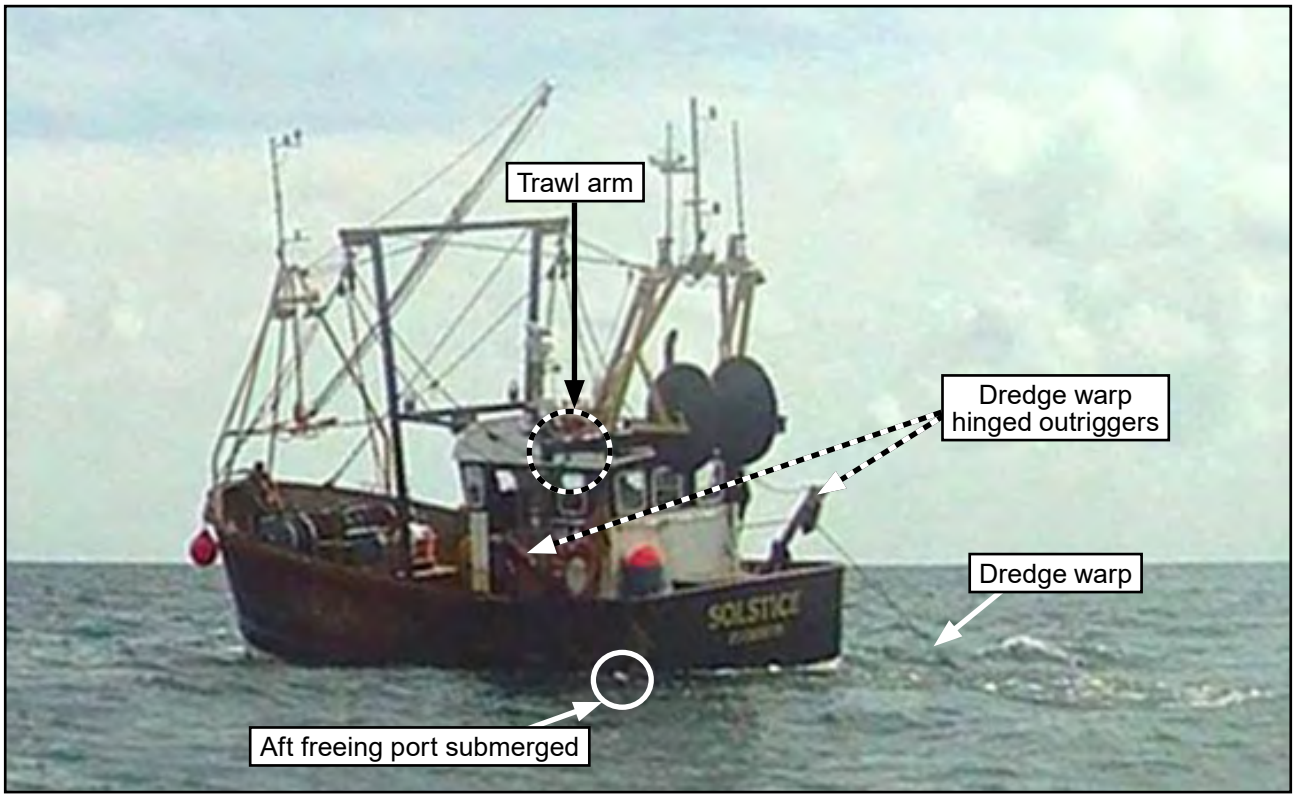

Figure 33: *Solstice* trimmed by the stern and heeling to port

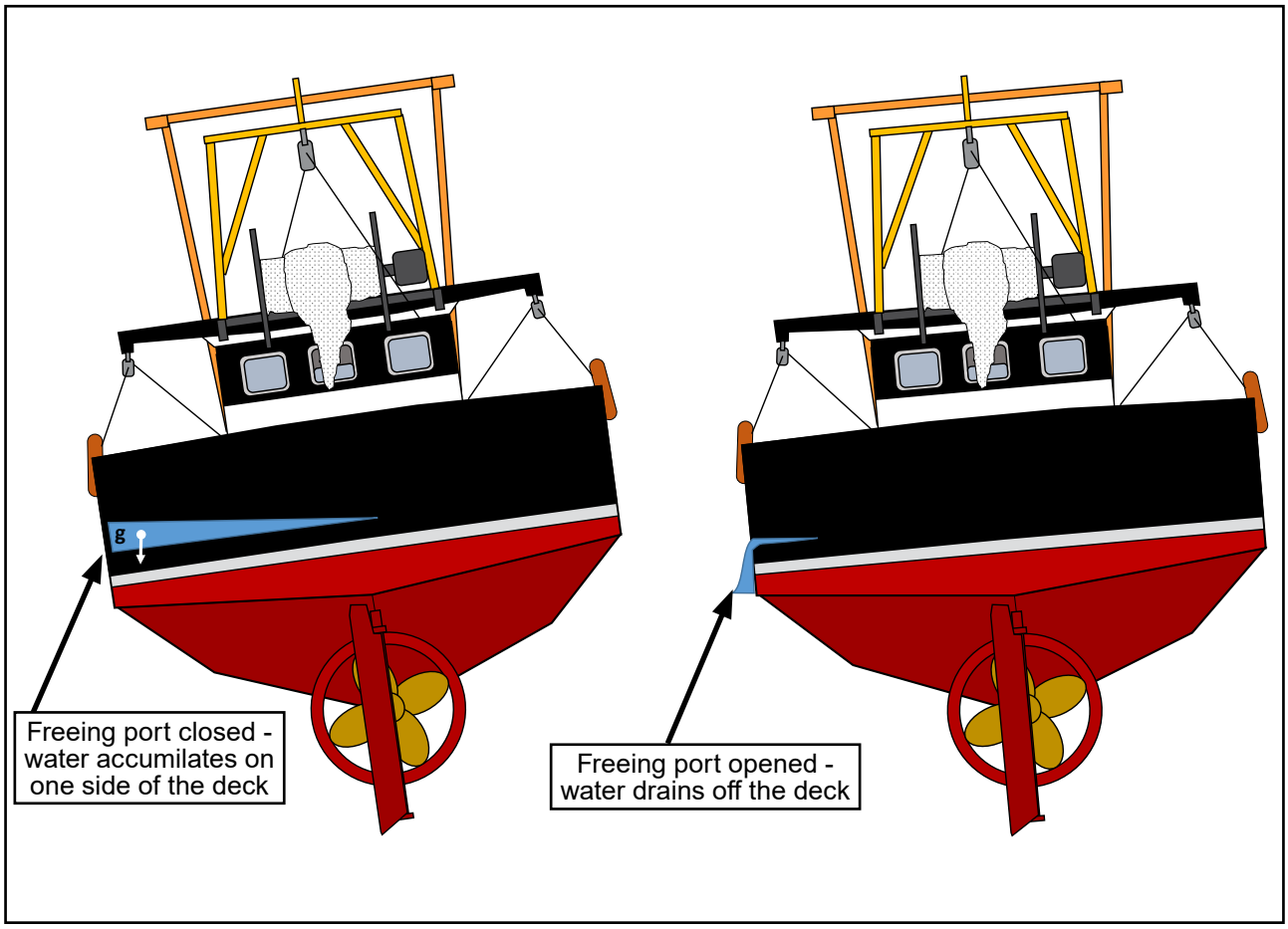

Figure 34: Free surface effect

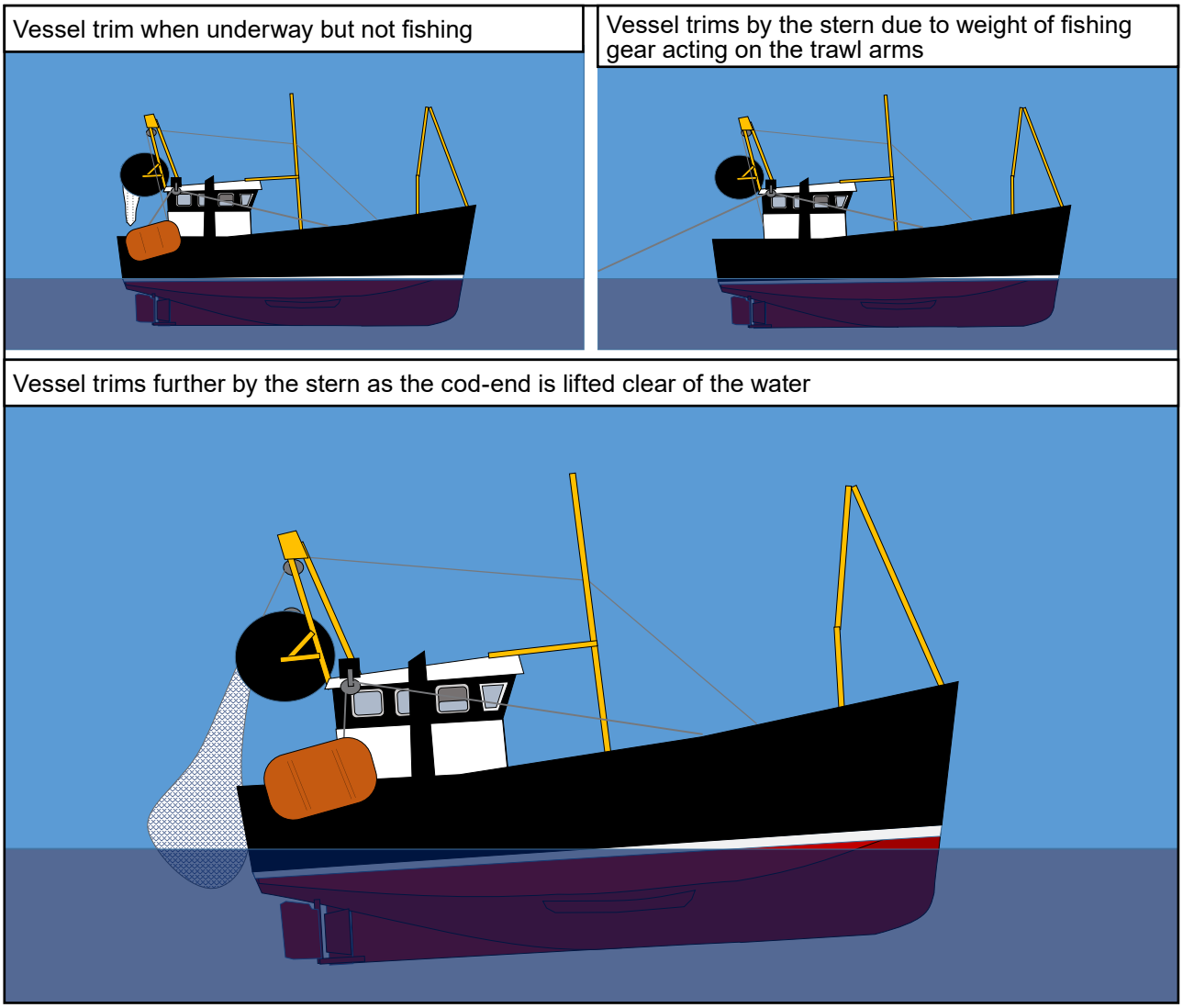

Figure 35: Large change of trim when lifting a weight at the stern

2.3.5 Underwater volume

Solstice had a reduced underwater volume at its stern due to its aft skeg design **(Figure 12)**. This was highlighted by the MCA during its post-accident inspection and stability assessment of a vessel with an identical hull design and similar rigging to that of *Solstice* (section 1.8.3).

Where a vessel is lifting a heavy weight at the stern, the larger the underwater volume aft, the greater will be the resistance to the vessel trimming down by the stern. Conversely, a small underwater volume aft will result in the vessel trimming further by the stern. In such a situation, the righting levers would reduce and therefore the likelihood of capsize would increase.

2.4 VESSEL STABILITY ASSESSMENTS

2.4.1 The requirements

There was no specific statutory requirement for fishing vessels under 15m overall length, such as *Solstice*, to have approved stability or meet any intact stability criteria. In the absence of a specific requirement, the MCA's MGN 427(F) reminded

vessel owners and skippers of their general duty, under the UK maritime sector generic occupational health and safety legislation, to provide a safe working environment and safe systems of work to follow. The MGN also offered advice on how best to assess small fishing vessel stability.

No stability assessments of *Solstice* had been carried out under Tony's ownership and he had no stability data for the vessel. Tony relied entirely on his experience as a career fisherman and the knowledge that *Solstice* had proved to be a stable vessel in the past. It is unlikely that a stability roll or heel test would have identified all of the complexities of recovering the catch on board over the stern. However, the use of the Wolfson Guidance method in combination with a heel test could have alerted the crew to the increased risk of capsizing *Solstice* when lifting weights from the top of the aft gantry and the scotch poles.

A greater level of stability awareness and the application of stability criteria would have improved the crew's appreciation of the risks they were taking and might have prompted a different approach to landing the catch. This case, like many others investigated by MAIB, clearly demonstrates the widespread reluctance of the owners of small fishing vessels to invest in formal stability assessments. In the absence of specific statutory requirements or the enforcement of generic health and safety legislation, it is highly likely that this will remain the case.

2.4.2 Vessel modifications and changes in fishing method

Solstice had been modified and its fishing methods changed several times since build. Prior to re-rigging *Solstice* for stern trawling, Tony had increased the size of the dredge gear and had fitted steel trays to the tops of the main deck gunwales.

The MCA specifically advised Tony to consider stability when making any changes in fishing method, and had instructed him to inform them of any intended modifications. Tony did neither. This might have been because he thought the modifications were minor and did not merit any undue concern. Similarly, as *Solstice* was equipped to, and had previously stern-trawled, he might have had a perception that the change of fishing mode was straightforward, and the minimal alterations insignificant. However, this was not the case.

A simple roll or heel test conducted before and after the vessel modifications would have provided Tony with an immediate indication of their impact on *Solstice*'s transverse stability. A more detailed assessment needed to be made following the change in fishing method.

The MCA and fishing industry guidance repeatedly warned of the dangers associated with carrying out vessel modifications and changing fishing methods. This was because such changes can, and often do, have catastrophic outcomes. The importance of stability assessments in these circumstances cannot be emphasised enough.

2.5 EMERGENCY RESPONSE

2.5.1 Crew response to excessive weight in the net

It was evident that *Solstice*'s catch was too heavy for it to be recovered on board safely in one lift. In such circumstances, fishermen often reduce the risk of capsize by splitting the catch and recovering it on board in two or more lifts. This is achieved

using the lazy-deckie and a halving becket. However, fishermen have little control over weights such as mud, sand, stones or moss once it is in the cod-end. When this causes the cod-end to become too heavy to recover safely, alternative options need to be considered. These include:

- Jettisoning the gear for retrieval by a larger, more capable vessel.
- Towing the net onto hard seabed to cause the obstruction to be torn free.
- Cutting away the cod-end.
- Towing the net, from a low point on the vessel so as not to reduce stability, back to harbour, and employing a suitable crane to lift it onto the quayside.

These options all result in lost fishing time, damage to fishing gear and/or loss of the catch. Therefore, it is understandable why skippers will strive to recover their nets back on board. Nevertheless, in such situations it is essential to review the situation regarding stability as it is better to lose the net than capsize the vessel.

Excessive weight in the net was a foreseeable hazard, and the consequential capsize was an obvious likely outcome. Fishing vessel owners and skippers should ensure procedures are in place to deal with excessive net weights and, when necessary, be prepared to release their catch and/or fishing gear. Although not the vessel's skipper, it was apparent that Tony was in charge on deck and was the key decision maker when it came to adapting the catch recovery method following the failure of the net drum. It was also apparent, in this case, that the high value of the catch influenced the level of risk that *Solstice*'s owner and crew were prepared to take.

2.5.2 Crew response to the loss of stability and capsize

Once the cod-end started to roll along the transom, *Solstice*'s crew had little time to react. They were unable to release the gear because the net was tied to the wheelhouse rail and part of the cod-end was resting on top of the vessel's gunwale. In this instance, the only option left was to release the contents of the net by cutting open the cod-end.

The crew were not carrying knives, and knives were not readily available on the aft working deck. Tony's primary reason for entering the wheelhouse appears to have been to grab a knife, which he passed to the crewman through the aft window. However, while in the wheelhouse, Tony might have tried to raise the alarm or grab the crew's lifejackets. Regardless of his intentions, there was no time for either as the vessel capsized rapidly to port.

Tony lost his life because he was trapped in the wheelhouse and could not escape when *Solstice* capsized. The sudden inrush of water through the wheelhouse door would have pushed him backwards and prevented his escape. It might also have been the cause of his head injuries, which in turn might have rendered him unconscious. The crewman's observations support this assessment.

Following the capsize, the skipper and crewman were extremely fortunate that *Solstice* remained afloat as this allowed them the opportunity to escape from under the vessel and swim to the surface. It also provided refuge out of the water. Without this, it is highly likely that neither would have survived.

2.6 EMERGENCY PREPAREDNESS

2.6.1 General

To minimise the consequences of a marine accident, a fishing vessel and its crew need to be prepared to deal with a variety of emergency situations. Fishing vessels are prepared through design and the provision of LSA and other safety equipment. Fishing vessel owners and skippers can prepare their crews by providing them with guidance and procedures, and through the delivery of training.

Solstice carried the required levels of LSA and safety equipment, as set out in the SFV Code, for a vessel of its size. In addition, it was equipped with a 4-man liferaft and two PFDs for use when working on deck.

Tony and the skipper had completed the fishing vessel sea survival, elementary first-aid, fire-fighting, health and safety, and safety awareness training courses. The crewman had completed the sea survival, elementary first-aid and fire-fighting courses.

2.6.2 Working on deck

The area where the net was being landed on the aft deck following the net drum failure was confined. Therefore, the risk of Tony or the crewman being carried over the stern by the net was high. In such circumstances it would be appropriate to wear a PFD and carry a knife.

Given the rapid nature of the capsize, the risk of entrapment for both the skipper and crewman in this case might have been increased if they had been wearing a PFD. Nevertheless, had *Solstice* sank and its liferaft not deployed, both survivors would probably have drowned without the buoyant support provided by a PFD.

Despite the circumstances of this accident, the safety message remains clear: when working on deck fishermen must always be prepared for things to suddenly go wrong; carry a sharp knife, or at least have one readily to hand, and wear PFDs whenever there is a risk of going overboard. Had knives been carried, Tony might still have entered the wheelhouse but the crew's ability to release the catch from the net before the vessel capsized would have increased.

2.6.3 Liferaft and lifebuoys

Solstice's liferaft was stowed in a cradle on top of the wheelhouse roof and was secured in place by means of an HRU. The lifebuoys were stowed in cradles on the deck either side of the wheelhouse. Both the liferaft and lifebuoys were supposed to float free if the vessel sank. The liferaft was not a mandatory LSA item. It had been purchased and fitted by the vessel's previous owner and was overdue for its periodic service.

During the capsize, the liferaft's HRU operated as designed but it did not float free. This was probably due to the speed of the capsize. Either the buoyant force of the liferaft in its canister held it in its cradle, or it became entrapped on the underside of the deck or in the vessel's rigging. When the vessel sank the following day the liferaft came to the surface and inflated. However, the starboard lifebuoy remained in its cradle.

It was evident from the dive survey that one of the net drum's hydraulic hoses impeded the release of the starboard lifebuoy. This hose was not part of the original design but had been in place for some time **(Figure 23)**. It should have been identified as a snag hazard and replaced with a shorter one or secured out of the way.

It is essential that all LSA and safety equipment, regardless of whether or not they are mandatory items, should always be maintained in a fully operational state. They can and often do save lives.

2.6.4 Raising the alarm

HMCG cannot respond to an incident until it becomes aware that a ship or people need assistance. Mobile phone evidence indicated that *Solstice* capsized at 1938. The vessel was expected back in port between 1800 and 1900, but was not reported overdue until 2038.

Such a delay is typical in these circumstances as, like the coastguard, family and friends usually go through an uncertainty phase. Initially, they will try to contact the vessel and call other family members and friends to find out if anyone knows of the vessel's whereabouts. As concern builds, there is often a reluctance to alert the coastguard as family members do not want to make a fuss or annoy their loved ones if they are safe and sound. This type of dilemma can easily be avoided by the provision of an EPIRB.

The speed at which a small fishing vessel can capsize often precludes the opportunity to raise the alarm through making a VHF call or sending a DSC alert. To mitigate this, the MCA has introduced a requirement for decked fishing vessels of less than 10m in length, such as *Solstice*, to be equipped with an EPIRB or PLBs for all on board. This requirement will become mandatory from 23 October 2019 for vessels built before October 2017.

At the time of the accident, the MCA's SFV Code recommended the carriage of an EPIRB. However, again, this advice was not heeded. Therefore, once in the water, the skipper and his crewman had no means of raising the alarm and were totally reliant on someone seeing the vessel's unlit, upturned hull or friends and family reporting them overdue. Fishing vessel owners and skippers should not wait until November 2019, or, the issue of a Safety Certificate deficiency in a subsequent MCA inspection before investing in critical safety equipment.

2.6.5 Vessel location

When the coastguard became aware that *Solstice* was overdue, one of the first tasks it carried out was to search for an AIS position and previous track. As *Solstice* was not equipped with an AIS transceiver, no positional information was found.

Solstice was under 15m long and therefore was not required to have an AIS transceiver. AIS was designed to enhance navigational safety but, in circumstances where a vessel is reported overdue, AIS transmissions can be a vital aid during the initial stage of a SAR mission. If the vessel is on the surface, it can be immediately located; if it has sunk or capsized, its previous track history will provide a starting point for the search. Given the lack of AIS, EPIRB, PLBs or DSC message, the skipper and crewman were effectively invisible to SAR resources.

2.7 THE SEARCH AND RESCUE MISSION

2.7.1 Overview

The SAR mission was successful; *Solstice*'s upturned hull was found, and its skipper and crewman were rescued. Even had an alarm been raised immediately the vessel capsized and *Solstice*'s position been known, it was evident that *Solstice*'s owner, Tony Jones, would still have lost his life. Nevertheless, concerns were raised publicly about HMCG's co-ordination and control of the SAR operation.

The study carried out by the MAIB, at the request of the UK government's Shipping Minister, found no discernible pattern that might suggest there is an enduring systemic problem with the way HMCG responds to incident reports, and concluded that most delays were the result of late reporting. In the few cases that HMCG's actions or omissions were adjudged to have contributed to delays in finding vessels in distress, CGOC staffing levels, operator training, operational procedures and IT systems were identified as common contributory factors. These factors were evident in this case and, if not addressed, might lead to more severe consequences during future SAR operations.

2.7.2 The awareness stage and initial stage of the search and rescue mission

The coastguard was made aware that *Solstice* was overdue at 2038, when the skipper's partner and her father made their initial telephone call. The first attempt to make VHF radio contact with *Solstice* was made at 2106 by the Falmouth coastguard SMC, and the first "Pan Pan" broadcast was made 9 minutes later. An alert phase was declared by the SMC at 2121. The first "Mayday" broadcast was made at 2251 when the status of the emergency phase was raised from alert to distress.

The Irish Coast Guard review of the *Solstice* SAR mission concluded that the essential information required to initiate a VHF radio communications search could have been collected in half the time taken by the MOO during the initial call. The review also concluded that the alert phase should have been declared almost immediately. The evaluation process for an overdue vessel is a particularly crucial function. All reports received must be carefully assessed to determine their validity, the urgency for action, and the extent of the response required. While evaluation of reports may be difficult and time-consuming, decisions must be made, and action taken as quickly as possible.

The MOO took a methodical approach to collecting the information needed to evaluate the level of urgency associated with the overdue report. He also worked hard to reassure the skipper's partner while simultaneously typing a summary of the information provided into the incident log as the call progressed. However, the coastguard officers at the Falmouth CGOC worked in isolation, without the support of the HMCG's national network, during the initial uncertainty phase of the SAR mission. This was due in part to the time it took the MOO to gather information during the initial call and create the incident on the coastguard network electronic log. By the time the incident was created (2100) the SMOO had become directly involved in the information gathering process, and the Duty Controller was distracted preparing for and delivering the network's routine evening brief.

Given the level of information gathered during the initial call (known destination and expected time of return, loss of mobile phone signals and change of fishing mode), the guidance provided in the coastguard OMS and *Solstice*'s failure to respond to VHF calls, the SMC should have declared the alert phase for the incident almost immediately, and tasked SAR assets much earlier. The delays in taking these actions were probably influenced by a combination of workload and knowledge that the vast majority of overdue vessel incidents are concluded without the need to commit SAR assets.

2.7.3 The planning stage and operational stage of the search and rescue mission

The SMC formulated a quick mission plan during the initial uncertainty phase and entered it in the incident log when the alert phase was declared at 2121. This, together with the details recorded in the incident log, was reviewed and endorsed by the network Duty Controller. The quick mission plan indicated that SAR helicopter and RNLI lifeboat assistance would be required, but the launch authorities were not forewarned.

At this stage, local fishermen and ships operating in the Plymouth area were responding to the "Pan Pan" broadcasts, and the SMC and MOO were fully engaged receiving and making telephone and radio calls. This adversely affected the SMC's ability to assimilate the information being received and formulate a detailed SAR plan.

The first report that *Solstice* had been fishing south of the Eddystone Lighthouse was received at 2111. An 1100 sighting of the vessel by another fisherman was reported at 2134. When the MOO spoke to *Kenavo*'s skipper about 15 minutes later, he confirmed that he had seen *Solstice* 7 miles south of Plymouth and 6 miles east of the Eddystone Lighthouse at about 1700 to 1730. With this level of information, the status of the emergency phase could have been raised from 'alert' to 'distress', and SAR assets tasked.

When the lifeboats were launched, and the SAR helicopter tasked, the SMC did not have a detailed plan, so the Eddystone Lighthouse was used as the centre point of the search. This was because the numerous sightings reported by local fishermen **(Figure 28)** were not chronologically logged or charted, and therefore no one had a clear overview of the situation.

The success of a SAR mission often depends on the speed with which the operation is planned and carried out. The prompt collection and evaluation of information, and timely tasking of SAR assets, is therefore critical. In this case the evaluation of the information gathered was slow and the SAR mission planning process was hampered by the SMC's involvement in the initial information gathering and communications search. Had the SMC or the Duty Controller been able to stand back and take an overview, it is likely that the mission would have been escalated to the distress phase much sooner and the search plan centred on *Solstice*'s last reported position **(Figure 36)**. In turn, this would probably have resulted in the upturned hull being found and survivors rescued much earlier.

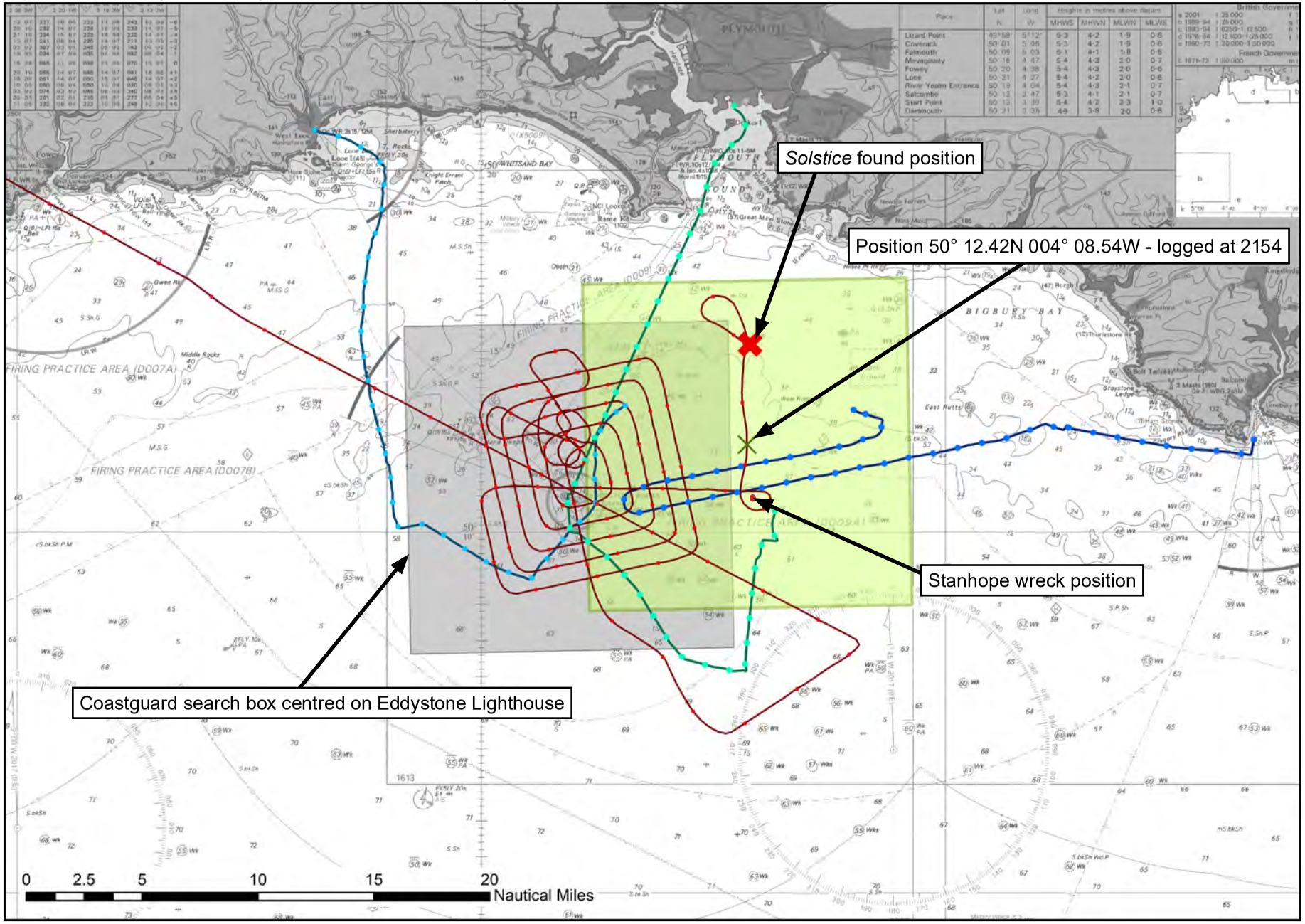

Figure 36: Coastguard search box centred on approximate position logged at 2154

2.8 COASTGUARD OPERATIONS CENTRE STAFFING LEVELS AND NETWORK SUPPORT

When *Solstice* was reported overdue, the HMCG SAR network was staffed by 38 coastguard officers, which was four more than the organisation's suggested minimum. However, Falmouth CGOC was staffed by two coastguard officers; one less than the suggested staffing level. Two other CGOCs were also staffed by two coastguard officers.

The suggested staffing levels set by HMCG had been specifically designed to cope with regional shortfalls. The network system was designed to allow the *Solstice* SAR mission to be managed or supported by the NMOC and the area CGOCs. It was only preference, based on local knowledge, that most SAR operations were co-ordinated by the CGOC located within the area of the incident.

The SMOO and MOO in Falmouth were both fully qualified and experienced coastguard officers, but they were overwhelmed during the initial and planning stages of the SAR mission. This was either because the network was understaffed or because it was not functioning effectively, or both.

When fully staffed, the Falmouth CGOC should have been able to plan and co-ordinate the *Solstice* SAR mission, with little or no network support. With only two coastguard officers on duty, a high level of support should have been provided by the network. This did not happen, particularly during the initial and early planning stages. It was evident from a review of the CGOC telephone and radio recordings that the operations officers felt isolated; repeatedly explaining to callers that "*there are only two of us in here*".

HMCG had routinely operated with a 10% staffing shortfall and it has been a constant challenge to maintain its recommended staffing levels across the national network following the implementation of the Future Coastguard programme. The reasons for this have been reviewed and actions are being taken to address the issue. However, given the number of people available on the network and the low level of SAR activity nationally, it is apparent that the network was not functioning effectively.

When the incident was created on the coastguard log, the Duty Controller was delivering the network's routine evening brief. Once engaged with the mission, the Duty Controller soon became distracted by problems obtaining mobile phone communications data. When the SMOO at Falmouth CGOC did request specific support with routine VHF channel 16 traffic, positive and immediate action was not taken, and the task fell on the SMOO to sort it out.

It had been highlighted during the evening briefing that Falmouth CGOC might require network support. This support should have been proactive and at a level that permitted the SMOO to maintain a clear overview of the operation as it developed. It was apparent that remote working was not yet instinctive and was hampered by several minor IT issues. Efforts need to be made to ensure the failure to deliver the recommended staffing levels at the CGOCs does not become routine. Furthermore, action needs to be taken to improve the effectiveness and efficiency of the network system, probably through the delivery of bespoke remote working training.

2.9 COMMUNICATIONS BETWEEN HMCG PERSONNEL AND RNLI CREW

During the initial stages of the SAR mission, the focus of the operations officers at the Falmouth CGOC was on information gathering and communications searches. Meanwhile, the RNLI staff at the Plymouth and Looe lifeboat stations, who were monitoring the coastguard's VHF radio transmissions, were keen to launch their boats and begin the search. As the operation progressed they became increasingly frustrated with what they perceived to be a reluctance, by the coastguard, to task them and initiate a search. This led to heated exchanges between the MOO at the CGOC and some RNLI staff, and the subsequent decision by the coxswains of the Plymouth and Looe lifeboats to self-launch.

Regardless of the staffing and operational issues discussed in the previous sections, proper and accurate planning is critical to SAR mission success; this is especially so when the location of the distress situation is unknown. SAR mission planning is a reactive process and can often be extremely complex. Where uncertainty exists, there is a balance to be struck between gathering sufficient information to formulate a meaningful search plan and committing SAR assets. If the wrong area is searched, there is no hope of finding the vessel in distress, or survivors, regardless of the quality of search techniques or the number of SAR assets employed.

It is understandable that the RNLI crew members and their LOMs were frustrated by the coastguard's lack of engagement because they were concerned for the safety of *Solstice*'s crew and had local knowledge that could have supported the communications search.

It was clear that perceived shortcomings during recent SAR missions since the development of the Future Coastguard programme, such as less efficient ways of working, fuelled these frustrations and influenced the tone of the initial interactions between RNLI and coastguard staff. However, it is important to recognise that all those involved in the *Solstice* SAR mission were focused on saving lives. It is therefore essential that these local issues are addressed, and actions are taken to ensure that relationships between RNLI station teams and CGOC operations officers remain strong.

2.10 LOCAL KNOWLEDGE

During discussions with the MOO, *Kenavo*'s skipper referred to two wrecks: the *Western Coal Boat* and the *Stanhope* as he tried to provide a more specific location for *Solstice*'s last known position **(Figure 28)**. This information was entered in the incident log, but the operations officers at the CGOC did not know the location of either wreck. It was an overheard reference to the *Stanhope* wreck during a VHF transmission that prompted the pilot of R924 to divert to the position of the upturned hull during his return to base.

Loss of local knowledge was a serious concern prior to the implementation of the Future Coastguard programme. The retention of one CGOC in each geographic region, and the provision of the FINTAN software were actions that were taken to mitigate the concerns. However, wreck names and positions had not been entered into FINTAN and therefore could not be searched. Another significant resource for local knowledge was the RNLI crewmen. As well as being experienced lifeboat

crew, many of them were local fishermen with knowledge of *Solstice* and its fishing grounds. This resource was not used effectively during the initial information gathering stage.

The wrecks were well known reference points for Plymouth-based fishermen, but the operations officers in Falmouth did not have that level of local knowledge. In these circumstances the MOO should have asked *Kenavo*'s skipper to provide latitude and longitude positions for each wreck, because without them the information was of little use. Improved levels of liaison between CGOC and regional RNLI station staff will help ensure best use of local knowledge. The addition of wreck data to the FINTAN database would also provide valuable assistance.

2.11 MOBILE PHONE DATA COLLECTION

At 2126 the SMOO asked the Duty Controller to request mobile telephone communications data for *Solstice*'s crew. The Duty Controller sought and received approval in accordance with RIPA protocols but could not log on to the NMOC's RIPA designated computer due to known licensing issues. As a result, the Duty Controller spent long periods of time engaged in conversations with police officers who were tasked to retrieve the data on the coastguard's behalf.

The data recovered identified that the skipper's telephone suddenly dropped off its provider network at 1938. Interrogation of the data identified that three telephone masts were transmitting to and from the skipper's mobile telephone. The mapping of the signals provided a search area of 93.1nm2, the centre of which was east of the Eddystone Lighthouse **(Figure 27)**.

It took almost 3½ hours to collect the mobile telephone data from the initial request by the SMC. Very shortly afterwards, *Solstice* was found, and the data obtained was no longer required. Had the Duty Controller been able to collect the communications data without the assistance of the police, it could have been used much earlier to support the search planning process.

SECTION 3 - CONCLUSIONS

3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. *Solstice* capsized in benign sea conditions because it did not have sufficient transverse stability to safely lift the contents of its net on board over the stern. This was primarily because:

   - The weight of the catch in the net was excessive. [2.3.2]
   - The height of the lifting point at the stern was high. [2.3.2]

2. Other factors that contributed to capsize included:

   - The free surface effect generated by trapped water sloshing on the aft deck. [2.3.4]
   - A reduction in buoyancy due to the vessel's limited underwater volume aft. [2.3.5]

3. Lifting the catch on the centreline made it difficult to assess the effect of the load on the vessel's transverse stability. [2.3.5]

4. *Solstice*'s owner had no stability data for his vessel and relied on his experience as a fishing boat skipper and the knowledge that *Solstice* had proved to be a stable boat in the past. A thorough stability assessment would have given him a clearer understanding of the vessel's limits. [2.4.1]

5. *Solstice*'s owner did not follow the stability advice and guidance provided by the MCA and fishing industry bodies; he modified his vessel and changed its mode of fishing without consultation and without conducting stability assessments. [2.4.2]

6. *Solstice* did not have any risk assessments for stern trawling and the method adopted to recover the catch following the net drum failure was adhoc in nature and inherently hazardous. [2.5.1]

7. Excessive weight in the net was a foreseeable hazard and capsize was an obvious consequence, but the crew remained determined to lift the high value catch on board. [2.5.1]

8. The vessel's owner lost his life because he was trapped in the wheelhouse by the inrush of water. [2.5.2]

9. The skipper and crewman were fortunate that the capsized vessel remained afloat and provided a safe haven as it is unlikely they would have survived without the buoyant support of a PFD. [2.5.2]

10. The vessel and its crew were not adequately prepared or equipped to deal with emergency situations. Of note:

    - Knives were not carried or readily available on the working deck. [2.6.2]
    - PFDs were not worn on deck when there was a realistic risk of being carried overboard by the fishing gear. [2.6.2]

- The liferaft had not been serviced. [2.6.3]
- The release of the starboard lifebuoy was impeded. [2.6.3]

11. Once in the water, the crew had no means of raising the alarm. The carriage of an EPIRB and/or PLBs would have resulted in an immediate and location-focused emergency response. [2.6.4]

3.2 SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT THAT HAVE BEEN ADDRESSED OR RESULTED IN RECOMMENDATIONS

1. Once the coastguard was made aware that *Solstice* was overdue, its biggest challenge was in establishing a search area. The carriage of an AIS transceiver in these circumstances would have been of invaluable benefit. [2.6.5]

2. The SAR mission was successful; *Solstice*'s upturned hull was located and both survivors were rescued. No actions could have been taken during the emergency response to prevent the death of *Solstice*'s owner. [2.7.1]

3. Several operational issues adversely affected the effectiveness and efficiency of the SAR mission. These included:
   - It took longer than necessary during the initial call to extract the key information required to begin a communications search. [2.7.2]
   - The coastguard officers in Falmouth CGOC were overwhelmed by the levels of communication traffic. The SMOO got directly involved in the information gathering process and therefore could not maintain an overview. [2.7.2]
   - Reports of vessel sightings were not listed chronologically or plotted on a chart. [2.7.3]
   - The coastguard Duty Controller was distracted, and network support was reactive. [2.7.2]
   - The SAR assets were not forewarned of their imminent tasking. [2.7.3]

4. The initial stages of the SAR mission were hampered by the fact that Falmouth CGOC had only two coastguard officers on duty at the time; one less than HMCG's recommended level. [2.8]

5. The HMCG network did not function effectively during the important initial stage of the SAR mission. The Duty Controller was distracted by other tasks, and requests for assistance were not dealt with decisively. [2.8]

6. Strained and fractious communications between the CGOC and RNLI staff adversely affected the SAR efforts. [2.9]

7. The local knowledge held by the RNLI lifeboat crews was not exploited. [2.10]

8. Known IT issues at the NMOC prevented timely access to mobile telephone communications data, which could have been used to narrow the search area. [2.11]

SECTION 4 - ACTION TAKEN

4.1 MAIB ACTIONS

The **Marine Accident Investigation Branch** has:

- Issued a Safety Flyer to the Fishing Industry **(Annex C)**.
- At the request of the government's Shipping Minister; conducted a review to determine if:
    - The lessons identified in the MAIB's *Louisa* accident report have been acted upon by the MCA, HMCG and the RNLI.
    - There was a pattern with response times in other incidents.
- Previously issued several recommendations to the MCA in respect of stability for fishing vessels under 15m in length. The recommendations relevant to this accident are:
    - 2015/165 Introduce intact stability criteria for all new and significantly modified decked fishing vessels of under 15m in length [*Stella Maris*].
    - 2016/130 Include in its intended new legislation introducing stability criteria for all new and significantly modified decked fishing vessels of under 15m in length a requirement for the stability of new open decked vessels, and all existing vessels of under 15m to be marked using the Wolfson Method or assessed by use of another acceptable method [*JMT*].
    - 2013/107 Expedite its development and promulgation of alternative small fishing vessel stability standards, which will ensure that all new fishing vessels under 15m (L) are subject to appropriate stability assessments, and which will eventually be included in the standards based on the Small Commercial Vessel and Pilot Boat Code scheduled for introduction in 2016 [*Heather Anne*].
    - 2013/110 Work together with the Marine Management Organisation and the Cornish Fish Producers Organisation to arrange trials of the 'Wolfson' mark on board a selection of Cornish fishing vessels under 15m (L) in order to gather sufficient data to enable the MCA to provide clear evidence on the marks' practicality, accuracy and usefulness [*Heather Anne*].

The MCA has accepted all these recommendations with the implementation target date of 2020.

4.2 ACTIONS TAKEN BY OTHER ORGANISATIONS

Her Majesty's Coastguard has:

- Changed its Coastguard Officers' training programme to include visits to other SAR organisations and local RNLI stations, improve effectiveness of practical network operation exercises.

- Undertaken a comprehensive review of its staffing levels, resulting in a revised watch pattern of five teams at the NMOC and a four-watch system at the GCOCs, to be implemented in January 2019. In addition, an initiative to over-recruit coastguard officers on a temporary basis to offset current retention issues has been completed.

- Amended OMS guidance relating to overdue vessels, designation of the Search Mission Controller and communications with RNLI stations.

- Initiated improvements in FINTAN to include maritime locations.

The **Irish Coast Guard** has:

- Undertaken a review of the *Solstice* SAR incident.

The **Royal National Lifeboat Institution** has:

- Prior to the *Solstice* accident, introduced a workshop to prioritise methods of joining up RNLI and HMCG delivery teams to improve knowledge and understanding of each other's roles, processes, decision-making and operational capabilities in order to optimise partnership working in SAR.

SECTION 5 - RECOMMENDATIONS

The **Maritime and Coastguard Agency** is recommended to:

2018/132 Commission an independent review of UK SAR operational capability and HMCG network functionality to assess the effectiveness of the actions taken as a result of the lessons identified in the MAIB and Irish Coast Guard *Solstice* investigation reports.

2018/133 Conduct a thorough review of SAR IT systems to ensure a reliable network function with accessible information exchange between CGOCs and the NMOC, identifying areas for improvement within the SAR IT systems infrastructure.

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

Marine Accident Report