ACCIDENT REPORT

Report on the investigation of

a fatal man overboard from the Reflex 38 yacht

# *Lion*

14.5 miles south of Selsey Bill, West Sussex

18 June 2011

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

VERY SERIOUS MARINE CASUALTY REPORT NO 4/2012 March 2012

**Extract from**
**The United Kingdom Merchant Shipping**
**(Accident Reporting and Investigation)**
**Regulations 2005 – Regulation 5:**

*"The sole objective of the investigation of an accident under the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005 shall be the prevention of future accidents through the ascertainment of its causes and circumstances. It shall not be the purpose of an investigation to determine liability nor, except so far as is necessary to achieve its objective, to apportion blame."*

NOTE

This report is not written with litigation in mind and, pursuant to Regulation 13(9) of the Merchant Shipping (Accident Reporting and Investigation) Regulations 2005, shall be inadmissible in any judicial proceedings whose purpose, or one of whose purposes is to attribute or apportion liability or blame.



Front cover photograph (*Lion*) courtesy of Yachting Monthly.

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## GLOSSARY OF ABBREVIATIONS, ACRONYMS AND TERMS

| | | |
|---|---|---|
| AIS | - | Automatic Identification System |
| C | - | Centigrade |
| CG | - | Her Majesty's Coastguard |
| cm | - | centimetre |
| CoC | - | Certificate of Competence |
| COG | - | course over ground |
| CPR | - | cardio-pulmonary resuscitation |
| CSWP | - | Crotch Strap Working Party |
| GD | - | general duties |
| GPS | - | Global Positioning System |
| EN | - | European Norm |
| ISAF | - | International Sailing Federation |
| ISO | - | International Organization for Standardization |
| kg | - | kilogram |
| kgf | - | kilogram-force |
| kW | - | kilowatt |
| m | - | metre |
| MCA | - | Maritime and Coastguard Agency |
| mm | - | millimetre |
| MNA | - | Member National Authority |
| MOB | - | man overboard |
| OSR | - | Offshore Special Regulations |
| oz | - | ounce |
| RNLI | - | Royal National Lifeboat Institution |
| RORC | - | Royal Ocean Racing Club |
| RYA | - | Royal Yachting Association |

| | | |
|---|---|---|
| SCV Code | - | The Small Commercial Vessel and Pilot Boat Code of Practice |
| SOG | - | speed over ground |
| SSR | - | Small Ships Register |
| T | - | True |

| | | |
|---|---|---|
| Bungy Strap | - | A length of elasticated line with fastenings at either end. |
| Jackline | - | A length of stainless steel wire or webbing extending fore and aft to which a safety tether can be attached. |
| Parbuckle | - | A device, usually of ropes or fabric, that is made fast at one end. The opposite end is passed under the object to be moved and then passed back for the purposes of hauling or lowering. |
| Spreader | - | A strut that holds the shrouds away from the mast. |

Times: All times used in this report are UTC+1 unless otherwise stated

## SYNOPSIS

At 0036 on 18 June 2011 the skipper of the yacht *Lion* fell overboard and drowned while still attached to the yacht by means of a tether connected to his lifejacket harness.

*Lion* sailed from Southampton on 17 June 2011 to compete in the Royal Ocean Racing Club's (RORC) 95-mile Morgan Cup Race to Cherbourg. The weather conditions were challenging for the yacht's crew, with winds gusting 25-30 knots and rough seas.

At 0027 on 18 June, the helmsman noticed the No.1 genoa, which had been secured on deck following a sail change, had slipped into the water. The sail was recovered on board and was being passed by hand into the cockpit when it was noticed that the skipper had fallen over the port side near the bow. The skipper was still connected to the starboard jackline by his 1.8m-long tether. The mainsheet was immediately slackened and the foresail was released a short time later, which slowed the yacht's speed to 1.5 knots through the water.

It took the crew 16 minutes to recover the skipper to the deck, where he was pronounced dead by a consultant cardiologist who was one of the crew. The investigation found that the following factors influenced the rescue:

- The prevailing conditions made the recovery of the skipper physically challenging.
- No one had been nominated to replace the skipper if he was incapacitated; initially it was unclear who was in charge which hindered communications.
- Recovery of a tethered man overboard (MOB) is not routinely covered during Royal Yachting Association's (RYA) training courses and not all the crew had participated in the MOB drill, conducted 6 weeks before the race.

Actions have been taken by:

The Royal Yachting Association (RYA) to:

- Encourage the use of a suitable dummy during MOB training exercises.
- Promulgate through various yachting related publications the purpose and use of short tethers, including recovery of a tethered MOB, the need to anticipate and how to deal with a variety of MOB situations, and the need to nominate a replacement for the skipper should he/she become incapacitated.

The International Sailing Federation (ISAF) to:

- Amend its Offshore Special Regulations (OSR) including the introduction of a requirement for a person to be nominated to take over from the skipper in the event of his/her incapacitation.

A recommendation has been made to RORC to:

- Promulgate the safety issues identified in this investigation report, in particular; the need to formally nominate a skipper's replacement, guidance on the appropriate use of tethers and the difficulties that may be experienced when recovering a tethered MOB.

Image courtesy of Yachting Monthly


*Lion* under sail

# SECTION 1 - FACTUAL INFORMATION

## 1.1 PARTICULARS OF *LION* AND ACCIDENT

### SHIP PARTICULARS

| | |
|---|---|
| Flag | United Kingdom |
| Classification society | Not applicable |
| SSR number | 903775 |
| Type | Reflex 38, 9/10 fractional sloop |
| Registered Owner | Lion Yacht Charter Limited |
| Manager(s) | Not applicable |
| Construction | glass-reinforced plastic |
| Length overall | 11.61m |
| Registered length | Not applicable |
| Displacement | 6.16 tonnes |
| Minimum safe manning | Not applicable |
| Authorised cargo | Not applicable |

### VOYAGE PARTICULARS

| | |
|---|---|
| Port of departure | Southampton |
| Port of arrival | Cherbourg (intended) |
| Type of voyage | Yacht race |
| Cargo information | Not applicable |
| Manning | 8 (maximum permissible 10) |

### MARINE CASUALTY INFORMATION

| | |
|---|---|
| Date and time | 18 June 2011 at 0036 |
| Type of marine casualty or incident | Very Serious Marine Casualty |
| Location of incident | 50º 29.012'N 000º 46.447'W - 14.5 miles south of Selsey Bill, West Sussex |
| Place on board | Over side |
| Injuries/fatalities | 1 fatality |
| Damage/environmental impact | Not applicable |
| Ship operation | Racing |
| Voyage segment | Mid-water |
| External & internal environment | Westerly wind force 7. Wave height 3.5m. Tidal stream easterly 0.8. Sea temperature 15ºC. |
| Persons on board | 8 |

## 1.2 BACKGROUND

### 1.2.1 Preparation for participation in the 2011 Fastnet Race

Christopher Reddish, the owner and skipper of the racing yacht *Lion,* intended to use her to compete in the August 2011 Fastnet Race. The organising authority for the race was the Royal Ocean Racing Club (RORC) in association with the Royal Western Yacht Club, Plymouth, and the Royal Yacht Squadron.

As the Fastnet Race can be a highly demanding event, RORC had developed a number of requirements to maintain and improve safety, including a crew "Experience Qualification". One of the options to satisfy this requirement was that:

> *"The Person in Charge, with at least half the crew, must have completed in the yacht in which they will race the Rolex Fastnet Race, in the 12 months preceding the start, 300 miles of RORC offshore racing".*

Details of the 12 offshore races organised under RORC's authority were published in RORC's Notice of Race 2011. Completing both the Myth of Malham and the Morgan Cup Races would have satisfied *Lion*'s entry requirements for the Fastnet Race provided more than half the intended Fastnet Race crew had participated in both races.

The skipper and four of the seven other crew who were on board *Lion* at the time of the accident had competed in and finished RORC's 230-mile Myth of Malham Race during 27-28 May 2011. Also, a training weekend had been carried out on 6-8 May, which included a man overboard (MOB) exercise, where 50% of the crew on board at the time of the accident were involved.

### 1.2.2 Morgan Cup Race

The Morgan Cup Race on 17 June 2011 was designated by RORC as an International Sailing Federation (ISAF) Category 3 race with the additional requirement that a Category 2 race liferaft was to be carried. A copy of the Morgan Cup Race details is at **Annex A**. The ISAF Offshore Special Regulations (OSR) Category of Events definitions are at **Annex B**.

The race was provisionally planned to last between 24 and 36 hours and initially had 110 entrants. The race start was at Cowes, Isle of Wight, with the finish designated as Cherbourg, France.

### 1.2.3 Identification of crew members

For the purpose of this report, the crew members are identified as follows:

- skipper
- helmsman
- navigator
- bow man[1]
- mast man[2]
- trimmer 1
- trimmer 2
- general duties man

[1] The bow man was the skipper's son

[2] The mast man was a consultant cardiologist

## 1.3 NARRATIVE

### 1.3.1 Events leading up to the race start

Following the Myth of Malham Race, two of *Lion*'s experienced crew informed the skipper that they would not be available for the Morgan Cup Race. As the race was of relatively short duration, the skipper decided to compete with a crew of eight instead of the usual ten. He had raced with eight crew previously and had considered it safe.

During the week preceding the race, the navigator closely monitored the steadily deteriorating weather conditions. On 14 June, he sent an e-mail to the skipper raising concerns that the predicted weather for the period of the race might damage the yacht and jeopardise safety. The skipper considered that the crew's experience and the yacht's performance rendered the yacht safe to race, and advised the navigator accordingly. No further concerns were raised.

On 16 June, another of *Lion*'s Myth of Malham Race crew became unavailable. The navigator suggested that his business partner, who had considerable racing experience, predominantly as a helmsman, would be able to join *Lion*'s crew. The skipper agreed to the proposal.

At 2004 on 16 June, the navigator sent an e-mail to the skipper and crew advising them of the latest weather forecast, which was broadly the same as had been promulgated 2 days earlier.

At 1130 the following day, the Meteorological Office issued the shipping forecast for the period 1200 UTC on 17 June, to 1200 UTC on 18 June. The forecast, which was obtained by the navigator, advised of gale warnings in a number of sea areas. The forecast weather for sea areas Thames, Dover and Wight was:

> *"South-east 5 to 7 veering south-west 7 to severe gale 9. Moderate, becoming rough or very rough. Rain then showers. Moderate to poor".*

At 1320 on 17 June, RORC's Race Committee sent details of the Morgan Cup Race course to the competitors by e-mail **(Annex C)**. The course, at 95 miles long, was relatively short to take account of the difficult conditions expected. A chartlet showing the course is at **Figure 1**.

By 1500, the full crew had arrived at *Lion*'s berth at Shamrock Quay, Southampton, and at about 1630 the skipper spoke in general terms to them about the race and the predicted poor weather conditions which remained exactly the same as the earlier forecast. He also allocated the crew to their roles. In view of the short race duration no watches were specified. There was no specific briefing given regarding nomination of a person to take over from the skipper if he became incapacitated, manoverboard procedures or any other safety considerations.

At 1720, *Lion* departed Shamrock Quay. The bow man was on the helm as *Lion* motored down Southampton Water and on towards Cowes. About an hour later, the helmsman took the helm and the storm jib was raised[3].

[3] This was a RORC pre-race requirement to prove that the equipment was carried on board all competing yachts.

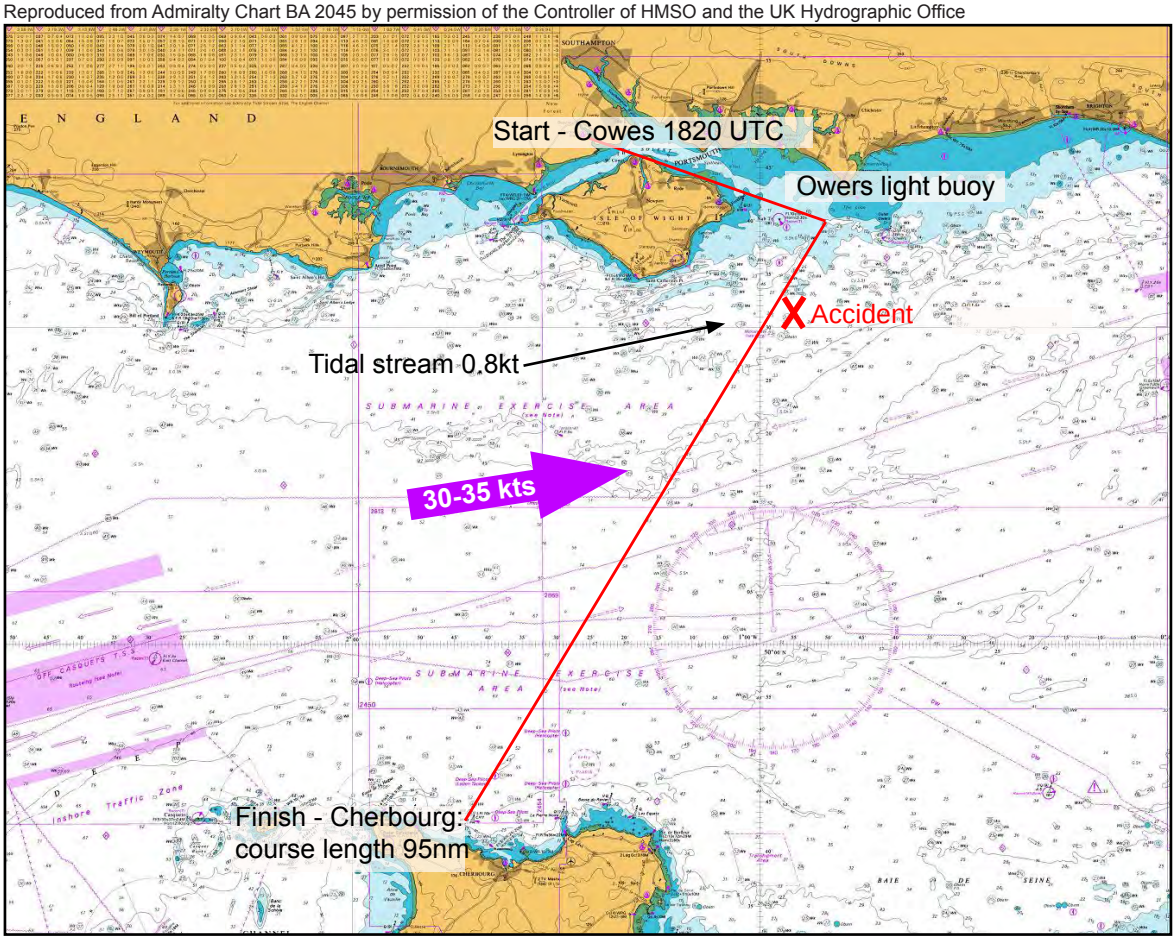


**Figure 1:** Chartlet showing Morgan Cup Race course and key events

At approximately 1850, *Lion* passed close to RORC's committee boat off Cowes. About 5 minutes later, the storm jib was lowered and the mainsail hoisted. However, the crew found that the reefing lines had not been rigged in the mainsail, so it was lowered so that they could rectify the omission. The No.3 genoa was then hoisted, but this was delayed because of difficulties in keeping the sail's luff in the forestay luff groove, which was very stiff. During this operation, one of the spinnaker halyards was accidently allowed to fly up the mast, where it remained snagged around the spreaders. Once the No.3 genoa was finally hoisted, the helmsman noticed a tear in the luff and advised the skipper.

*Lion* crossed the start line at 1920. At that time, the wind was 15 knots (force 4) from a direction of 134º.

### 1.3.2 Events from the start of race to the No.1 genoa going overboard

The early stages of *Lion*'s race were uneventful as the yacht progressed east along The Solent close-hauled at speeds over the ground (SOG) of between 6.4 and 8 knots **(Figure 2)**. At about 2025, the helmsman felt that with the No.3 genoa the boat was under-powered. The skipper agreed, and the sail was replaced with the No.2 genoa; the No.3 genoa was then taken into the cabin for repairs to the luff.

At about 2100, *Lion* was off Bembridge Ledge. The sea state had deteriorated slightly but the wind force had reduced. The skipper instructed that the No.1 genoa be hoisted, and afterwards the No.2 genoa was stowed in its sail bag and taken below deck. Some time later, with the wind veering, consideration was given to rigging the spinnaker; in view of the crew's earlier problems with the sails, the skipper decided against doing so.

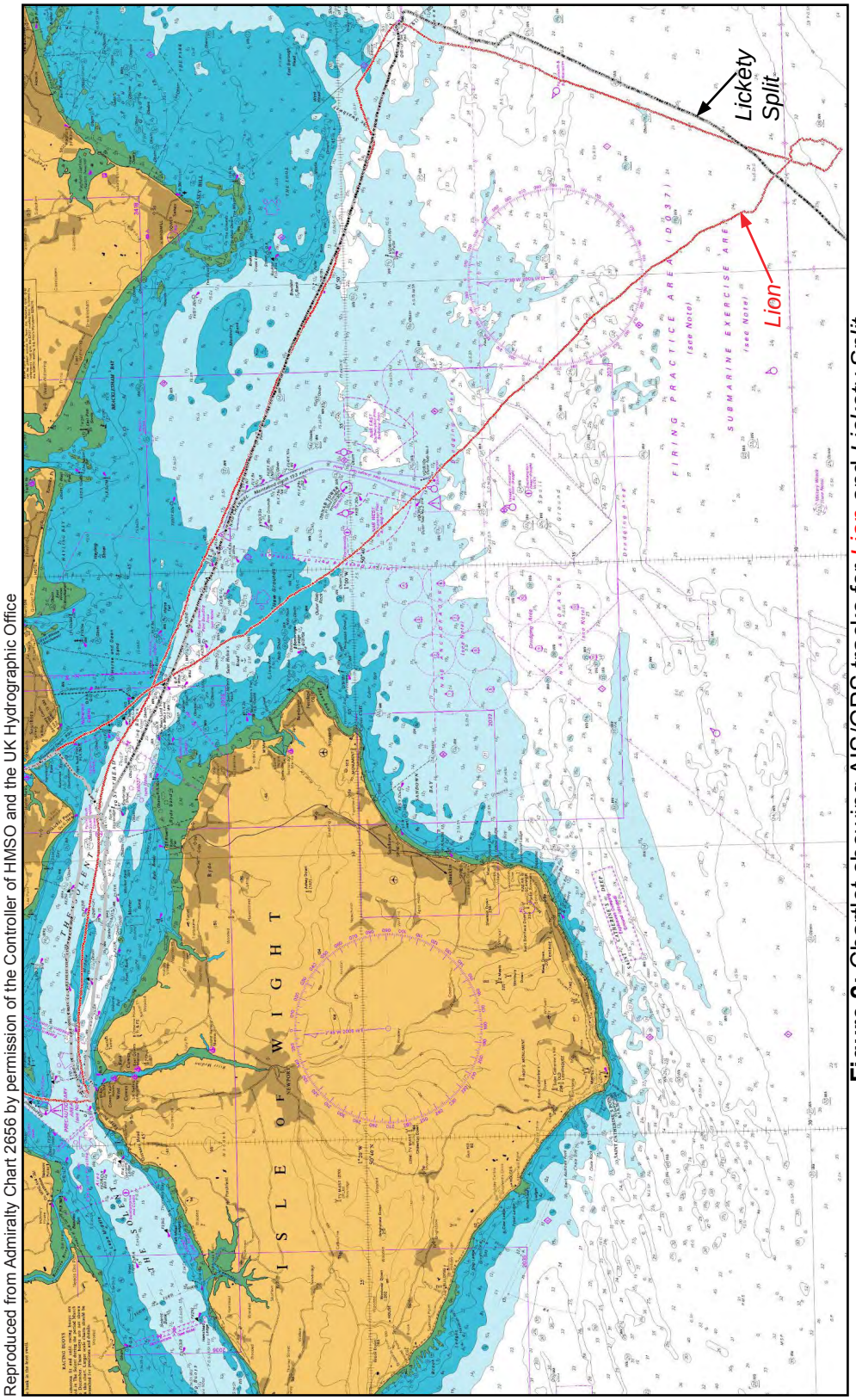


**Figure 2:** Chartlet showing AIS/GPS tracks for *Lion* and *Lickety Split*

As the wind strengthened again, the skipper and helmsman agreed that the No.3 genoa would be required once *Lion* rounded the Owers Light Buoy. Because of the earlier sail-rigging problems, both felt it prudent to change the sail before the yacht reached the buoy as they expected that conditions were going to worsen during the upwind leg across the English Channel to Cherbourg. At 2210, with the wind having veered further, the helmsman gybed to port. At that time, *Lion*'s Global Positioning System (GPS) recorded the yacht's SOG as 8.8 knots. The No. 1 genoa was then lowered and the helmsman gybed to starboard. Immediately afterwards the No. 3 genoa was hoisted.

The helmsman then heard the skipper instruct the bow and mast men to lash the No.1 genoa on the deck. The sail was secured to the port guard wires and supporting stanchions using light “bungy” straps and two sail ties **(Figure 3)** while the tack remained clipped to the forward pad eye **(Figure 4)**. Soon afterwards the helmsman instructed that the first reef in the mainsail should be taken in. Once the mainsail had been reefed, the skipper told the helmsman that he was content with the new sail configuration.

At 2240, *Lion* passed the Owers Light Buoy leaving it to starboard and turned to commence her crossing of the English Channel. As the yacht made her way across the English Channel she was close hauled on a starboard tack and heeling about 20º to port. The wind strength was about 25 knots, veering and increasing, and the wave height was 2.5m and building. The skipper, helmsman and navigator were aft, and the remaining crew were on the high, starboard side of the yacht with their tethers clipped to the starboard jackline. The helmsman felt the yacht was now well-balanced and, at up to 9 knots SOG, was overtaking other yachts.

At about 2315, the skipper suggested that some of the crew should go to the cabin to rest. The bow and mast men went below and, at 2330, the skipper followed, having told the helmsman he would take about 30 minutes rest.

In the meantime, the wind had veered to 260º and increased in strength to about 30 knots (force 7 - near gale), and the wave height had built to about 3-3.5m. *Lion’s* port toerail dipped into the water as spray and occasional green seas were shipped across the bow area.

As the weather deteriorated, trimmer 2 noticed that the No.1 genoa was slipping from its lashings. He clipped his tether to the starboard jackline, went forward up the starboard side and used two additional sail ties to re-secure it.

As the wind gusted above 30 knots, the helmsman considered that the second reef should be put in the mainsail. He checked his watch, which showed 0016 on 18 June 2011, and called the skipper to the deck, before the second reef could be taken in.

At 0027, the helmsman felt the yacht’s handling characteristics change. At the same time, he noticed that the No.1 genoa had slipped from its lashings and was streaming down the port side of the yacht. However, the tack remained secured to the forward pad eye, which prevented the sail from floating away. The skipper called the bow and mast men to the deck to help recover the sail if required. Meanwhile the helmsman concentrated on maintaining a steady course to assist the recovery operation. As the mast man entered the cockpit he noted the wind speed indicator was reading 38 knots. The yacht was heeling to port with her toerail dipping into the water.


**Figure 3:** Position of the lashed No.1 genoa

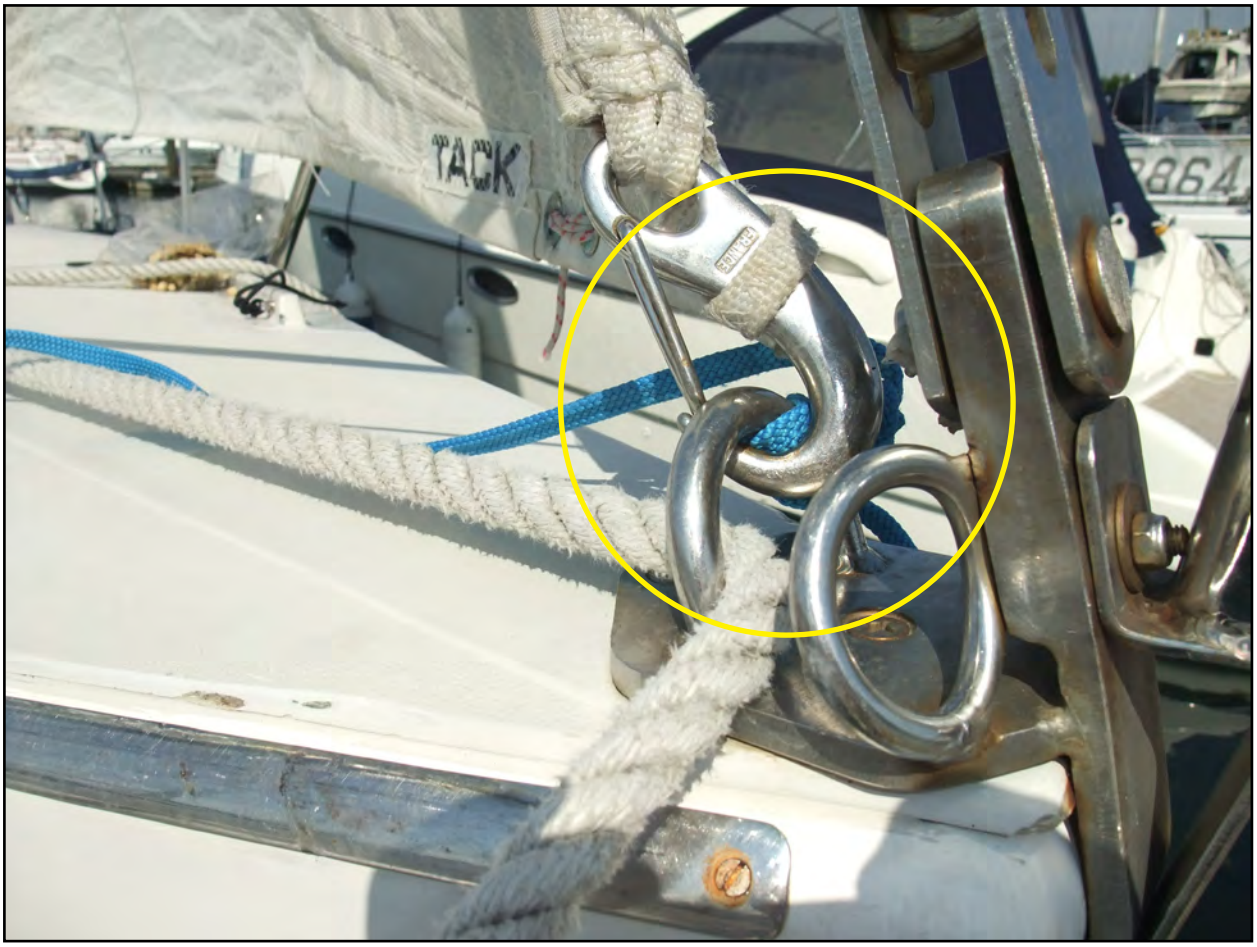


**Figure 4:** Genoa tack connected to the forward pad eye

### 1.3.3 No.1 genoa recovery to the man overboard

The skipper and trimmer 1 clipped their tethers to the starboard jackline and made their way forward to recover the sail. Once in the pulpit area the skipper transferred his tether to the port jackline as trimmer 1 was joined by trimmer 2.

As the skipper recovered the sail from the water it was passed along the starboard side by trimmers 1 and 2, and the navigator guided it down the companionway and into the cabin. When all of the sail was recovered on board, the skipper disconnected the tack from the forward pad eye. He then transferred his tether from the port to the starboard jackline in preparation to return to the cockpit along the high, starboard side, as was his usual practice. Almost immediately, the sail snagged and the skipper called “stop”. Trimmer 1 then saw him lie on the deck, on his stomach, facing forward and to starboard of the centreline. It is likely that the sail had snagged on the forward centreline cleat **(Figure 5)** and the skipper was attempting to free it. After a short time, the skipper called “OK” and the sail continued to be passed along the starboard side, partly over the coach roof and down the companionway into the cabin.

At about 0036, trimmer 2 saw a white strobe light through the No.3 genoa and called out to trimmer 1, who recognised it as a lifejacket strobe light. Trimmer 1 shouted “man overboard”, which was then repeated by the navigator.

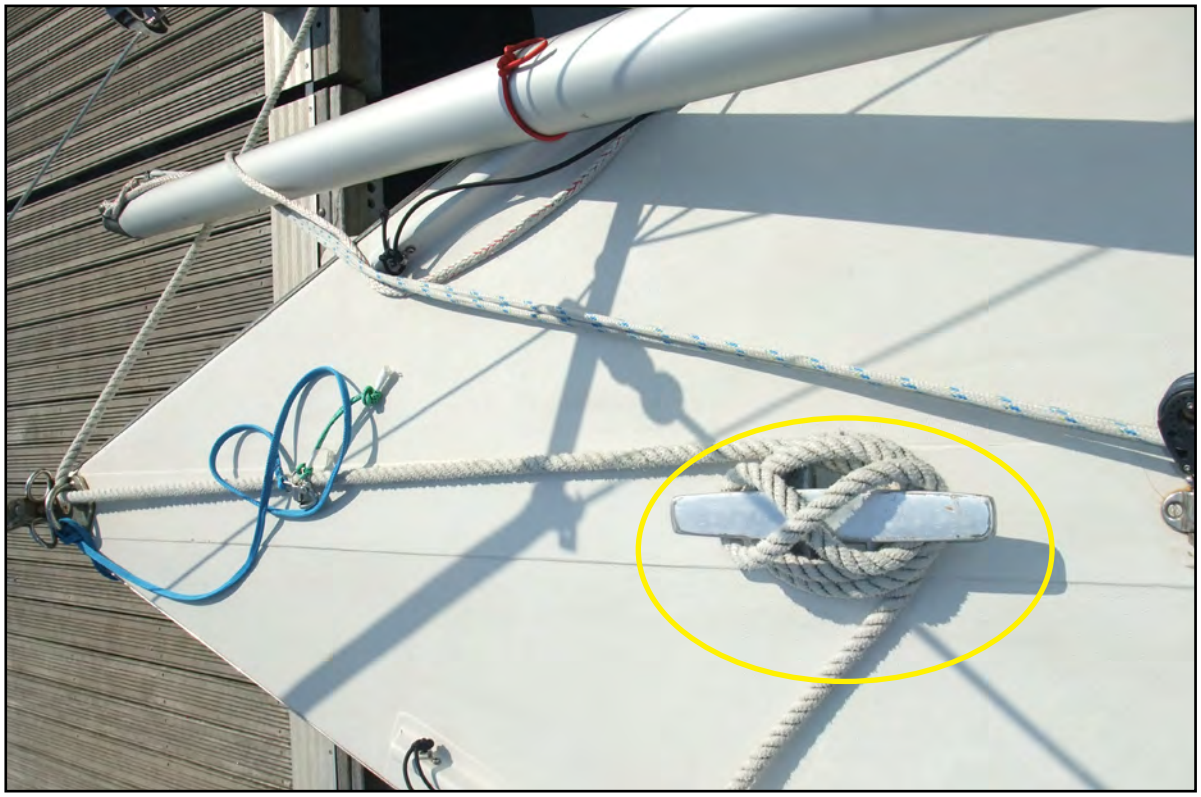

**Figure 5:** Position of the forward centreline cleat

### 1.3.4 Man overboard recovery

The helmsman's immediate reaction was to prepare to throw one of the yacht's horseshoe lifebelts overboard in accordance with the standard MOB procedure. However, the navigator confirmed that the skipper was still attached to the yacht by his tether; the helmsman realised that the lifebelt was unnecessary and was relieved that the skipper was still attached to the yacht which he hoped would make his recovery easier.

To assist in the recovery, the helmsman instructed the general duties man to release the mainsheet, which had the effect of immediately slowing *Lion* down from 4.5 knots to 1.5 knots through the water, with a course over ground (COG) of approximately 135º True (T) **(Figure 6).**

At 0038, the navigator transmitted a "Mayday" distress message. This was received by Solent Coastguard (CG), who then activated coastguard rescue helicopter R104, based at Lee-on-the-Solent, to provide assistance. In the meantime, trimmers 1 and 2 and the bow and mast men went forward, with their tethers clipped to the starboard jackline, to try to recover the skipper. The No.3 genoa sheet was released soon afterwards on the instruction of the helmsman. The noise generated by the flapping sails, wind and sea made verbal communications between those in the cockpit and the recovery team forward difficult.

The skipper was found in the water on the port side with his lifejacket inflated and the lifejacket bladder over his head, obscuring part of his face. His tether was still connected to the starboard jackline and had passed over the spinnaker pole and under the lower guard wire between the pulpit and the first vertical stanchion **(Figure 7)**. The mast and bow men went to the port side and attempted to pull the skipper out of the water. Trimmers 1 and 2 remained on the starboard side; they leant across the spinnaker pole and hauled on the skipper's tether. The team managed to raise the skipper's head above water, but there was no reaction from him. Attempts by the mast man to clear the skipper's airways and check for signs of life proved very difficult because of the obstructing lifejacket bladder.

As the helmsman concentrated on keeping the yacht as upright and steady as possible, the recovery team fought hard to keep the skipper's head above water. However, as they tired, he repeatedly slipped under the surface. After about 8-9 minutes of frustrated effort, the mast man suggested using one of the spinnaker halyards to lift the skipper. They attempted to locate the skipper's lifejacket harness tether attachment loop (see Section 1.12.1) but were unsuccessful because of the yacht's motion and because the skipper was partially hidden by the flare of the bow. The mast man, who was now managing the recovery, decided to clip the halyard directly to the skipper's tether **(Figure 8)**. The skipper was lifted partially clear of the water and was grabbed by the recovery team as his lifejacket started to slip up his body. The team managed to keep the skipper's torso on the deck and hold onto his legs but, despite their best efforts, they could not pass him under the lower guard wire.

The bow man shouted to the helmsman to turn *Lion* onto a port tack so that the skipper would then be on the high side of the yacht and so aid his recovery. At 0050, the helmsman tacked the yacht and, at the same time, he started the engine.

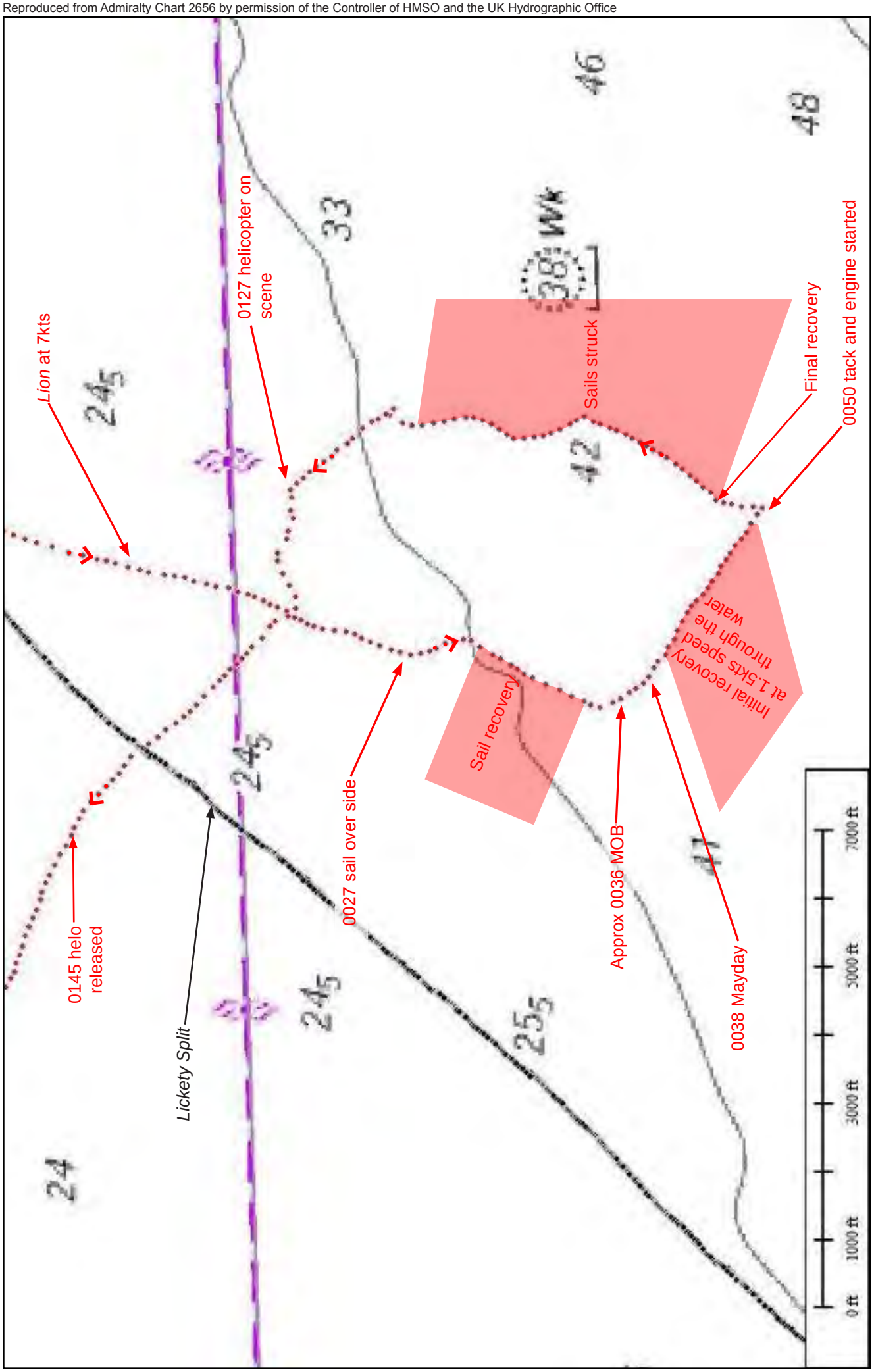


**Figure 6:** Detailed AIS track showing key events

**Figure 7**: Approximate path believed to have been taken by the skipper when falling overboard

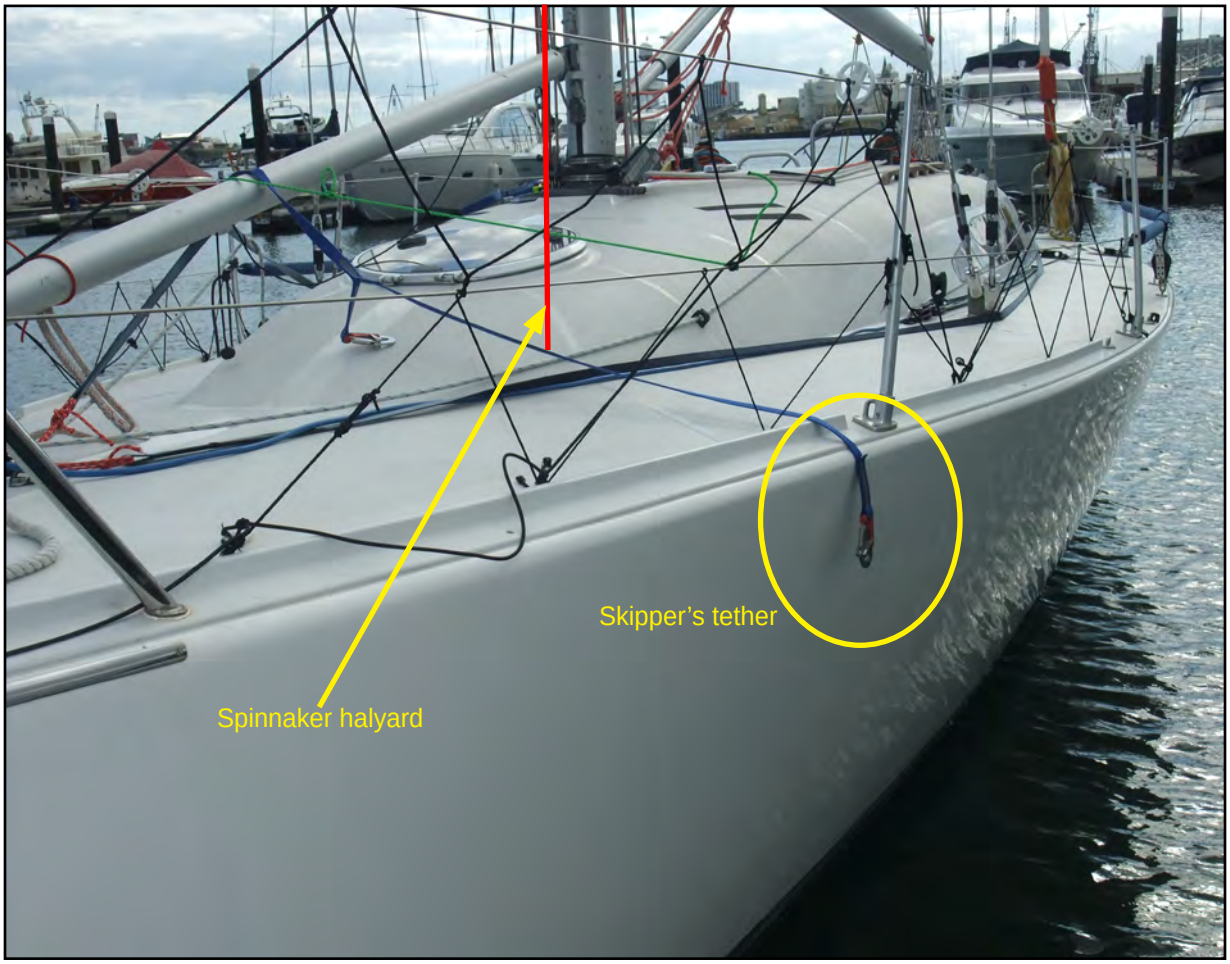


**Figure 8:** Pictorial interpretation of the spinnaker halyard connected to the skipper's tether

At about 0052, the skipper was recovered to the deck. The final effort and load on the halyard pulled the lifejacket up and over his head. However, the recovery team managed to hold onto the skipper's clothing to prevent him from falling overboard again.

### 1.3.5 Post-recovery actions

The mast man (the consultant cardiologist) immediately examined the skipper, but he detected no signs of life and determined that the skipper had died. To avoid the trauma associated with taking the skipper into the cockpit or cabin, it was decided to secure him to the port guardrails and stanchions. After doing so, the recovery team made their way back to the cabin where the bow man (the skipper's son) was comforted. The mast man remained with the skipper for a short time to check on his security before returning to the cabin to check on the well-being of the skipper's son.

The helmsman had by now assumed overall charge of the yacht, and the crew recognised and accepted this. At 0108, the helmsman instructed the navigator to confirm to Solent CG that the skipper had been recovered but was not breathing. At the same time the mainsail and No.3 genoa were lowered. At 0021, *Lion* was set on a north-westerly heading towards The Solent. At 0127, rescue helicopter R104 arrived on scene, and various options to recover the skipper were considered. In view of the poor weather conditions, and confirmation by the mast man (consultant cardiologist) that the skipper had passed away, it was decided not to attempt to recover the skipper's body from the yacht and, at 0145, Solent CG released the helicopter from the scene.

*Lion* motored towards Portsmouth following agreement with Solent CG and the Queen's Harbour Master that she could proceed to a secure berth in Portsmouth Naval Base.

At 0238, Bembridge RNLI lifeboat met *Lion.* At 0436, *Lion*'s fuel level was low, and she was taken under tow. At the same time a crewman was transferred to the yacht to provide support and to take over the helm. At 0530, the tow was released and *Lion* was manoeuvred into Portsmouth Naval Base. At 0550, she was secured alongside. Officers from Hampshire Constabulary attended the yacht and the skipper's body was removed.

Marine Accident Investigation Branch (MAIB) inspectors attended *Lion* at 0900 on 18 June 2011.

The subsequent post mortem determined that the skipper had drowned.

## 1.4 ENVIRONMENTAL CONDITIONS

At the time of the accident, the tidal stream was setting easterly at 0.8 knot and the sea temperature was 15ºC. There was a full moon but the sky was very overcast.

The environmental conditions deteriorated as *Lion* proceeded through The Solent and began racing (described in detail at Section 1.3). *Lickety Split,* a Grand Soleil 40 yacht, was equipped with a comprehensive weather data collection suite. At the time of the accident, *Lickety Split* was within 1 mile of *Lion* and recorded the wind direction as 264º and wind speed as 34.5 knots. Another nearby yacht, *Keronimo,* reported steep 3-4m high seas in the vicinity of the accident.

## 1.5 YACHT *LION*'S TRACK

*Lion*'s combined Automatic Identification System (AIS) and GPS tracks up to the accident and the return leg to Portsmouth are at **Figure 2**. The figure also shows the AIS track for *Lickety Split.*

A more detailed AIS track for *Lion,* showing the specific stages of the accident and actions taken, is at **Figure 6***.*

## 1.6 OWNERSHIP AND USAGE

### 1.6.1 Ownership

*Lion* was built in 2000 for commercial use, and was purchased second-hand on 5 January 2007 by the skipper and two business partners. Ownership was later passed to the skipper when Lion Yacht Charter Limited was established.

### 1.6.2 Usage

The skipper/owner used the yacht for private sailing and as a skippered charter yacht operating under the Lion Yacht Charter Limited banner. He also offered *Lion* for bare boat charter, without a skipper.

### 1.6.3 Funding arrangements for competing in the 2011 Fastnet Race

The skipper and crew agreed to share the costs of their entry in the 2011 Fastnet Race, which was in common with a number of other organisations. The crew had been assembled by "word of mouth" and by advertising on the RORC website for a programme that included a training weekend, competing in three of RORC's Fastnet Race qualifying offshore races, and the Fastnet Race itself.

## 1.7 THE INTERNATIONAL SAILING FEDERATION

The International Sailing Federation (ISAF) is the world governing body for the sport of sailing. As such, ISAF is responsible for promotion of the sport internationally, developing the Racing Rules of Sailing for all sailing competitions, and the training of race officials.

ISAF currently consists of 137 member nations, who are its principal members and responsible for the decision-making that governs yacht racing activity world-wide.

## 1.8 ROYAL OCEAN RACING CLUB

The Ocean Racing Club was established in 1925 immediately following the first Fastnet Race. The Club received its royal charter in 1931 and became the Royal Ocean Racing Club. The Club comprises approximately 3,300 members from 54 different countries.

RORC organizes and promotes offshore racing activities, including race management and the development and administration of rating rules for racing yachts around the world. It also contributes in advancing related standards, particularly with regard to safety issues.

## 1.9 REGULATIONS

### 1.9.1 The Small Commercial Vessel and Pilot Boat Code of Practice

When undertaking commercial activities, *Lion* was required to comply with the Maritime and Coastguard Agency's (MCA) Small Commercial Vessel and Pilot Boat Code of Practice (SCV Code). Plymouth-based Mecal Ltd (Mecal) acted as the MCA's Certifying Authority and a Mecal surveyor carried out the related surveys on *Lion*.

*Lion* was certified as an MCA Category 2 vessel, which permitted her to operate up to 60 miles from a safe haven, carrying up to 10 persons, or up to 12 if they were on board for less than 24 hours.

Section 28.1 of the SCV Code provides for vessels operating under race rules to be exempt from complying with the code. The reference states:

> *"A coded vessel chartered or operated commercially, for the purpose of racing need not comply with the provisions of the Code whilst racing, or whilst in passage directly to or from a race, provided that the vessel complies with the following:*
>
> *1. It complies with the racing rule provisions of either the International Sailing Federation (ISAF) or the Union Internationale Motonautique (UIM)…"* [sic]

Mecal carried out a post-accident Occasional Survey of *Lion* on 6 July 2011. A number of deficiencies were noted, some of which were caused by the accident and others that were pre-existing. None of the deficiencies contributed to the accident, nor did they affect the recovery of the skipper.

### 1.9.2 ISAF Offshore Special Regulations

While competing in offshore races, *Lion* was required to comply with ISAF's OSR for 2010 - 2011 as invoked by the organising authority. The OSR covers both monohulls and multihulls racing in Category 0 - trans-oceanic races, through to Category 6 - inshore racing.

The OSR specified mandatory and permissive requirements covering structure, stability, fixed and portable equipment, personal equipment and training. The appendices included guidance on dealing with a man overboard situation and a model for an Offshore Personal Survival Training Course.

Proposals for changes to the OSR are made primarily by the ISAF Member National Authorities (MNA); in the case of the UK, the MNA is the Royal Yachting Association (RYA). However, in the UK, RORC is recognised as the most knowledgeable body with regards to the OSR matters, and is influential in the delivery of change proposals by the RYA.

### 1.9.3 RORC Notice of Race 2011

All yachts competing in RORC's 2011 race events had to comply with the requirements laid out in the RORC Notice of Race 2011. These requirements generally mirrored those in the ISAF's OSR but RORC also imposed additional prescriptions, some of which were race specific.

To demonstrate compliance with both ISAF's OSR and RORC's additional prescriptions, owners were required to submit to RORC a completed "Royal Ocean Racing Club ISAF OSR Checklist 2011".

The submitted checklist for *Lion*, dated 19 May 2011 **(Annex D)**, had no deficiencies noted and remained valid for the entire 2011 season.

Both ISAF's OSR and the RORC Notice of Race 2011 emphasised:

> "*The responsibility for a boat's decision to participate in a race or to continue racing is hers alone".*

The references go on to state that:

> "*The safety of a yacht and her crew is the sole and inescapable responsibility of the Person in Charge…"*

## 1.10 REFLEX 38 YACHT *LION* - DESCRIPTION

### 1.10.1 General

The Reflex 38 yacht was designed by Christian Stimpson and built by Harley Raceboats. Both companies were based at Cowes, Isle of Wight.

In 2011, *Lion* was fitted with a Type "B" AIS transponder as recommended for ISAF Category 3 races and as required for Category 0, 1 and 2 races.

### 1.10.2 Deck layout

*Lion* was a 9/10 fractional rigged sloop fitted with a keel stepped mast and discontinuous rod rigging. A twin groove foil facilitated concurrent hoisting and lowering of the genoas during sail changes.

When not in use, the inboard end of the spinnaker pole was secured to the mast and the outboard end was loosely stowed by passing it between the pulpit stanchions on the starboard side. It was not usual practice to secure the forward end of the pole. The largest gap between the bottom of the spinnaker pole and the coach roof and foredeck was 290mm.

The port and starboard webbing jacklines were individually secured to the transom aft and to a forward common deck fitting positioned just aft of the cleat on the foredeck. On inspection, following the accident, the jacklines and fastenings were found to be in good condition.

The deck layout is shown at **Figure 9**.

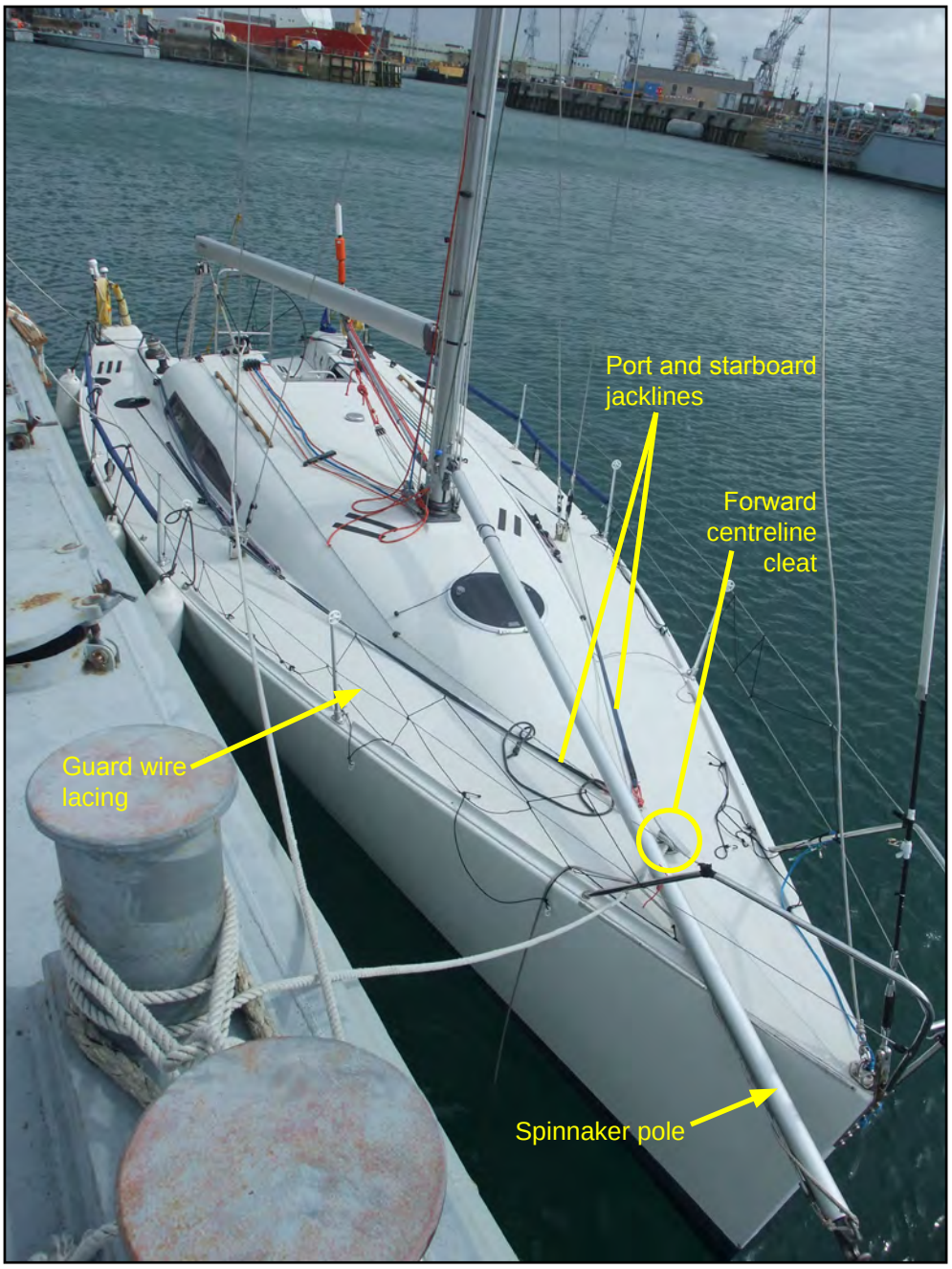


**Figure 9:** Deck layout

### 1.10.3 Stanchions, guard wires and lacing

*Lion*'s stainless steel vertical guard wire stanchions were 635mm high and equi-spaced at 2.14m intervals. The spacing between the lower end of the angled pulpit stanchion to the first vertical guard wire stanchion was 1.58m. Two stainless steel guard wires were fitted. The spacing from the deck to the lower guard wire was 320mm[4], and from the lower to the upper guard wire, was 290mm.

[4] The stanchion and guard wire dimensions complied with the ISAF OSRs and SCV Code.

A criss-cross combination of light “bungy” line and braided cordage lacing was used to help prevent sails from falling overboard. The lacing was fitted on each side from the deck to the upper guard wire between the pulpit after stanchion and the first vertical guard wire stanchion, and from the deck to the lower guard wire between the first and second vertical guard wire stanchions.

The stanchion, guard wire and lacing arrangements are shown at **Figure 10**.

### 1.10.4 Sail wardrobe

Yacht *Lion*’s sail wardrobe comprised the mainsail, Nos 1, 2 and 3 genoas, a storm jib, 0.6oz and 1.5oz spinnakers and a tri-sail.

The gap between the foot of the No.3 genoa, the sail in use at the time of the accident, and the deck was 295mm **(Figure 11)**.

## 1.11 SKIPPER’S CLOTHING

Over his underclothing, the skipper wore high quality Musto MPX race salopettes and jacket. The salopettes incorporated a Velcro-fastened knife pouch with lanyard. Following the accident, the knife was found to be still in the pouch.

The skipper also wore Musto HPX race boots. The soles were “razor cut”, the grooves of which opened up when the foot flexed to provide firm traction. All the clothing was found to be in good condition.

## 1.12 LIFEJACKETS

There were 14 Remploy Commodore, 150 newton, manually-inflated lifejackets on board, which complied with the RORC Notice of Race 2011 requirements.

### 1.12.1 Skipper’s lifejacket

The skipper wore his own Spinlock Deckvest 150 Pro Sensor lifejacket. The lifejacket was of the auto[5] and manual inflation type with an integral safety harness. It was manufactured in May 2008; the lifejacket’s integral safety harness complied with European Norm (EN) 1095/International Organization for Standardization (ISO) 12401, and the lifejacket complied with EN 396/ISO 12402-3.

The lifejacket harness was fitted with individually adjustable, contoured thigh straps with side-release buckle fasteners. The straps were designed to help prevent the lifejacket, when inflated, from “riding up” the torso of a person in the water.

Following the accident it was noted that the thigh strap side release buckles were easily unclipped under straight load tension, and especially so under rotational load. Straight pull load tests showed that the left and right thigh strap buckles released when a load of 20 kilogram-force (kgf) and 40kgf was applied respectively. It is understood from the lifejacket manufacturer that the buckles should withstand a 50kgf load before unfastening.

[5] The lifejacket was designed to auto-inflate when the inflation sensor came in contact with water.

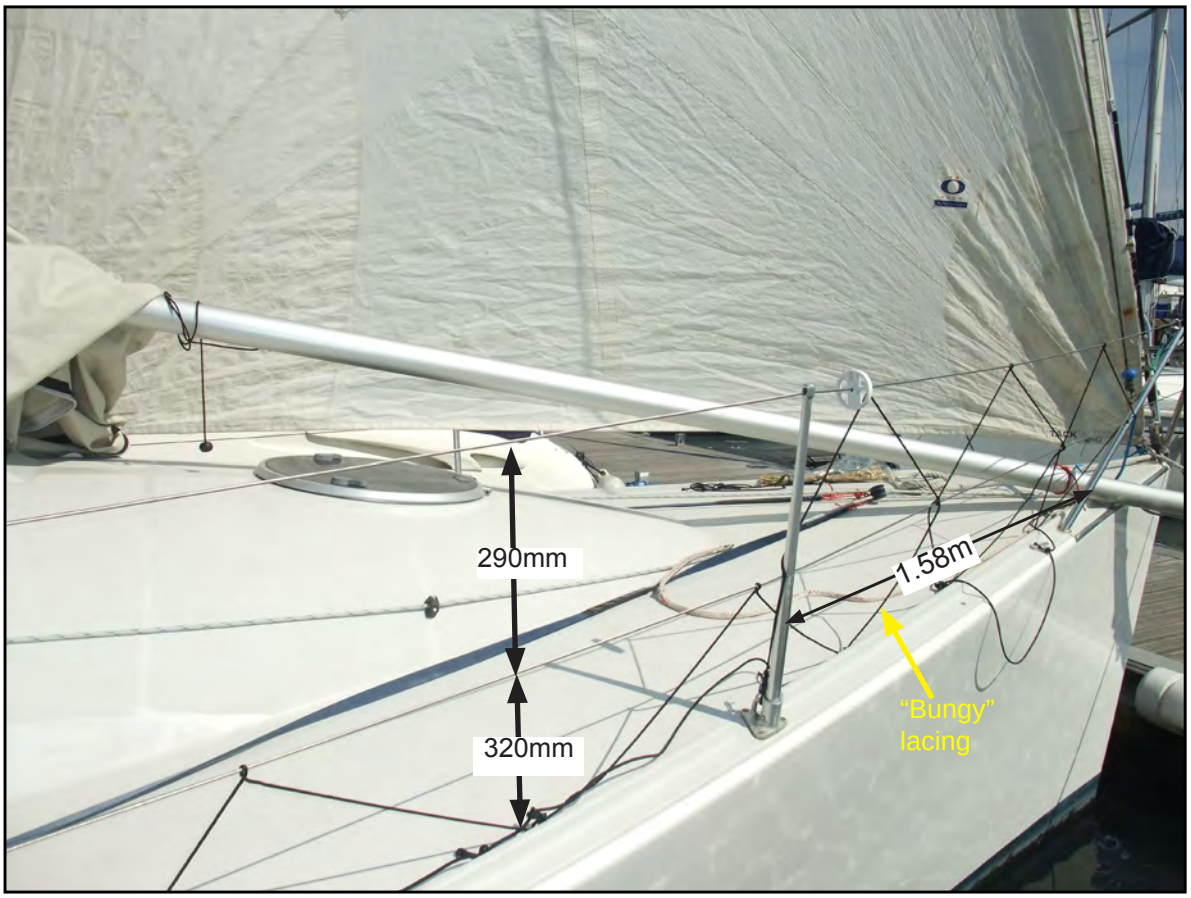


**Figure 10:** Stanchion, guard wire and lacing arrangements


**Figure 11:** Gap between the foot of No.3 genoa and the deck

A 25cm fibre lifting loop was attached to the right-hand side of the lifejacket to assist with the manual recovery of a person from the water. The loop complied with the requirements of ISO 12402-9 and was load-tested to 3200N (362kg) in accordance with Section 5.5 - Strength of EN ISO 12402-3. The loop was contained within the lifejacket valise and was only exposed once the lifejacket was inflated or the valise was manually unzipped. A separate high-tensile fibre loop with a high-visibility bar was attached to the front of the harness for tether/safety line attachment.

On inspection following the accident, the lifejacket, harness and thigh straps were found to be in good condition with no obvious damage to their components. The arrangement is shown at **Figures 12** and **13**.


**Figure 12:** Skipper's Spinlock Deckvest 150 Pro Sensor lifejacket, harness and thigh straps

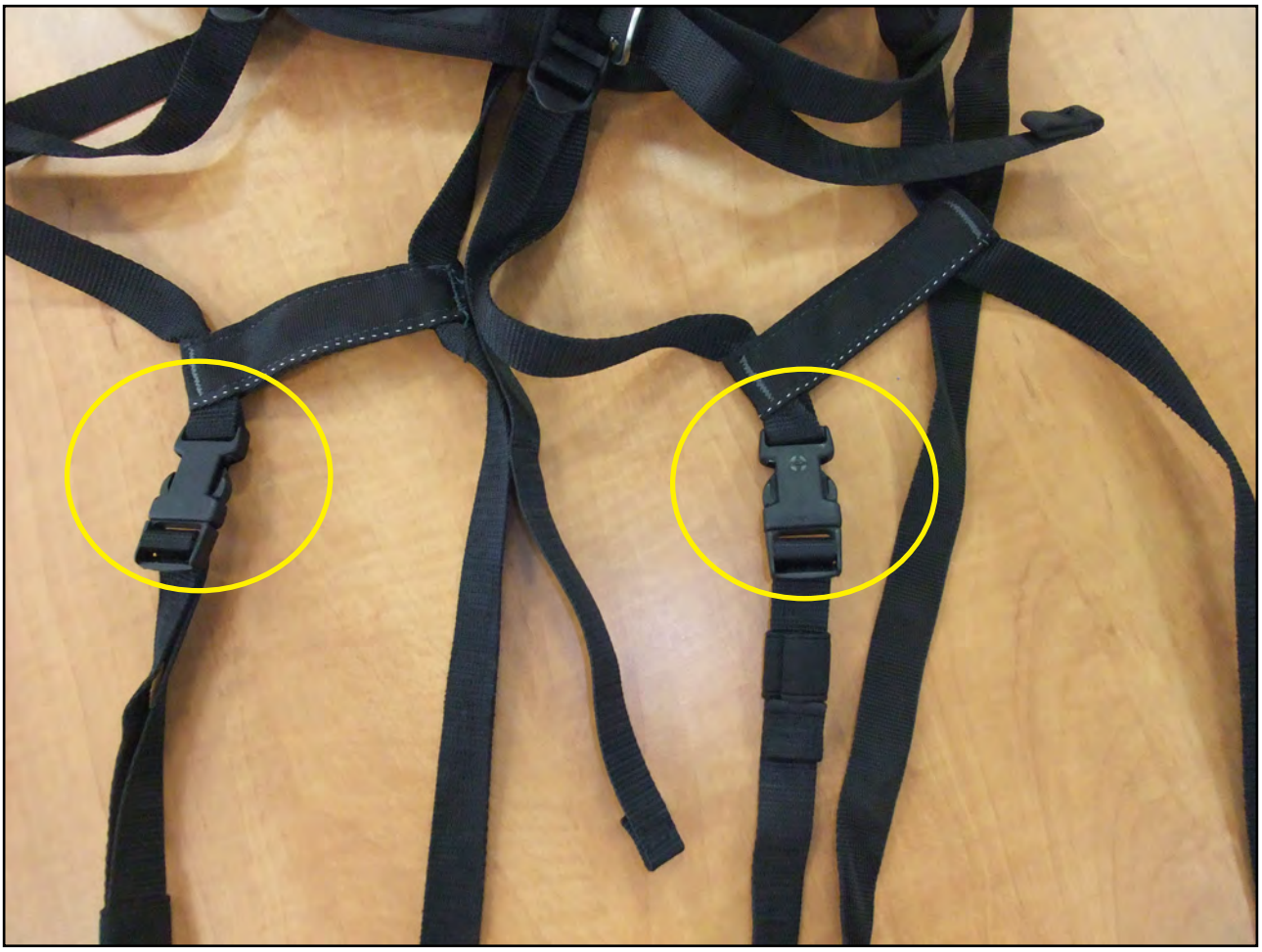

**Figure 13:** Spinlock Deckvest 150 Pro Sensor lifejacket thigh strap side release buckles

### 1.12.2 ISAF's OSR - lifejacket harness crotch/thigh strap requirements and recommendations

Section 5.01 of the OSR deals with lifejacket requirements and recommendations.

Sub-section 5.01.1.b states:

> *"Each crew member shall have a lifejacket as follows:*
>
> *...Crotch straps or thigh straps together with related fittings and fixtures should[6] be strong enough to lift the wearer from the water".*

Section 5.02.5 reiterates the comment made at Sub-section 5.01.1.b above regarding crotch straps etc, but adds:

> *"It is strongly recommended that:-*
>
> *A harness should be fitted with a crotch strap or thigh straps. Crotch straps or thigh straps together with related fittings and fixtures should be strong enough to lift the wearer from the water".*

In recognition that safety harnesses are not designed to withstand the dynamic loads associated with towing a person in the water, Section 5.02.6 of the Regulations provides the following warning:

[6] The Regulations define the term *"shall"* as mandatory and *"should"* as permissive.

*"Warning - a safety harness is not designed to tow a person in the water and it is important that a harness is used to minimise or eliminate the risk of a person's torso becoming immersed in water outside the boat. The diligent use of a properly adjusted safety harness is regarded as by far the most effective way of preventing man overboard incidents".*

Sub-section 5.02.5.e highlights that crew members should adjust their harnesses before a race, and retain that harness for the duration of the race.

### 1.12.3 ISAF's Crotch Strap Working Party

In 2008, the ISAF Special Regulations Sub-Committee established the Crotch Strap Working Party (CSWP). The initial purpose of the CSWP was to review any deficiencies in the lifejacket harness crotch and thigh straps experienced during the 1998 Sydney to Hobart Race[7] and to determine requirements for inclusion in the OSRs. Those requirements are promulgated at OSR Sub-sections 5.01.1.b and Section 5.02.5.

## 1.13 TETHERS

### 1.13.1 General

Webbing tethers are commonly fitted with spring snaphooks at both ends, one of which is clipped to an individual's safety harness. The other spring hook can be connected to a jackline or other suitable strong point on a vessel. The purpose of the harness and associated tether is to prevent a person going overboard, or in the event of a person going overboard to ensure they remain attached to the vessel. The tether is of particular importance when crewmembers are moving about the vessel or when working in a vulnerable, exposed position such as the foredeck.

There are two main types of tether: the two-hook and the three-hook versions. The three-hook tether has an additional, short tether, complete with hook, stitched to the main tether at approximately the mid-point. The configurations are at **Figures 14** and **15** respectively.

### 1.13.2 ISAF's OSR tether requirements

Section 5.02.1 of ISAF's OSR required all crew members to be provided with a tether of not more than 2m in length. Tethers were to comply with ISO 1401 or EN 1095 standards.

Section 5.02.2 also required that:

*"At least 30% of the crew shall each, in addition to the above (Regulation 5.02.1) be provided with:-*

*a safety line not more than 1m long, or*

*a mid-point snaphook on a 2m safety line".*

*Lion* complied with the above requirements[8].

[7] A lifejacket was pulled from a crewmember during his recovery after he fell overboard from a competing yacht.

[8] Three of the long safety tethers (1.8m long) were fitted with mid-point snaphooks.

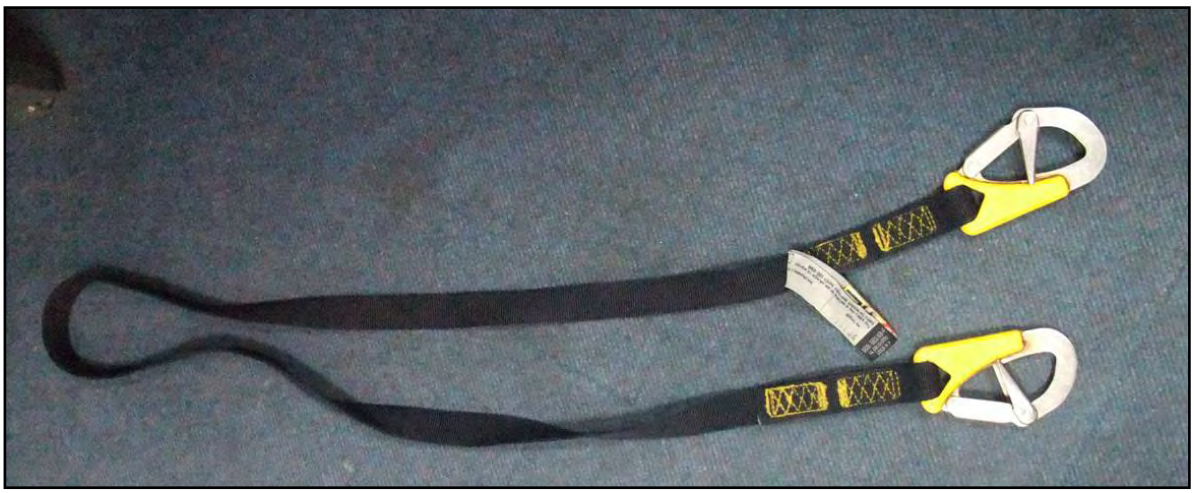

**Figure 14:** Two-hook tether

**Figure 15:** Three-hook tether

### 1.13.3 RYA guidance

RYA's Sea Survival Handbook discusses the use of tethers at Chapter 6 - MOB Prevention. The publication highlights the benefit of using a three-hook tether as being able to fit a clip before removing one of them. It does not identify the purpose of the short tether option.

## 1.14 RE-ENACTMENT TRIAL - JACKLINES AND TETHERS

A re-enactment trial was carried out to determine whether the skipper could have fallen overboard on the port side of *Lion* if he was using either a long or short tether when clipped to:

- the port jackline; or
- the starboard jackline with the tether passing under or over the spinnaker pole.

The trial was carried out at Shamrock Quay in Southampton. The yacht was upright and the freeboard was 1.3m.

Both jacklines were subjected to deflection tests to replicate their displacement under load. A load of 100kg was initially applied to represent the skipper's body mass. The port jackline was displaced by 360mm and the starboard by 345mm.

An additional load of 20kg was then applied to represent the mass of the skipper's water-logged clothing and the dynamic effect of the yacht's speed through the water. The port jackline displaced by 380mm and the starboard one by 360mm.

When a three-hook tether was connected to the deflected port jackline, the long and short tethers extended 1.2m and 500mm over the port deck edge respectively **(Figure 16)**.

When the same three-hook tether was connected to the starboard jackline and passed under the spinnaker pole, the long tether extended 450mm over the port deck edge. When passed over the spinnaker pole it extended 250mm over the port deck edge **(Figure 17** and **18)**. In both cases the short tether hook remained well clear of the port deck edge.

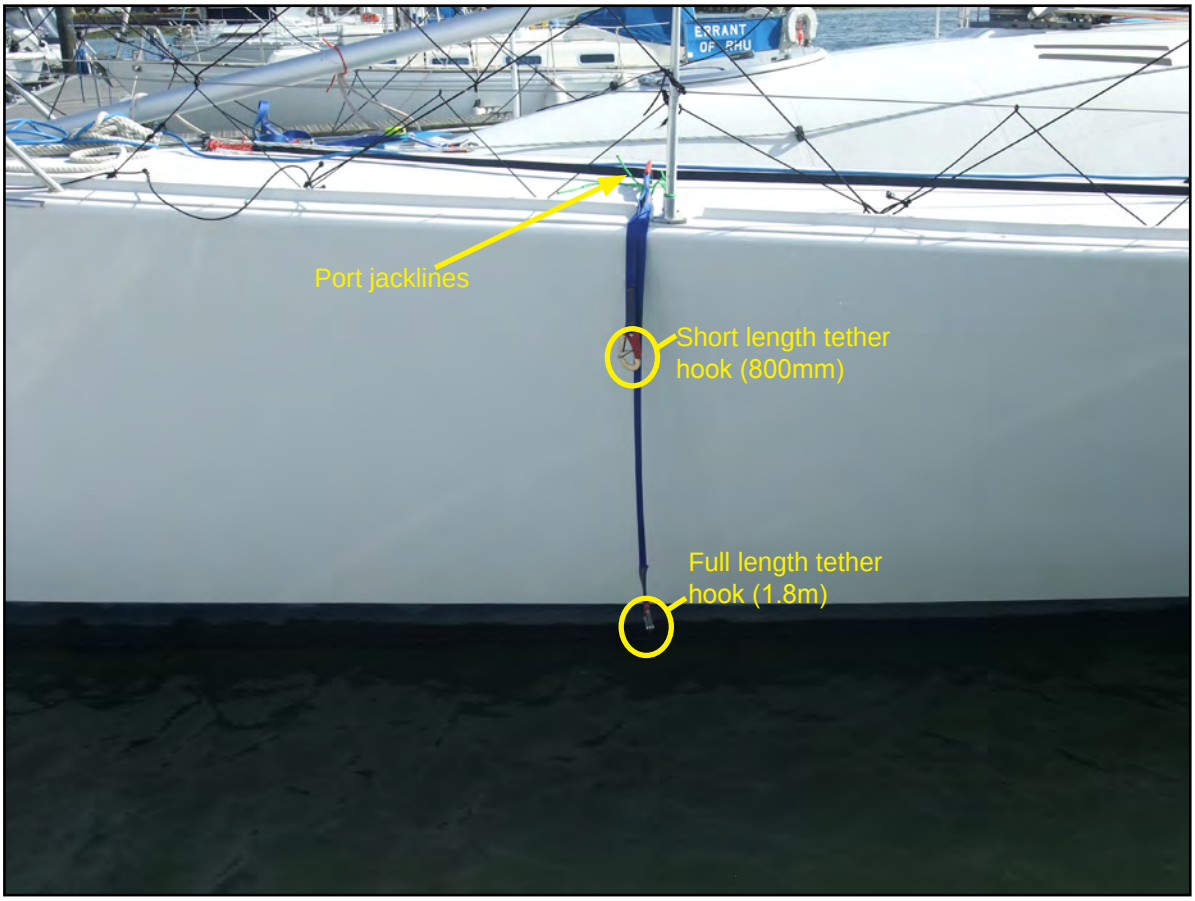


**Figure 16:** Three-hook tether connected to the port jackline

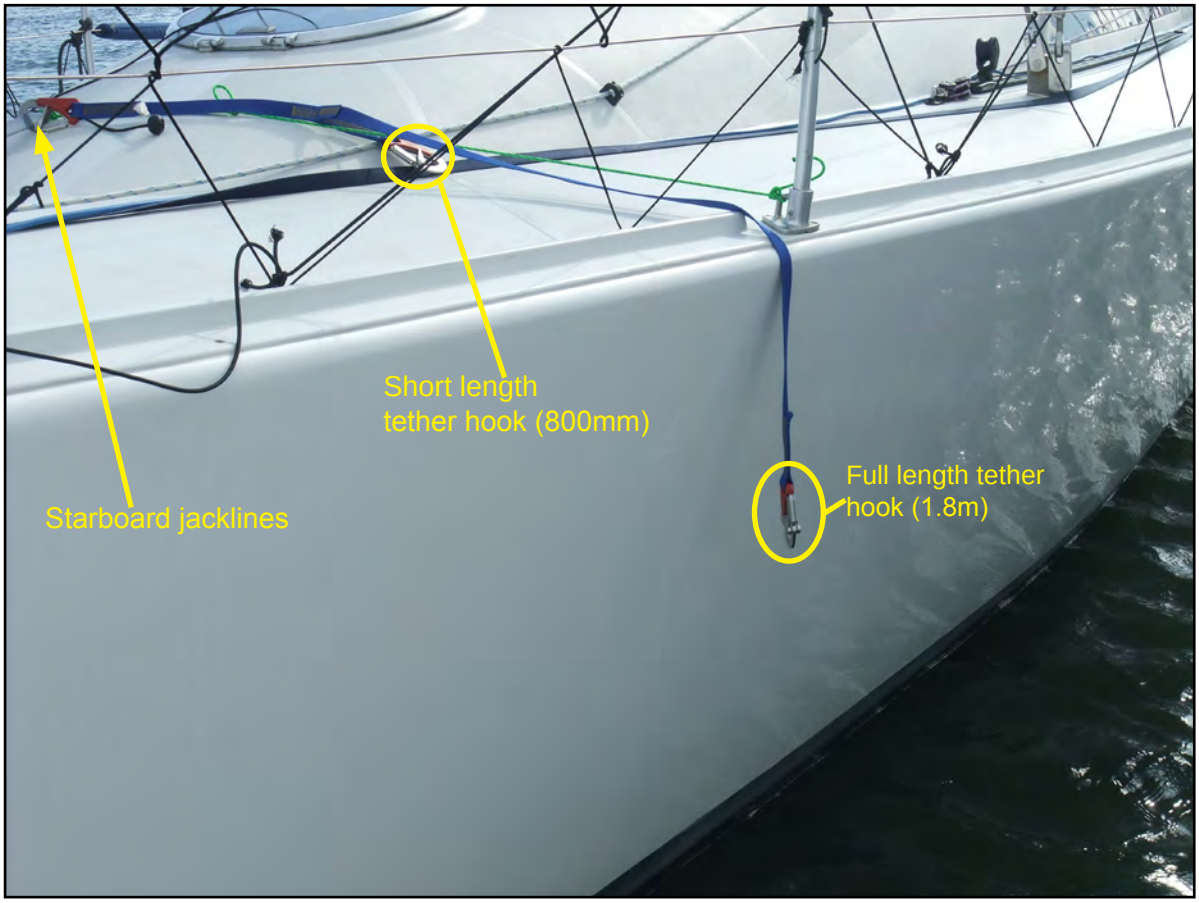


**Figure 17:** Three-hook tether connected to the starboard jackline and passing under the spinnaker pole

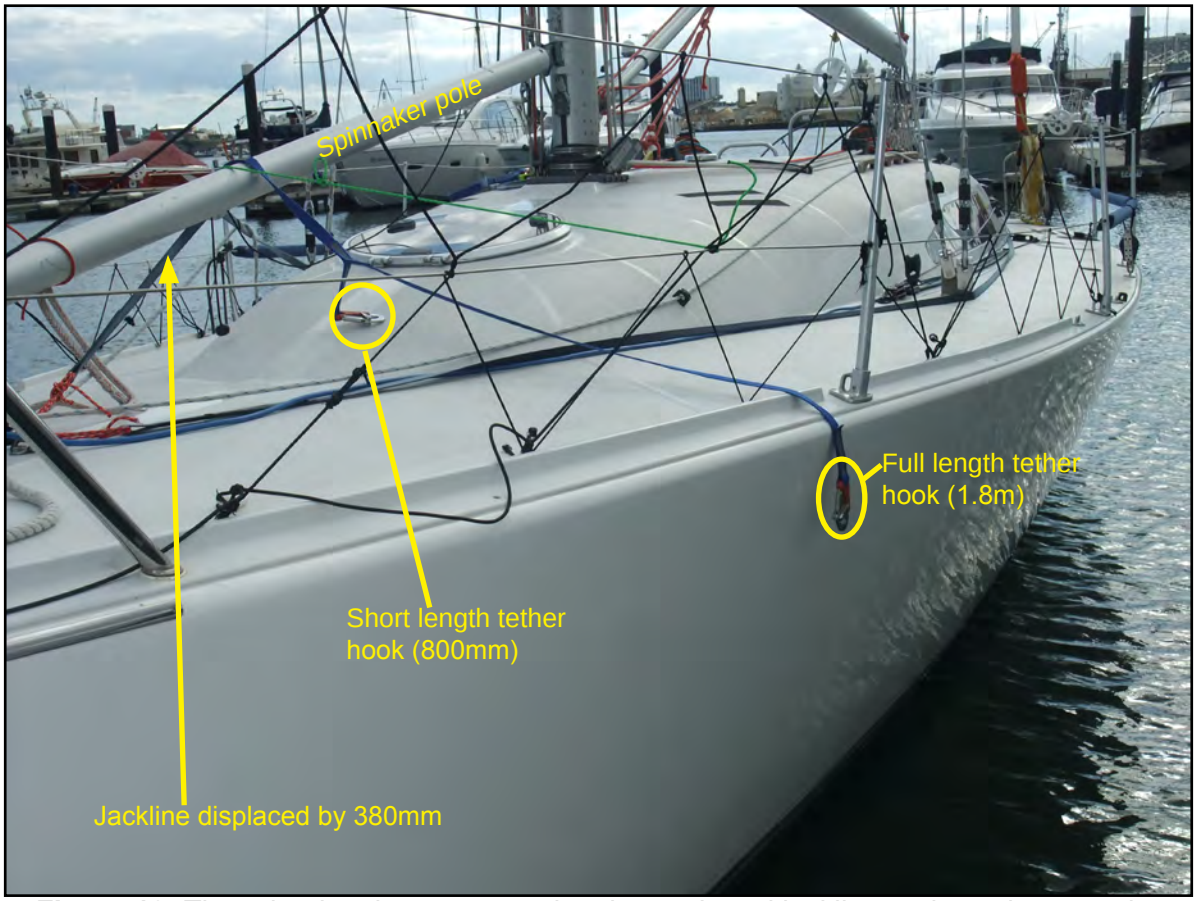


**Figure 18:** Three-hook tether connected to the starboard jackline and passing over the spinnaker pole

## 1.15 GUIDANCE ON SAFETY BRIEFINGS

On 16 July 2007, the skipper completed the RYA/ISAF Offshore Safety Course as required by ISAF OSR 6.01[9]. Session 1 of the course emphasised the importance of a "safety ethos". It also covered the importance of the crew briefing which should include safety equipment, stowage details, emergency procedures and other responsibilities in case the skipper and key crew members are incapacitated.

Annex 7 - Skippered Charter - Safety Briefing, of the SCV Code discusses the safety items which should be covered during the briefing. These include the procedures to be followed in an emergency and the location of safety equipment. Annex 7 also required the skipper to brief at least one other person who would be sailing on the voyage on a wide range of safety issues, including:

*"Procedures for the recovery of a person from the sea".*

*Lion*'s Safety Training Manual, which was held on board, provided a list of topics that should be covered during the "Safety Brief" **(Annex E)**. This included: location of harnesses, when they were to be worn, and clipping on points. The briefing requirement also included "Action in Case of a Man Overboard".

## 1.16 CREW EXPERIENCE

### 1.16.1 Skipper

Christopher Reddish was 47 years of age and throughout most of his adult life had been involved with leisure sailing and offshore racing. He had regularly competed in the Fastnet Race, initially in 2003 and 2005 as crew, in 2007 as mate, and finally in 2009 as the skipper of *Lion*.

Among other sailing qualifications, the skipper was awarded a Certificate of Competence (CoC), RYA/MCA Yachtmaster Offshore in 2005.

### 1.16.2 Crew

The helmsman held a CoC, RYA/MCA Yachtmaster Ocean qualification and had 23,000 miles sailing experience. The rest of the crew had considerable yachting experience, and variously held Day and Coastal Skipper, First Aid and Sea Survival course qualifications.

### 1.16.3 Training

The skipper arranged a training weekend at sea during 6-8 May 2011 which formed part of the Fastnet Race package. With the exception of the helmsman, all of the crew attended, but not all at the same time. The training centred on sail management, boat-handing and included one manoverboard drill.

[9] The reference requires that two crew members, including the skipper, are to have completed the Offshore Safety Course within the past 5 years.

## 1.17 MAN OVERBOARD ISSUES

### 1.17.1 RYA MOB recovery procedure guidance

The RYA's courses and associated documentation cover procedures for the recovery of an MOB. The Competent Crew course focuses on the crews' actions, so they become familiar with deploying equipment and know what to expect should the emergency occur. Options for recovery from the water are discussed, including use of stern ladders and halyards.

Day Skipper Practical Course students become more involved in the decision-making process, which includes practising returning to and finding an MOB. There is more emphasis on the skipper having a recovery plan and ensuring the crew understand the plan. Pages 54 and 55 of the Day Skipper Practical Course notes describe the MOB procedures **(Annex F)**.

The Yachtmaster examination syllabus also requires candidates to be proficient at recovering an MOB.

The Autumn 2011 edition of the RYA Instructors' magazine "Wavelength" carried an article entitled "What's the Point of MOB Drills?" **(Annex G)**. The article highlighted the need for realistic training and preparation.

Additional information is contained in the RYA's Sea Survival Handbook **(Annex H)**, which includes recovery options and supports the RYA Sea Survival and RYA/ISAF Offshore Safety Courses.

### 1.17.2 ISAF MOB guidance

ISAF's procedural MOB guidance is contained in Appendix D of the OSR 2010-2011 **(Annex I)**. The reference includes options for recovering the person on board the vessel.

Appendix G **(Annex J)** of the OSR 2010-2011, Session 6 of the Model Training Course Offshore Personal Survival, deals with MOB prevention and recovery.

The OSR also recognise the importance of routine training on board. Section 6.04.1 states:

> *"It is recommended that crews should practice safety routines at reasonable intervals including the drill for man-overboard recovery".*

None of ISAF's MOB procedures/guidance explains how to deal with a conscious/ unconscious MOB who is still connected to the vessel.

### 1.17.3 Lion's Safety Training Manual

Appendix B3 of *Lion*'s Safety Training Manual **(Annex K)** detailed procedures for dealing with an MOB situation. The guidance included the following short paragraph to deal with an MOB who is still connected to the vessel:

*"If someone goes overboard, follow this standard procedure:*

- *If the person is still attached to vessel, stop engines and recover them using lifeline/harness or other recovery device;*
- *Throw lifebuoy immediately;*
- *Raise the alarm by shouting "MAN OVERBOARD".*

### 1.17.4 MOB recovery equipment

Section 22.8 of the SCV Code - Recovery of Persons from the Water - requires:

*"An overside boarding ladder or scrambling net which extends from the weather deck to at least 600mm below the operational waterline, or other means to aid the recovery of an unconscious person from the water ...".*

Although Appendix D of the OSR discusses equipment and methods to recover a MOB **(Annex I)**; it does not specify the need for any dedicated MOB recovery equipment to be carried. However, RORC has added the following prescription to Regulation 4.24 - Heaving Line:

*"The RORC recommends that yachts should carry a lifting strop to clip to a halyard, to aid MOB recovery from the water back onto the deck. The lifting strop or "helicopter strop" should fit under the arms and have a toggle to help keep the casualty from slipping out when lifted..."*

*Lion* was equipped with a valise-contained "Sowester" man overboard recovery ladder. The vessel also carried a single helicopter recovery strop.

## 1.18 SIMILAR ACCIDENTS

The MAIB's accident database records many instances of persons falling overboard from yachts while tethered and untethered. Fortunately, most resulted in the person being safely recovered because there were other crew on board, and the person was conscious, so were able to assist in their own recovery. The following accidents are relevant to this investigation.

### 1.18.1 UK registered small commercial sailing vessel - November 2003

An 11.3m yacht, being used for an intensive 13-week Yachtmaster training course, was on passage when the forecasted force 4 winds increased to gale force. The designated skipper was incapacitated through sea-sickness, and the most senior student took over. The acting skipper was on the helm and connected by his tether when he was washed overboard as the yacht was nearing a port of refuge. The

crew were unable to recover the MOB and subsequent waves surfed the yacht onto the beach, where she broke up. The acting skipper suffered cracked ribs; other crew members were unharmed.

### 1.18.2 UK registered small commercial sailing vessel - November 2007

Four crew members went forward to carry out a sail change. They were connected to the yacht by long tethers and were all wearing lifejackets. As the headsail was being secured, it fell into the water. During its recovery, a large wave carried one of the crew over the side and left him dangling waist deep in the water. The yacht was hove to but the remaining crew were unable to heave the MOB back on board. A short time later, the MOB slipped from his lifejacket and fell into the water. Fortunately, he was recovered unharmed. The lifejacket waist strap and crotch strap were found to have released during the recovery attempt.

### 1.18.3 Pleasure craft - non-commercial yacht - February 2011

A 10m yacht was on a delivery voyage and was approaching its planned destination port using its engine because of very light winds. The two crewmen were wearing lifejackets and were tethered to the yacht, but the skipper was wearing neither a lifejacket nor a tether. During the entry into harbour, the yacht adopted a considerable heel due to the effects of a very large swell on the port quarter. The skipper and crew were washed overboard. The crew were unable to get themselves back on board and the skipper drifted away from the yacht. The yacht broke up on the rocks and, although the skipper survived, the two crewmen died. Had the skipper and crew worn shorter tethers, it is probable they would all have remained on board.

### 1.18.4 Pleasure craft - non-commercial yacht - May 2011

The skipper of a 32 foot Contessa yacht was wearing a lifejacket and tether as he was furling the mainsail in preparation for entering harbour. Waves were breaking against the marina breakwater in the gale force conditions during which the skipper was washed overboard. The crew were unable to bring the skipper inboard, and broadcast a “Mayday”. The attending lifeboat crew recovered the skipper, who was taken to hospital for observation.

# 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 ACCIDENT OVERVIEW

### 2.2.1 General

Because there were no eye witnesses to the skipper going overboard, the actual cause for him doing so is a matter of speculation. However, the investigation identified the most probable cause and a number of important contributory factors.

As *Lion* approached the Owers buoy, and with the wind strengthening and veering, the change of sail from the No.1 genoa to the No.3 genoa in anticipation of the increased apparent wind after rounding the buoy was appropriate. However, the subsequent securing of the No.1 genoa to the port stanchions and guard wires started a chain of events that led to the skipper going overboard.

Although the crew reacted immediately to the emergency, they were unable to recover the skipper back on board until after he had drowned.

### 2.2.2 Delegation

*Lion*'s skipper was reported to be a highly competitive person, who led by example. Although he had options to delegate the No.1 genoa recovery to other crew members, it was typical that in the difficult weather conditions he opted to lead the recovery himself.

### 2.2.3 Crew observations and alarm

The skipper was seen to have used, and was recovered wearing a 1.8m-long tether. During the sail recovery, he followed best practice by clipping onto the jacklines. The last time the skipper was seen on board was when he laid on the deck to release the tack of the No.1 genoa from whatever was preventing it from being fed aft into the cockpit. None of the sail recovery team believed that he was in difficulty at any time.

While the sail was being dragged along the deck the recovery team were facing aft and had no visibility of the skipper, who was behind them. It is therefore unknown if the skipper was standing, crouching or crawling aft. By the time the sail recovery team noticed the skipper's lifejacket strobe light was flashing, he had probably been in the water for no longer than 1 minute. It is possible that the skipper shouted an alarm as he went overboard. However, there was considerable wind and sea noise, which could have easily prevented anyone from hearing a shout.

### 2.2.4 Footwear

The soles of the skipper's boots were in good condition and were specifically designed for maximum traction on wet yacht decks. However, the traction would have been reduced because the forward deck was intermittently awash from occasional seas, and this might have contributed to his possibly losing his footing.

### 2.2.5 Evidence of the path taken by the skipper

There is no doubt that the skipper went overboard on the port side. However, none of the crew could recall if his tether from the starboard jackline had passed over or under the spinnaker pole. A person, under momentum, could have passed through the 290mm gap under the pole, which could have also lifted as it was hinged to the mast. However, members of the recovery team do recall leaning over the spinnaker pole to pull on the skipper's tether. Had the tether passed under the pole, the weight of the skipper would have forced the tether to the deck and the crew would have suffered damage to their hands as they tried to gain grip on the tether with it pressed against the deck. In addition, had the skipper passed under the pole, it would have lifted as he was hauled inboard by the spinnaker halyard, which was connected to his tether. There is no evidence of this.

All the evidence confirms that the skipper's tether passed over the spinnaker pole. To achieve this, the skipper must have been either standing, or at least been in a semi-crouched position, otherwise he would have passed under the spinnaker pole, as he moved to port.

### 2.2.6 Conclusion

The post-accident re-enactment trial proved that when connected to the starboard jackline, the skipper's 1.8m tether length allowed him to pass over the spinnaker pole, and through the 295mm gap between the foot of the No.3 genoa and the deck. He then passed through the 320mm gap between the deck and the lower guard wire and between the pulpit and first vertical stanchion. The light "bungy" line and braided cordage fitted between the deck and guard wire were not strong enough to prevent him from going overboard.

In the absence of any medical condition that might have caused the skipper to fall overboard, it is concluded that he probably either lost his footing or was swept away by a combination of the yacht's heel to port, the yacht's motion, and seas being shipped over the foredeck.

## 2.3 SECURING THE NO.1 GENOA ON DECK

Following a sail change, it is good practice to immediately stow the replaced sail below deck unless it is likely to be required again very soon after the change. Given that the wind strength when the sails were changed was above 30 knots, it was most unlikely that the No.1 genoa would have been used again during the race.

Stowing sails that are not in use below deck keeps the working deck free of clutter and eliminates the risk of high value sails being lost overboard. It also reduces the need for crew members to spend time in the forward, high-risk area during hostile weather and rough sea conditions. However, the skipper may have perceived that it was safer to have secured the No.1 genoa on deck in the prevailing circumstances, given that *Lion* was about to round Owers light buoy and sail upwind. This would have increased pitching and angle of heel.

## 2.4 CREW'S ACTIONS

It has been calculated that, once the sails had been released, the yacht would have been travelling at about 1.5 knots through the water, this being a combination of forward motion and leeway. Even at this speed, the drag on the skipper's body would have been significant, causing his tether to pull tight and lead aft from the guard wire stanchion. With the skipper's tether connected to the starboard jackline the portion of it passed outboard was quite short, which effectively pinned him close by the yacht's side so that as *Lion* heeled he was repeatedly thrust under water. With the skipper trapped in this way, it was extremely difficult for the crew to pull him forward to a position where he could be recovered back under the lower guard wire. Some 12 minutes passed while the crew tried various methods of recovering the skipper, and a further 4 minutes elapsed once his upper body was on board before he was finally pulled clear of the water. During this time, there was no observed reaction from the skipper, and it is possible that he drowned very soon after falling overboard.

### 2.4.1 Post-recovery actions

Once the skipper had been fully recovered on board, the mast man (consultant cardiologist) was unable to detect any signs of life. He concluded, due to the length of time the skipper had been in the water, much of it submerged, and as he had shown no signs of life since falling overboard, that there was no prospect of cardio-pulmonary resuscitation (CPR) or other possible onboard medical intervention succeeding. Indeed, he considered that any attempt at CPR would have compromised the safety of the crew because of the skipper's exposed position and the hostile weather and sea conditions.

## 2.5 RECOVERY OPTIONS

A variety of propriety MOB recovery equipment is available on the market. These include variations of a buoyant helicopter strop (as carried on board *Lion*) that is attached to the vessel; an inflatable raft on which a crewman is placed to help recover the MOB, firstly onto the raft and then onto the vessel; and a sling supported on a frame which is passed under the MOB. Other equipment includes a parbuckle device and its derivatives. These items of equipment would have been difficult to use because of the sea conditions and because most of them require the assistance of a conscious MOB. Also, all these items of recovery equipment have the purpose of reconnecting a person in the water to the vessel: none of them completely address the problem of then recovering that person back on board.

In an ideal situation, if a man overboard is still connected to the vessel by a tether, then pulling on the tether will be sufficient to retrieve them on board. However, unless the MOB is conscious and able to assist, this will take considerable strength, that the crew might not have. Other options to recover an unconscious or incapacitated MOB are required. These include, using a spare halyard (usually a spinnaker halyard) which is clipped to the lifting loop of the MOB's lifejacket. In this case, the lead of the tether under the guard wire prevented the crew from simply lifting the skipper back on board, and another means of recovery was required. Ultimately, unless the skipper was to be recovered back through the gap between the deck and the lower guard wire, his weight needed to be taken by another means, and his tether released.

The mast man's decision to connect the halyard directly to the skipper's tether was born out of necessity to keep the skipper's head out of the water. This proved to be successful. However, once the lifejacket lifting loop was accessible **(Figure 12)**, a halyard could have been taken outboard of the guard wires, and connected to the loop. The skipper could then have been carefully manoeuvred back overboard and then hoisted over the upper guardrail, which would have provided a more direct lift. Alternatively, an additional line could have been connected to the loop and he could then have been taken to the stern, where the vessel's freeboard was less. Either option would have improved the crew's ability to recover the skipper on board after releasing the inboard clip of the tether.

## 2.6 TETHERED MOB PROCEDURES

The survival of a MOB is largely dependent on a rapid recovery, especially in cold, rough weather. To achieve this, it is important that MOB drills are conducted regularly so that actions are instinctive and the crew know what the recovery plan is. This accident starkly illustrates the extreme difficulty in recovering a heavy, unconscious MOB, even when four fit and strong crew are involved.

### 2.6.1 Training by professional bodies

MOB procedures taught on sea survival, boating and yachting training courses, and referred to in relevant documentation, relate almost entirely to a conscious person drifting away from a vessel.

When practising MOB recoveries, most RYA training centres use a lifebuoy or fender to simulate the MOB. While this is adequate for practising manoeuvring back alongside the MOB, it does little to prepare crews for managing the bulk and weight of a real person in a MOB situation. There is considerable advantage in using dummies to replicate as closely as possible the weight and characteristics of an unconscious casualty so that, in the real event, success is more likely.

Chapter 7 of RYA's Sea Survival Handbook[10] lists the following standard actions:

1. Shout 'man overboard' to alert the crew.

2. Press the MOB button on the GPS.

3. Throw a life-buoy and dan buoy to the MOB. Mark the MOB with a buoyant smoke flare.

4. Allocate a crew member to point at the MOB in the water.

5. Send a DSC distress alert and a voice Mayday.

6. Keep pointing. Don't lose sight of the MOB.

7. On a sailing boat, the skipper will ask for the jib to be lowered or furled and the engine started.

8. If possible reassure the MOB by talking to them.

[10] 2008 edition, reprinted in 2010.

9. Prepare a throwing line.

10. The skipper will bring the boat alongside the MOB, with the boat pointing into the wind and the propeller stopped.

11. Get a line around the MOB and get them aboard.

However, the most effective actions taken in a specific case will vary depending on the circumstances prevailing at the time. These include: wind and sea state, whether the MOB is tethered or untethered and conscious or unconscious, whether an engine is available, and the proximity of the vessel to other assistance. It is therefore not possible to be strictly prescriptive.

In this particular case, the skipper was attached to the yacht and the helmsman was relieved, because he anticipated this would ease his recovery. His decision to reduce speed and keep the yacht as upright and steady as possible to assist with the recovery was understandable and reasonable in the circumstances.

The engine was not started until about 14 minutes after the MOB was called because the helmsman was unsure if there were any lines over the side which might foul the propeller. Checking over the side, starting the engine earlier and leaving the propeller out of gear would have given the helmsman immediate access to motive power. However, in this case it is unlikely to have changed the outcome of this accident.

During the RYA Instructor's Course, the issue of dealing with a MOB while the person is still attached to the vessel is broadly discussed. However, it is then left to the individual instructor's discretion as to how to teach the subject during a particular course.

The promulgation of the difficulties related to this matter merit wide distribution to the leisure yachting community and those involved in higher risk offshore racing.

### 2.6.2 Onboard MOB training

In accordance with ISAF's MOB guidance, *Lion*'s crew should have routinely practised a manoverboard recovery drill.

The crew on board *Lion* last practised a MOB drill during the 6-8 May training weekend. However, only 50% of the crew on board at the time of the accident were involved. As a result, the current crew had not worked as a team for MOB recovery purposes, and there was no opportunity other than during the passage to the Cowes start line to do so. As the skipper had not planned to conduct a MOB exercise before the race, it was all the more important that the procedures were covered during the skipper's pre-sailing briefing, but they were not.

This accident demonstrates how difficult it can be to recover a tethered MOB especially in poor weather conditions. As discussed at section 2.6.1 there is currently very little professional training covering this scenario. Skippers are encouraged to consider the tethered MOB situation when briefing crews and highlight the importance of effective communications between all those involved in the MOB recovery process.

## 2.7 GUIDANCE FOR USE OF SHORT TETHERS

It is usual and good practice to connect a short tether to a strong point when working in an exposed position where the use of a long tether would allow a person to fall overboard.

There is a need to balance the need for mobility against the risk of falling overboard. Section 6.1 of Appendix G (model Offshore Personal Survival Training Course) to ISAF's OSR provides details for "Man overboard prevention and recovery". The reference requires instructors to:

> *"encourage the use of shorter safety line and in particular lines with mid-line clips[11] as being most adaptable (highlighting issues with being towed in the water at speed while in a harness and how a shorter line (less than 1m) both aids recovery and reduces the potential risk particularly on high performance boats)".*

Some yachtsmen feel that the use of a three-hook tether erodes safety in that the unused hook presents a snagging hazard. While this is recognised, the availability of both a long and a short tether provides the wearer with a choice of options to best suit the situation, and the spare hook can be tucked away to reduce the snagging risk.

This accident shows the benefits of using a short tether when the risks of falling overboard are high. While the RYA Personal Survival Training Course attendees are advised of this, it would be beneficial to further promulgate such advice to the wider yachting community.

Had the skipper used one of the short 800mm tethers which were on board, and had it been clipped to the starboard jackline, he would not have gone overboard.

## 2.8 INCIDENT MANAGEMENT

In an emergency, whether it is a fire, flood or a man overboard situation, effective and co-ordinated incident management is of the utmost importance. Strong leadership, good communications and an unequivocal understanding by the crew of who is in charge are key factors to ensuring a successful and safe outcome.

### 2.8.1 Man overboard management

*Lion*'s skipper was a forthright, confident yachtsman and the crew had no doubt about who was in charge. However, once the skipper was lost overboard, there was initially a loss of direction because no-one had been nominated to replace him in the event of his incapacitation. The mast man, by default, assumed control of the recovery at the bow while the helmsman concentrated on controlling the yacht. The recovery team were fully engaged in retrieving the skipper onboard. Communications between those in the cockpit and the recovery team at the bow were very difficult because of the noisy environment, and it was some time before the helmsman and navigator had a proper understanding of the situation forward. The wholly understandable requests from the CG for quality information led to frustration on board because neither the helmsman nor the navigator had the necessary information.

[11] This is another term for the three-hook tether referred to in Section 1.13.1

Once the skipper was recovered on board, the crew acknowledged that the helmsman, as the most experienced person on board, had assumed the role of the person in charge i.e. the replacement skipper. As such, the helmsman provided the direction the crew were looking for following the trauma of recovering the skipper.

### 2.8.2 Publications guidance

Annex 7 of the SCV Code - Skippered Charter - Safety Briefing, implies that a person is nominated to take the place of the skipper in the event of his/her incapacitation.

However, neither the ISAF's OSR nor the RORC's Notice of Race 2011 require the nomination of an appropriate person to take control of the vessel in the event of the skipper's incapacitation. This is an important omission, and one which should be addressed for the offshore racing community and brought to the attention of recreational yachtsmen/women.

## 2.9 DECISION TO COMPETE

Offshore yacht racing is an extreme, challenging sport and carries with it far higher risks than those of leisure sailing.

Of the initial 110 race entrants for the Morgan Cup Race, 38 withdrew before the start of the race because of the predicted conditions. There were 72 starters, 37 of which retired during the race; 35 yachts finished the course.

On 14 June the navigator raised concerns with the skipper about the predicted weather and the potential risks of competing. ISAF's OSR and the RORC Notice of Race 2011 made it clear that the decision to participate, or to continue in the race, and the safety of the yacht and her crew, were solely the skipper's responsibility. The skipper considered that the crew's experience and the yacht's performance rendered the yacht safe to race and advised the navigator accordingly.

Despite the early problems in managing the sails, the crew carried out their duties satisfactorily. With the exception of the general duties crewman, the crew had wide-ranging sailing experience. The yacht was capable of functioning safely in the conditions, so the skipper's decision to compete in the race was reasonable.

## 2.10 LIFEJACKET FITTINGS

### 2.10.1 Purpose and adjustment

The attachment loop on the front of the integrated lifejacket safety harness waist strap is designed to attach a tether/safety line. The waist crotch and/or thigh straps are designed to prevent the lifejacket riding up the torso of a person in the water so that the optimum torso and head elevation is achieved.

The effectiveness of the lifejacket and, in particular its lifting loop for manual recovery, is largely dependent upon its correct adjustment. A correctly adjusted integrated lifejacket safety harness should be capable of lifting a person from the

water using the lifting loop without being significantly displaced. Many publications, including those of the RYA, RNLI, MCA and lifejacket manufacturers[12] highlight the importance of correctly adjusting the lifejacket harness, including crotch/thigh straps.

To avoid having to repeatedly adjust the securing straps the ISAF OSR recommend that, once adjusted, crew members should keep the same harness for the duration of the race.

### 2.10.2 Skipper's lifejacket displacement

The skipper had removed his lifejacket harness while he was in the cabin. When he arrived on deck to recover the sail, there is no doubt that his waist strap was fastened, but no-one was able to confirm if the thigh straps were fastened or whether they had been tucked behind his waist strap.

What is known is that the skipper's lifejacket bladder was over the front of his face when he was discovered. It is also known that the crew did not use the lifting loop to recover the skipper, but instead opted to connect the hoisting halyard directly to his tether. When the lifejacket was finally pulled from him, the waist strap was still fastened. This suggests that the lifejacket might have been displaced by the effect of the yacht's speed through the water and/or that the waist strap had not been correctly adjusted. This may have been compounded by the halyard being connected to the tether which would have resulted in a different angle of pull than had it been connected to the lifting loop. The thigh straps, had they been initially fastened, are likely to have been released (see section 1.12.1) or slackened while in the water or while being recovered.

### 2.10.3 Lifting using the lifejacket integrated safety harness

There is a common misconception that the tether/safety line attachment loop of an integrated lifejacket safety harness is designed to lift a person from the water. This is not the case. The lifejacket lifting loop **(Figure 12)** is the only component designed and tested to lift a person from the water. The crew were fortunate that the lifejacket was not pulled from the skipper until he had been recovered on board. If this had happened during the early stages of the recovery, the skipper might well have been lost.

The lifejacket manual provided an illustration to highlight that the harness was not designed to support a person's weight. The Safety Notice section of the manual stated:

> *"A deck harness and safety line are intended to prevent the user falling overboard: they do not provide protection against falls from height".*

### 2.10.4 ISAF's work to determine lifejacket harness crotch/thigh strap specifications

ISAF's OSR Sub-section 5.01.1.b and Section 5.02.5 (see Section 1.12.2) contained a requirement and recommendation respectively, that the crotch and thigh straps and associated fittings of a lifejacket harness should be capable of lifting a person from the water. However, there are no related ISO or EN standards to guide a manufacturer seeking to comply with this requirement.

[12] The Spinlock website (www.spinlock.co.uk) also provided video guidance on adjusting, fitting thigh straps, inflation, inspecting and repacking the lifejacket.

In 2008, the CSWP was formed to resolve this issue. The CSWP's principal aim was to promulgate recommended minimum breaking strains for crotch and thigh straps, including fastenings, by the end of March 2010. However, the deadline, and a revised target date of March 2011, were both missed and the study has fallen into abeyance.

ISAF's Special Regulations Sub-committee met on 8 November 2010. It recognised the continuing difficulty faced by the CSWP and appointed a new chairman. This investigation identified that no new target date has been set for the CSWP to report, although ISAF had recommended to the CSWP that a programme of trials be established with the ultimate aim of developing an ISO standard to satisfy the requirement for the harness crotch and thigh straps to lift a person from the water.

The work of the CSWP should be expedited to clarify that the requirements of ISAF OSR Sub-section 5.01.1b and Section 5.02.5 are meaningful and achievable, and amend the references as appropriate.

## 2.11 FATIGUE

The skipper and crew had been awake for some 18 hours when the accident occurred. The mast and bow men went below to rest at about 2315 and the skipper followed a short time later, but the rest period was very brief. The helmsman was due to take rest at about midnight, after the skipper had planned to return to the deck, but as the situation developed this was not possible. Although having spent over 5 hours on the helm the helmsman considered himself fully alert at the time of the accident.

There is no doubt that the yacht's motion and the associated difficulty in moving about would have contributed to the crew's growing fatigue. This might have had a detrimental effect on the skipper as he was making his way aft just before going overboard. The physical exertion experienced by the recovery team was considerable as they struggled to bring the skipper on board. This was exacerbated by the skipper being unable to provide any assistance. The impact of this should be considered by those managing an MOB recovery situation, especially if the MOB is unconscious.

# SECTION 3 - CONCLUSIONS

## 3.1 SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT WHICH HAVE RESULTED IN RECOMMENDATIONS

1. Had *Lion*'s skipper used one of the available 800mm tethers while clipped onto the starboard jackline he would not have gone overboard. [2.2.6, 2.7]

2. *Lion*'s crew had extreme difficulty in recovering the skipper on board. Their experience of man overboard situations gained during training did not cover the recovery of a tethered unconscious person. [2.4, 2.6]

3. When *Lion*'s skipper went overboard, no one initially took charge of the overall situation, because a replacement had not been nominated in the event of the skipper's incapacitation. This hindered onboard communications. Neither ISAF's OSR nor RORC's Notice of Race 2011 requires such nomination. [2.8.1, 2.8.2]

## 3.2 OTHER SAFETY ISSUES IDENTIFIED DURING THE INVESTIGATION WHICH HAVE BEEN ACTIONED

1. The recovery of an unconscious tethered man overboard is not routinely carried out during professional yachting-related training, and dummies are not commonly used to simulate the difficulties of dealing with an unconscious casualty. [2.6.1]

2. ISAF's OSR Sub-section 5.01.1.b and Section 5.02.5 respectively require and recommends that the crotch and thigh straps and associated fittings of a lifejacket harness be capable of lifting a person from the water. However, there are no related ISO or EN standards for a manufacturer to comply with. [2.10.4]

3. ISAF's Crotch Strap Working Party's study has fallen largely into abeyance. It has missed deadlines in determining specifications for lifejacket crotch and thigh straps. The work of the CSWP should be expedited to ensure the requirements of ISAF OSR Sub section 5.01.1.b and 5.02.5 are meaningful and achievable. [2.10.4]

## 3.3 OTHER SAFETY ISSUES

1. The skipper's decision to lash the No.1 genoa on deck was contrary to good practice and required crew to access the forward high risk area when it broke free. However, his decision was probably based on risk, in that he perceived it was safer to secure the sail on deck rather than try to take it below in the severe conditions. [2.3]

2. The skipper's lifejacket was pulled from his body and over his head during the recovery process. The integrated lifejacket safety harness might not have been correctly adjusted and the use of the tether loop instead of the lifting loop may have caused the lifejacket harness to "ride up" the skipper's torso. [2.10.2]

3. Contrary to ISAF's MOB guidance, *Lion*'s crew at the time of the accident had not practised a MOB drill as a team. [2.6.2]

4. Contrary to ISAF's OSR the pre-sailing safety briefing on board *Lion* did not include the actions to be taken in an emergency (i.e. man overboard). [2.6.2]

5. *Lion*'s engine was not started until 14 minutes after the man overboard call due to a perceived risk of fouling the propeller by loose running rigging. Starting it earlier would have provided for greater manoeuvring options. [2.6.1]

6. Communications between those in the cockpit and the recovery team at the bow were difficult because of the noisy environment, and it was some time before the helmsman and navigator had a proper understanding of the situation forward. [2.8.1]

# SECTION 4 - ACTIONS TAKEN

## 4.1 THE ROYAL OCEAN RACING CLUB

The Royal Ocean Racing Club produced a post-accident report dated 5 July 2011. The report did not draw any conclusions, or make any recommendations.

## 4.2 MECAL LTD

Mecal Ltd carried out a post-accident Occasional Survey on board *Lion* on 6 July 2011.

## 4.3 HM CORONER FOR WEST SUSSEX

HM Coroner for West Sussex held an inquest into the death of the skipper on 24 August 2011 and concluded that his death was accidental.

## 4.4 THE INTERNATIONAL SAILING FEDERATION

The International Sailing Federation has amended sub-sections 1.02.1, 5.0.1.b and 5.02.5.b of the Offshore Special Regulations **(Annex L)**.

## 4.5 THE ROYAL YACHTING ASSOCIATION

The Royal Yachting Association has:-

- Incorporated information on the purpose and use of a short tether in the 2012 edition of the RYA's Sea Survival Handbook.

- Included MOB as a key topic at the end of January 2012 Yachtmaster Instructor Conference with specific emphasis on:

    - *MOB actions when the casualty is still attached to the vessel*

    - *Use of realistic methods for the teaching of MOB recovery from the water, including the use of realistic MOB dummies.*

- Highlighted the need for more representative MOB recovery training by RYA instructors, including, where possible, the use of weighted MOB dummies, in the September 2011 issue of the RYA instructor magazine "Wavelength".

- Included in the January 2012 issue of "Wavelength", an article on the need for instructors on training courses to ensure that MOB recovery is not treated as a "robotic set piece" exercise. [sic]

- Written an article for the December 2011 edition of "Sailing Today" discussing the need for skippers to ensure that one of their crew was adequately trained to take control of the vessel in the event of the skipper being incapacitated and to ensure that the rest of the crew was aware of who the responsible person would be.

- Written an article for the Spring 2012 "RYA Members Magazine" discussing the need for sailors to consider unusual MOB situations, such as an MOB remaining clipped on, and how to deal with them.

## SECTION 5 - RECOMMENDATIONS

**Royal Ocean Racing Club** is recommended to:

2012/104 Promulgate the following safety issues to their respective memberships and to the offshore racing community:

- The importance of nominating a person to take over from the skipper in the event of his/her incapacitation.
- The use of long and short tethers/safety lines, as appropriate, to prevent a man overboard situation.
- Procedures in dealing with, and the difficulties associated with recovering a conscious and unconscious man overboard while tethered to the vessel.

**Marine Accident Investigation Branch**
**March 2012**

Marine Accident Report