

Report on the investigation of
the loss of a crewman overboard

from the motor tug

Endurance

2.3 miles west-south-west of Beachy Head,

United Kingdom

on 5 February 2013



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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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AIS	-	Automatic Identification System
ALB	-	All-Weather Lifeboat
BML	-	Boatmasters' Licence
CA	-	Certifying Authority
CHA	-	Competent Harbour Authority
CoC	-	Certificate of Competency
COLREGS	-	The International Regulations for Preventing Collisions at Sea 1972 (as amended)
DSC	-	Digital Selective Calling
GPS	-	Global Positioning System
IIMS	-	International Institute of Marine Surveying
kg	-	kilogram
kts	-	Knots
LOA	-	Length Overall
m	-	metre
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MIN	-	Marine Information Note
mm	-	millimetre
MRCC	-	Maritime Rescue and Co-ordination Centre
MSN	-	Merchant Shipping Notice
PFD	-	Personal Flotation Device
PLA	-	Port of London Authority
PMSC	-	Port Marine Safety Code
PPE	-	Personal Protective Equipment
RNLI	-	Royal National Lifeboat Institution

SAR	-	Search and Rescue
SCV Code	-	MGN 280(M) Small Vessels in Commercial Use for Sport or Pleasure, workboats and Pilot boats – Alternative Construction Standards
SHA	-	Statutory Harbour Authority
SOG	-	Speed Over the Ground
SOLAS	-	International Convention for the Safety of Life at Sea 1974, as amended
t	-	tonne
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency
VTS	-	Vessel Traffic Services

TIMES: All times in this report are UTC unless otherwise stated

SYNOPSIS

At about 0005 on 5 February 2013, a crewman from the motor tug *Endurance* fell overboard in rough seas about 2.3 miles west-south-west of Beachy Head on the south coast of England. The crewman fell while attempting to cross to the unmanned motor cruiser *Sirius M* with a replacement towline after the original towline connecting the two vessels had parted. The motor tug's skipper's efforts to recover the crewman back on board in rough seas were unsuccessful; the crewman soon lost consciousness and disappeared from view.

The skipper informed Dover coastguard of the situation and a search and rescue operation was immediately started. However, the crewman's body was not found until it came ashore under the cliffs of Beachy Head 11 weeks later.

The MAIB investigation identified that the attempt to reconnect a towline between *Endurance* and *Sirius M* was a desperate and ill-considered measure brought about by the use of poor towing practices, a disregard of the weather forecasts, and a lack of planning, risk assessment and emergency preparedness. Factors contributing to the accident included:

- *Endurance* was not certified to operate in the sea conditions experienced
- the skipper was not qualified to operate the vessel during the coastal sections of the intended voyage
- the skipper was not trained or qualified in towing operations and did not follow good practice
- decision-making and behaviour on board were likely to have been affected by fatigue
- safety was afforded a low priority on board
- the crewman was not wearing a lifejacket.

The investigation also identified that, although not directly contributory to this accident, the certification process conducted by the International Institute of Marine Surveyors, which allowed *Endurance* to operate out to sea, was not robust. Weaknesses were also identified in Medway Ports' compliance with the Port Marine Safety Code with respect to motor tug licensing and operation, accident investigation and the sharing of information.

Action has been taken by the International Institute of Marine Surveying, Medway Ports, Peel Ports Group and the owner/skipper of *Endurance* to address the safety issues identified. The Maritime and Coastguard Agency has also taken steps to ensure the lessons learned are shared with all the UK certifying authorities. A recommendation has been made to *Endurance's* owner and skipper, which is intended to help ensure the safe operation of his vessel in the future.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *ENDURANCE* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	<i>Endurance</i>
Flag	UK
Certifying authority	International Institute of Marine Surveying
Licensing authority (River Medway)	Medway Ports
Licensing authority (River Thames)	Port of London Authority
Small Commercial Vessels Code number	C12MV1104904
Motor tug licence numbers	POSL 23 and PLA 4954
Type	Motor tug and workboat
Registered owner	Private
Manager	Thames and Medway Marine Services Ltd
Construction	Steel
Length overall	9.95m
Gross tonnage	N/A
Bollard pull	2t
VOYAGE PARTICULARS	
Port of departure	Dover, England
Port of arrival	Brighton, England
Type of voyage	Coastal
Manning	2
MARINE CASUALTY INFORMATION	
Date and time	5 February 2013 at about 0005
Type of marine casualty or incident	Very Serious Marine Casualty
Location of incident	50° 43.729 N; 000° 11.851E
Place on board	Fore deck of tug/main deck of towed vessel
Injuries/fatalities	One fatality
Damage/environmental impact	None
Ship operation	Towing
Voyage segment	Mid-water
External & internal environment	Wind - westerly force 6 to 7, gusting to gale force 8. Sea state - moderate to rough with a 2m swell from the west. The sea temperature was 8.4°C and the air temperature was 8°C.
Persons on board	2



Endurance

1.2 NARRATIVE

At about 0400 on 3 February 2013, the skipper of the motor tug¹ *Endurance* (**Figure 1**) and his crewman, Steven Trice met at Cuxton Marina near Rochester, England. They boarded a small boat and made their way to *Endurance's* River Medway mooring. *Endurance* was then manoeuvred across the river to Medway Bridge marina (**Figure 2**), where the skipper and Steven connected a towline from *Endurance* to the bow of the motor cruiser *Sirius M* (**Figure 3**). *Sirius M* was then towed by *Endurance* downriver. The vessels' destination was Brighton on the south coast of England. *Endurance's* skipper had checked the weather forecast using the *windfinder.com* website² and had assessed the predicted conditions to be suitable for the 2 day passage. He intended to berth the vessels overnight in Dover.

¹ The skipper was also the owner of the motor tug. Both titles will be used throughout the report. The Port of London Authority's definition of a motor tug is an inland waterways vessel which is less than or equal to 50gt and licensed to tow, push and manoeuvre small craft, barges and pontoons.

² Windfinder.com is a German based company that provides a global weather service for wind, wave and weather related outdoor sports. Its website combines weather forecasts for watersport locations and real time observations from more than 7000 weather stations worldwide.

Image courtesy of Patrick Hill



Figure 1: *Endurance* on the River Medway



Figure 2: Aerial view of the River Medway's Cuxton and Medway Bridge marinas



Figure 3: *Sirius M* berthed at Medway Bridge marina

At 0513, the skipper informed Medway vessel traffic services (VTS), via very high frequency (VHF) radio, that *Endurance* was underway and was towing “a 60 foot steel cabin cruiser outward bound for the south coast”. The VTS officer acknowledged the call and replied:

“...you’ve got a 60 foot cruiser you say, outward bound for the south coast. We have been issued with a gale warning, a couple of hours ago. A south-westerly gale force 8 is expected soon³. Over”.

The skipper acknowledged the weather warning and he also told the VTS officer that he would “*probably chuck in at Ramsgate then*”. At 0641, Steven sent a text message to his girlfriend advising her that they were outward bound at Kingsnorth and that force 8 winds had been forecast.

At about 0730, *Endurance* passed the Medway VTS tower (**Figure 4**). Several minutes later, Medway VTS repeated the gale warning. The warning was again acknowledged by the skipper when he reported his position. He also repeated his intention to proceed to Ramsgate and to assess the situation from there. At 0826, Steven sent a text message to his girlfriend telling her that she could follow *Endurance’s* progress on the MarineTraffic.com⁴ website.

³ On the Beaufort wind scale ‘gale force 8’ winds are between 34 and 40kts. The Met Office definition of ‘soon’ is within 6 to 12 hours.

⁴ The MarineTraffic.com website is part of an open, community-based project, which is dedicated to collecting and presenting data which are exploited for research purposes. It provides free real-time information to the public about ship movements and ports. Its initial data collection is based on the signals received from maritime vessels’ Automatic Identification System (AIS) transmitters (see footnote 8).



Figure 4: *Endurance* on passage east from the River Medway towards North Foreland

As *Endurance* continued on an easterly heading, the tug made good a speed over the ground (SOG) of between 6 and 7 knots (kts), assisted by the ebb tide. At about 1200, *Endurance*'s skipper altered the tug and tow's heading to the south, towards North Foreland (**Figure 5**). Two hours later, as the vessels approached Ramsgate, the skipper decided to continue on passage to Dover.

Shortly after, the direction of the tidal stream turned and the strength of the south-westerly wind steadily increased to force 6, with gusts up to force 8. As a result, *Endurance*'s SOG was reduced to between 1 and 2kts. At 1730, Steven's girlfriend sent him a text message:

"will take forever at that pace. AIS shows 2kts. You must be tired"

At 2130, *Endurance* and *Sirius M* entered Dover (**Figure 5**). *Endurance* was refuelled and the vessels were moored alongside. The skipper inspected the towline. He also looked at the weather forecast for the following day. The inshore waters forecast⁵ issued by the Met Office for the area included:

west to south-westerly winds, force 5 to 7, occasionally gale-force 8 with moderate to rough seas.

Overnight, the skipper slept on board *Endurance* and Steven slept on board *Sirius M*. At 0906 the following morning (4 February), *Endurance* sailed from Dover with *Sirius M* in tow (**Figure 6**). The skipper intended to assess the sea conditions once on passage. If the tow was handling well, he intended to continue to Brighton. If not, he intended to return to Dover.

Soon after leaving Dover, Steven recorded the movement of *Sirius M* in the moderate swell on his camera (**Figure 7**). The video footage taken showed that the towline did not have a catenary⁶ and was constantly snatching⁷. It also showed that the motor tug's aft deck was awash with water. During the remainder of the day, the vessels' SOG fluctuated between 2.5kts and 5kts depending on the direction of the tidal stream.

At about 2030, *Endurance* passed the Sovereign Light (**Figure 8**). By then, the weather conditions had worsened and both the skipper and Steven felt sea-sick. The men discussed aborting the passage and seeking refuge in Eastbourne. Despite being tired and finding the conditions uncomfortable, they both wanted to get the job done, so the skipper made the decision to press on to Brighton.

At 2300, *Endurance* passed south of Beachy Head. It was approaching slack water and the vessel was heading into a strong westerly wind; the SOG was 3kts. At 2337, the towline parted and *Endurance*'s SOG increased to 6kts. At about 2340, the skipper realised what had happened and reduced speed. *Sirius M* was not in sight so the skipper turned *Endurance* onto a reciprocal heading to look for the motor cruiser. Within 3 minutes, *Endurance*'s skipper saw *Sirius M*; it was stopped in the water, lying beam onto the wind and was unlit.

⁵ Inshore waters forecast – for coastal areas up to 12 miles offshore.

⁶ Catenary: a curve formed by a wire, rope or chain hanging freely from two points that are not in the same vertical line.

⁷ Snatching – the generation of large dynamic forces in a towline as it is stretched taught.

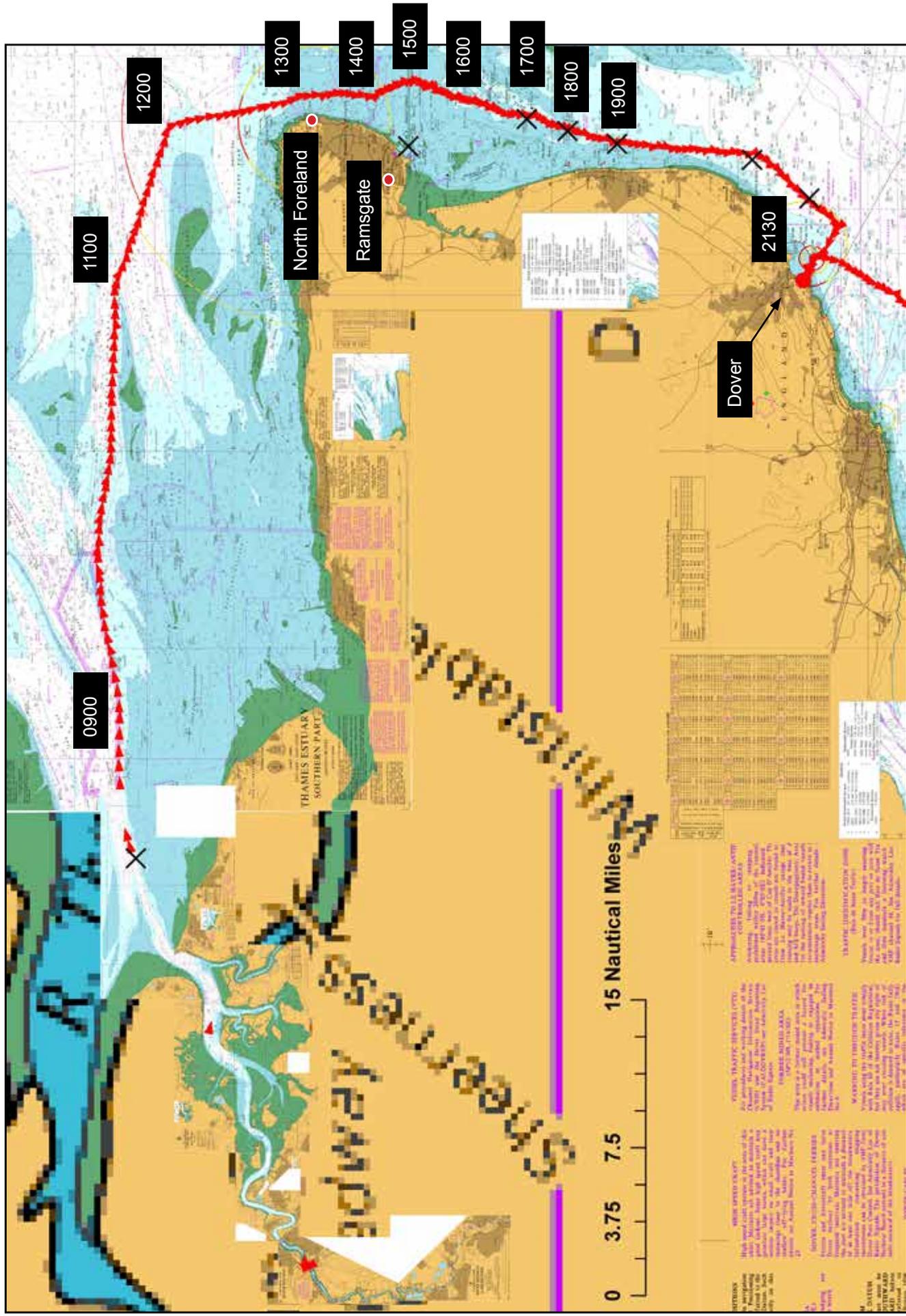


Figure 5: Automatic Identification System track of Endurance's towage voyage between Rochester and Dover

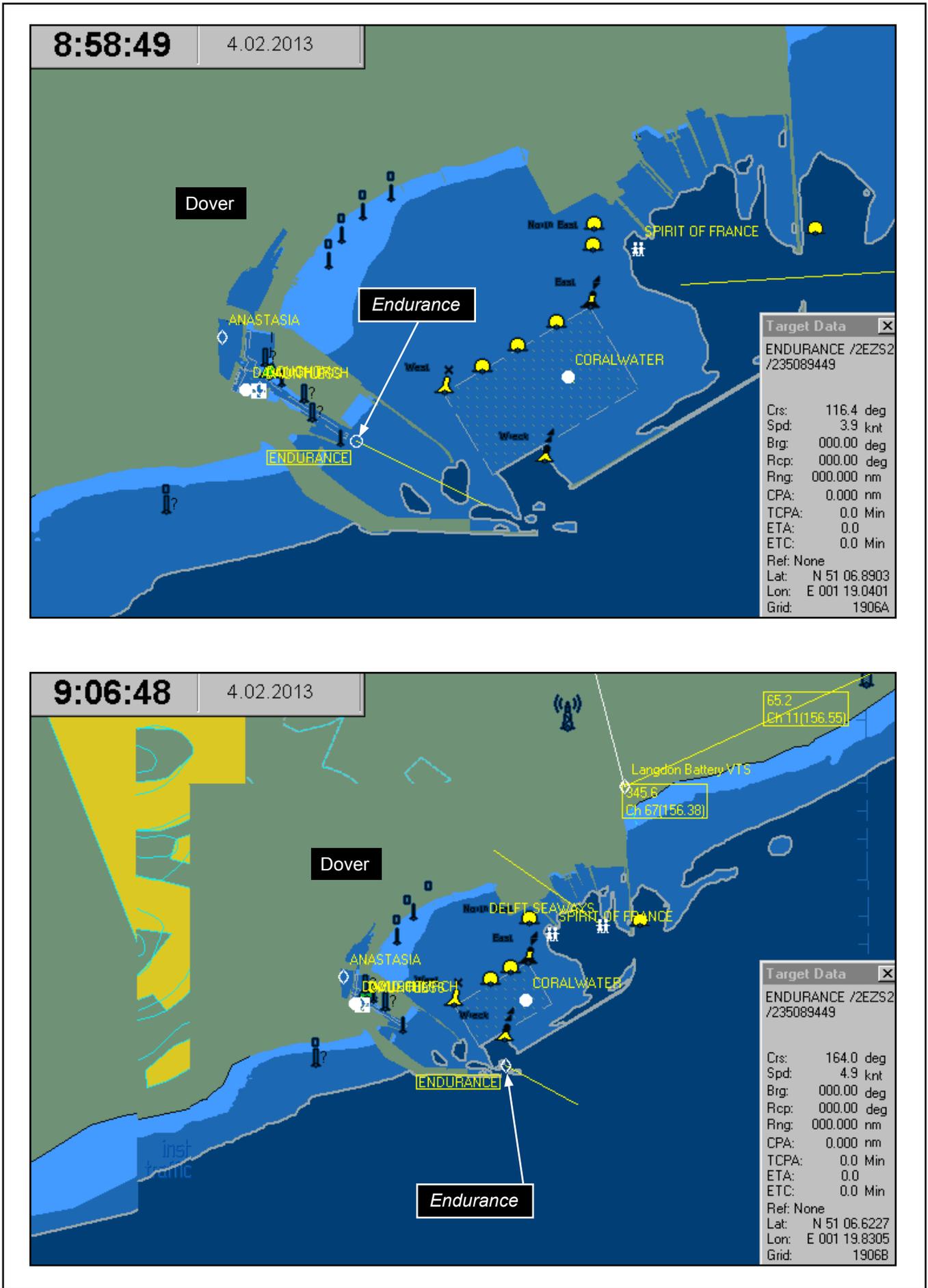


Figure 6: Endurance departing Dover with Sirius M under tow on 4 February 2013

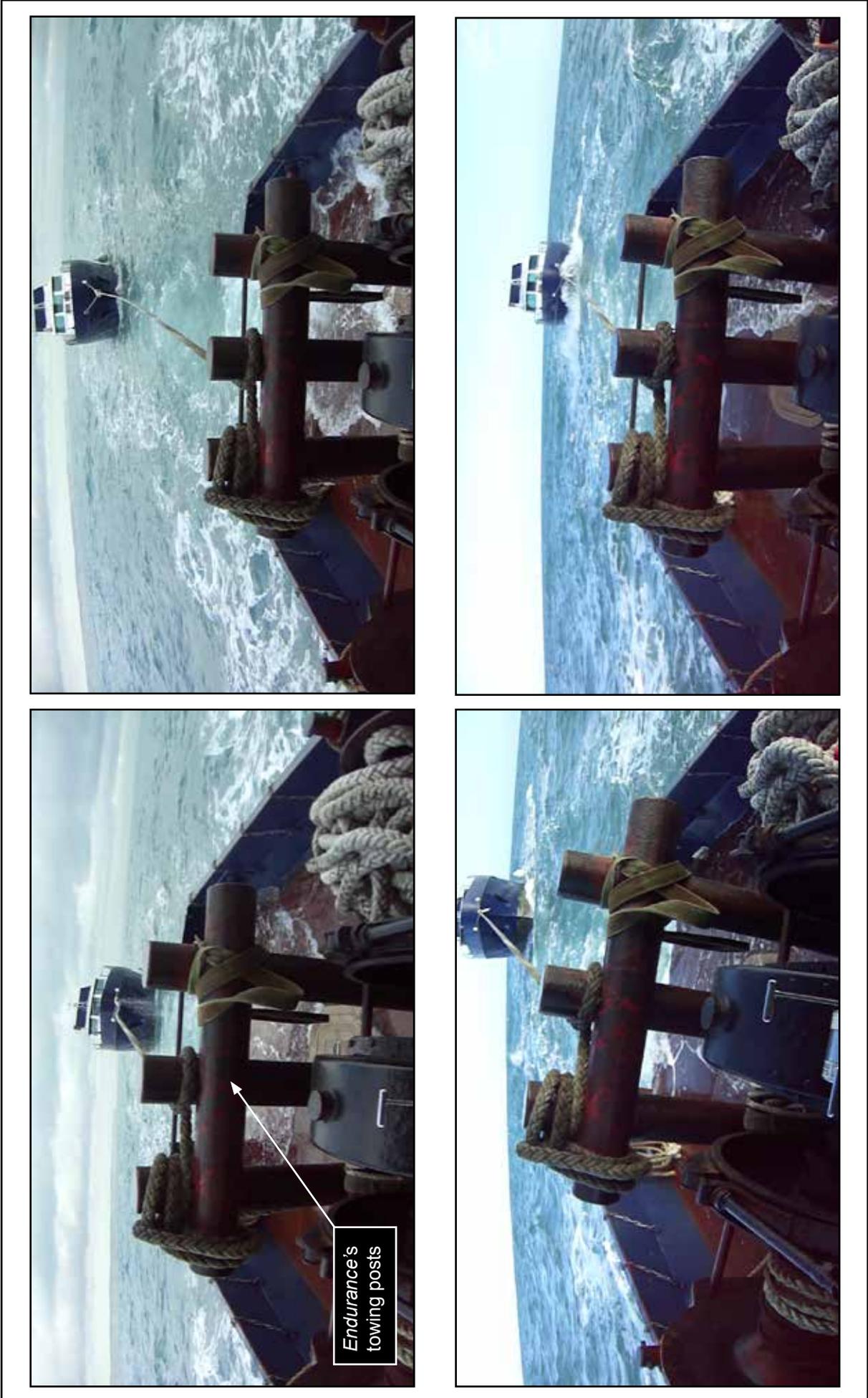


Figure 7: Stills from video footage taken of Sirius M under tow after leaving Dover

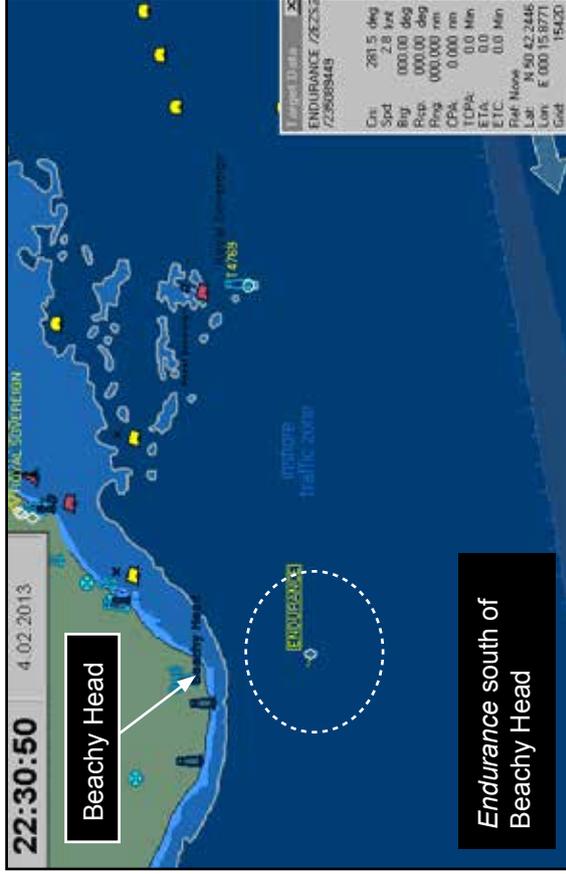
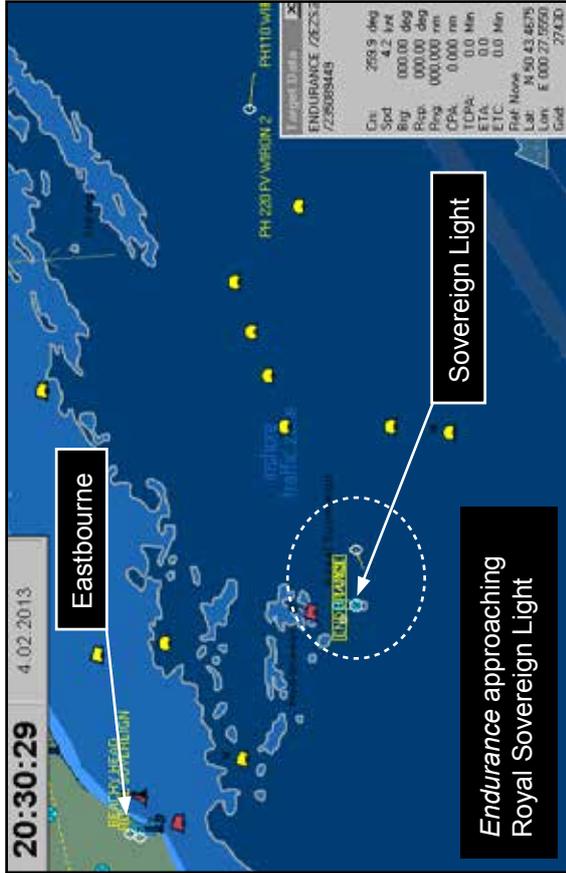


Figure 8: Endurance's passage off Beachy Head

Steven went on deck and recovered the remains of the parted tow rope back on board. When he returned to the wheelhouse, the skipper manoeuvred *Endurance* head on to the waves close to *Sirius M*. The skipper and Steven then discussed how they could re-connect the tow and agreed that Steven would take another towline across to *Sirius M*.

Steven donned a high visibility work coat and went onto the deck to prepare another towline. The skipper initially left the wheelhouse to assist, but had to return to the helm to prevent *Endurance* from falling beam-on to the wind and the sea.

Steven removed a 32mm diameter rope from the wheelhouse roof and coiled it down on the aft deck. He secured one end of the rope to the towing post and then pulled the eye in the other end and several metres of the rope along the starboard side of the vessel to the foredeck (**Figure 9a**).

At about midnight, *Endurance*'s skipper manoeuvred the motor tug's bow towards *Sirius M*'s leeward (starboard) side, aiming for an open section of main deck guardrails amidships (**Figure 9b**). Meanwhile, Steven stood on the foredeck with the eye of the tow rope over his shoulder; he was steadying himself by holding onto the coaming on the inner edge of the wheelhouse roof (**Figure 10a**).

When the vessels were in close proximity, Steven leapt from the foredeck towards *Sirius M* (**Figure 10b**). Almost simultaneously, the skipper manoeuvred *Endurance* astern as *Sirius M* came down off the crest of a wave and lurched towards his vessel. The skipper initially thought that Steven had crossed successfully onto the motor cruiser. However, as the distance between the two vessels increased, he could no longer see Steven and realised that he must have fallen into the sea.

To prevent Steven being crushed between the two vessels, the skipper continued to manoeuvre *Endurance* astern until the distance to *Sirius M* was about 15m (**Figure 11a**). He then went out on deck and saw Steven floating motionless on the sea surface off the starboard bow; he was lying face up with the eye of the tow rope under his armpits.

The skipper heaved in on the tow rope but soon had to stop and return to the wheelhouse to again manoeuvre *Endurance* clear of *Sirius M*. Once the vessels were again clear of each other, the skipper went back on deck and continued to pull in on the tow rope as quickly as he could (**Figure 11b**). When Steven was within 10m of *Endurance*, a large wave carried him under the tug's stern and the tow rope became entangled within the vessel's tyre fenders. By the time the skipper had freed the tow rope from the tyres, Steven had slipped from its eye. The skipper ran to the port side of the vessel and saw Steven drift into the darkness (**11c**) and out of sight.

At 0012 (on 5 February 2013), the skipper called Dover coastguard on VHF radio and advised that he had a "Mayday situation; or Pan Pan". He reported that he was a "small tug and tow bound for Brighton Marina", and that he had lost his tow and his crewman was in the water. The coastguard acknowledged the call and asked the skipper to confirm his position. Initially, the skipper explained that *Endurance* carried a Class A Automatic Identification System (AIS)⁸ and was 5 miles west of Beachy

⁸ AIS is an automatic tracking system used on ships and by VTS for identifying and locating vessels by electronically exchanging data with other nearby ships, AIS base stations, and satellites.

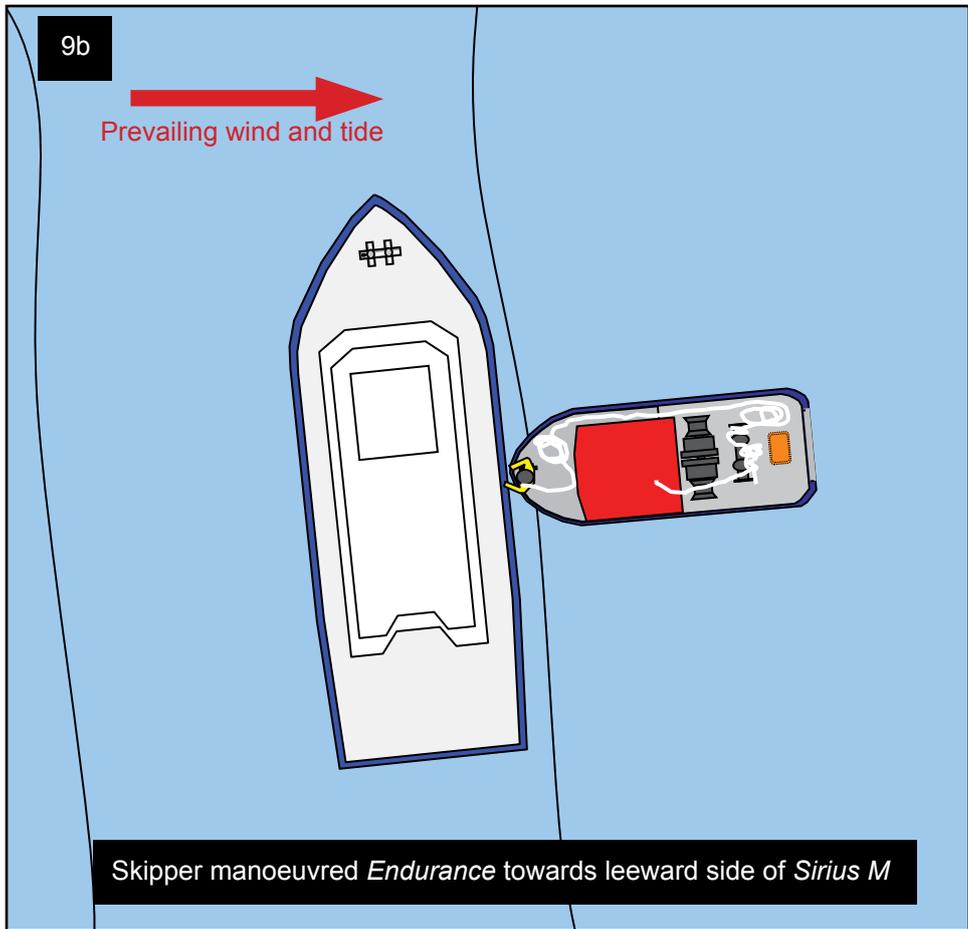
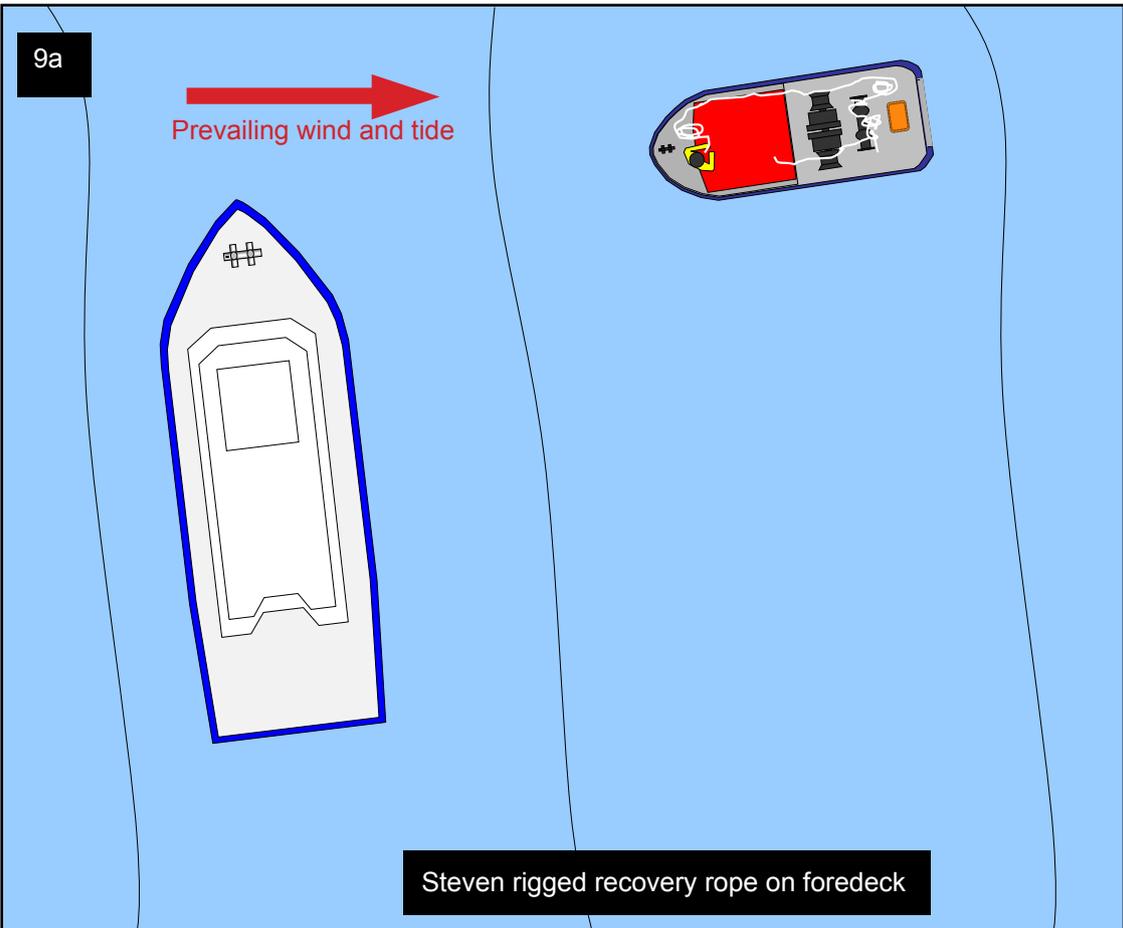
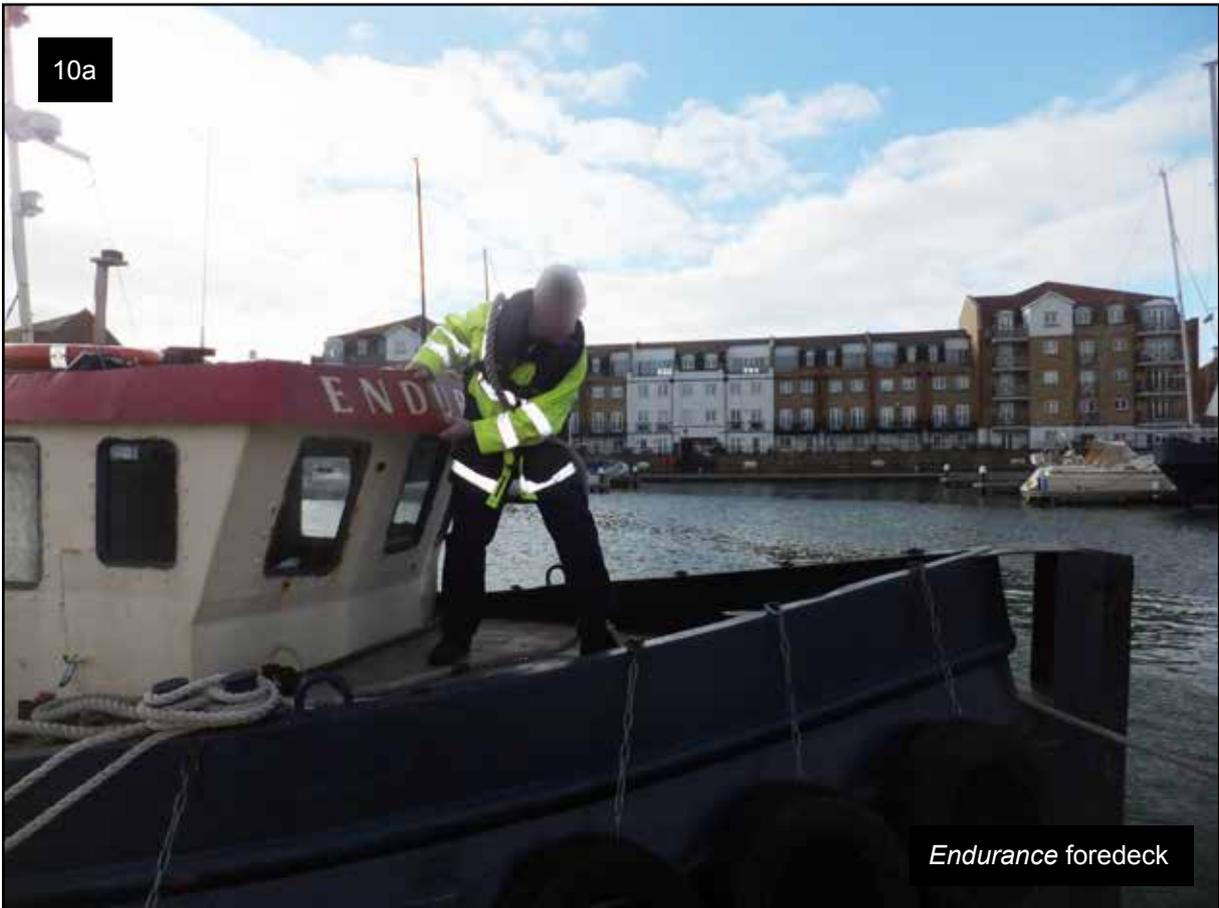


Figure 9a and 9b: Attempt to reconnect the tow

10a



Endurance foredeck

10b



Figure 10a and 10b: Reconstruction of Steven's position on *Endurance's* foredeck in preparation to step across to *Sirius M*

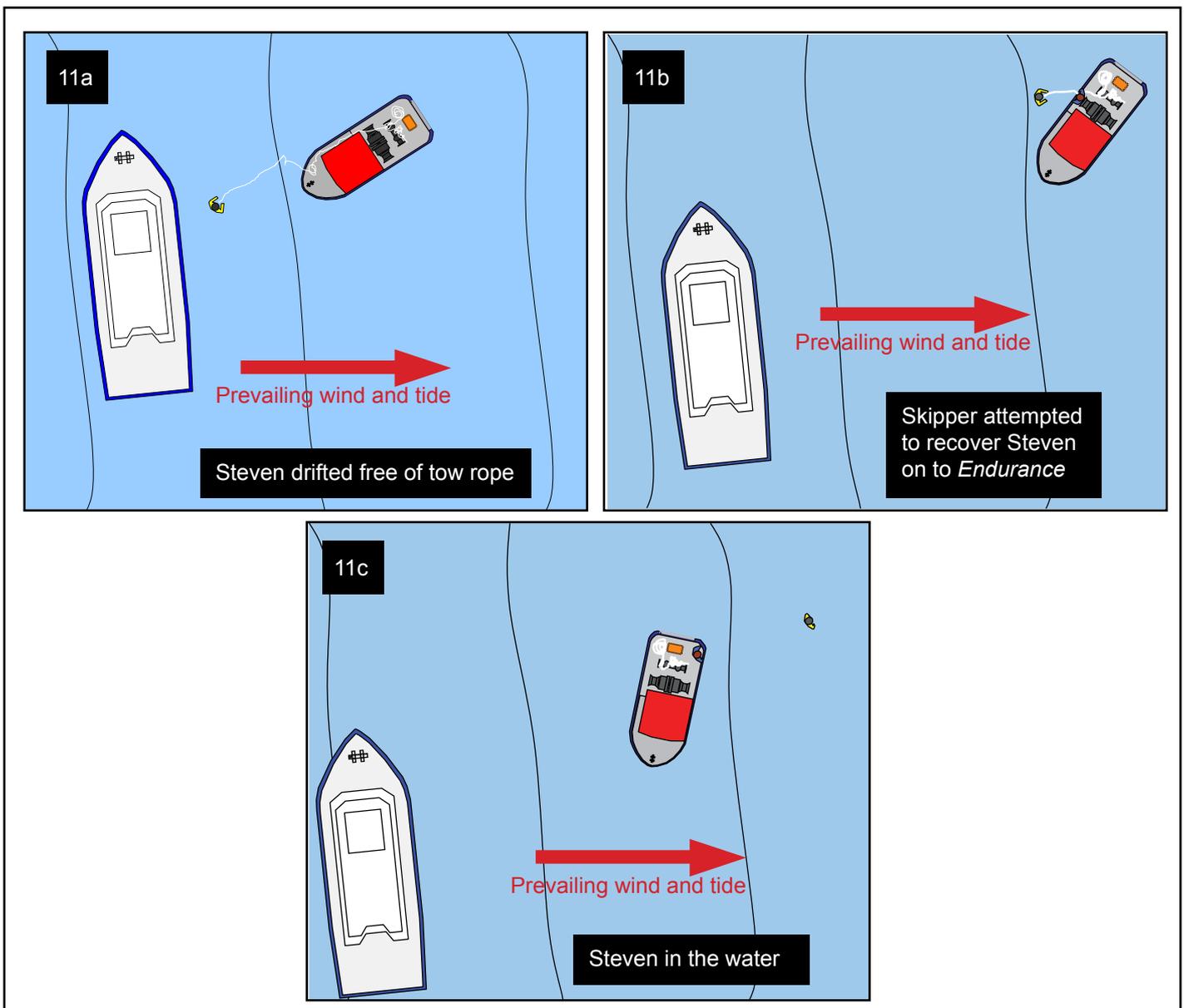


Figure 11a, 11b and 11c: Attempted recovery of Steven from the water

Head. About 1 minute later, he gave his position as 50° 43.729N and 000° 11.851E⁹, which was about 2.3 miles west-south-west of Beachy Head. When the skipper was asked by the coastguard operator whether his crewman was wearing any flotation aids, he replied:

“not quite sure, I think he was wearing one under his high-vis jacket, but I’m not quite sure”

The skipper also added that Steven was wearing jeans and a boiler suit under his jacket. In response to further questions, the skipper confirmed that *Sirius M* and *Endurance* were no longer connected and that *Sirius M* was unmanned and its navigation lights were not illuminated. He also advised that the sea conditions were moderate to rough.

⁹ The VHF radio exchange between *Endurance* and Dover Coastguard was monitored by the Marine Rescue and Co-ordination Centre (MRCC) Solent. As *Endurance* was within Solent’s area of responsibility, MRCC Solent immediately contacted Dover Coastguard to confirm which station would co-ordinate the search and rescue (SAR) operation and whether the Newhaven lifeboat should be tasked. Dover coastguard advised that as it was in contact with *Endurance*’s skipper, it would continue to co-ordinate the SAR and that it would probably initially task the Eastbourne lifeboat.

Between 0015 and 0020, Dover coastguard tasked a coastguard rescue helicopter (R104) and the Royal National Lifeboat Institution (RNLI) all-weather lifeboat (ALB) in Eastbourne to assist. The lifeboat arrived on scene at about 0059. At the same time, *Endurance's* skipper informed the coastguard that he had not relocated *Sirius M* and that his crewman was probably not wearing a lifejacket because all of the vessel's lifejackets were still in the wheelhouse. He also explained that his crewman appeared to be unconscious when he last saw him.

At 0115, R104 arrived on scene and the Newhaven ALB was tasked to join the search. At about 0130, R104 located *Sirius M* drifting in an easterly direction in position 50° 44.04N 000° 17.19E. When the position of *Sirius M* was relayed to *Endurance's* skipper by the coastguard, the skipper stated that he was operating single-handed and could not take the motor cruiser back under tow.

The coastguard was concerned about the wellbeing of *Endurance's* skipper and requested the coxswain of the Eastbourne ALB to transfer one of his crew to the motor tug to assist. However, when the ALB arrived alongside *Endurance* its coxswain quickly decided that it was too dangerous to transfer crew due to the relative motion of the vessels in the rough seas and the large amount of seawater awash on the motor tug's aft deck.

At 0215, *Endurance's* skipper requested the coastguard's permission to head into Eastbourne. By this time, the extent of the rolling and pitching of the tug was so severe that the skipper was concerned that it might lead to problems with the engine fuel supply. The coastguard approved the request and, at 0305, *Endurance* entered Eastbourne's Sovereign Harbour (**Figure 12**). *Sirius M* was later recovered by the Newhaven ALB and towed into Eastbourne (**Figure 13**).



Figure 12: *Endurance* entering Eastbourne's Sovereign Harbour

Newhaven all weather lifeboat making its approach towards *Sirius M*

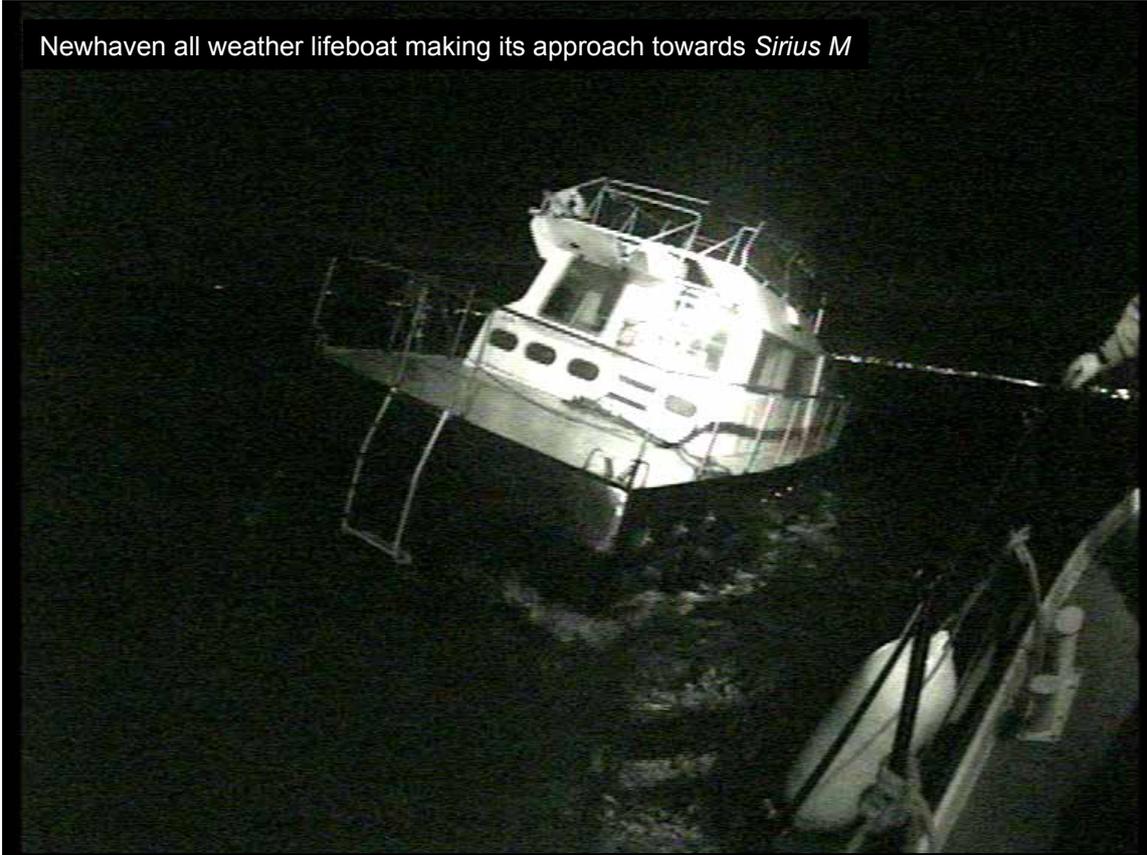


Figure 13: Recovery of *Sirius M* by RNLI lifeboat

The search and rescue (SAR) operation continued throughout the night and into the following day, but Steven was not found. His body was later recovered from the rocky shoreline under the cliffs of Beachy Head on 21 April 2013. The postmortem report identified that Steven had no signs of serious injury and concluded that the most likely cause of death was either drowning or exposure to the cold.

1.3 ENVIRONMENTAL CONDITIONS

When Steven fell overboard, the wind was westerly force 6 to 7, gusting to gale force 8. The sea state was moderate to rough with a 2m swell from the west. The tidal stream was setting to the west at a predicted rate of 0.6kt. The sea temperature was 8.4°C and the air temperature was 8°C.

1.4 THE VESSELS

1.4.1 *Endurance*

Built as a fishing vessel in 1989, *Endurance* was 9.95m in length and had a steel hull. In 2003, then named *Amber*, the vessel's fishing net snagged on a rock and the vessel sank in the Firth of Forth, Scotland, with the loss of its skipper¹⁰. *Amber* was salvaged (**Figure 14**) by the vessel's insurers. In 2007, the vessel was bought by a London-based company and was used as a workboat to move pontoons around London's West India docks. In 2008, the vessel flooded and sank while berthed alongside on the River Thames but was again salvaged (**Figure 15**).



Figure 14: Salvaged fishing vessel *Amber* in 2003

¹⁰ MAIB report 25/2003 – Report on the investigation of the loss of the fishing vessel *Amber* (PH78) in the Firth of Forth on 6 January 2003 with the loss of one life.



Figure 15: *Endurance* out of the water in 2008 after being salvaged on the River Thames

In 2009, *Endurance* was bought by the current owner who spent 2 years converting the vessel to a motor tug. The aft deck was strengthened and a three pillar towing post was installed (**Figure 7**). A new deck winch was also fitted and a section of the bulwark at the stern of the vessel was cut away to enable buoys to be recovered on board. In 2012, a steel pushing bar was fitted to the stem (**Figure 16**).



Figure 16: *Endurance* out of the water in 2012 - pushing bar fitted

The bulwarks along the sides of *Endurance*'s aft deck were 600mm high and there was no bulwark or guardrails fitted around the raised foredeck or at the transom.

Endurance was commercially operated through Thames and Medway Marine Services Ltd, which was also owned by the vessel's skipper. The vessel was licensed by Medway Ports¹¹ and the Port of London Authority (PLA)¹² to operate on the River Medway and the River Thames respectively as a motor tug. *Endurance* was also certified by the International Institute of Marine Surveying (IIMS)¹³ to operate commercially as a workboat up to 60 miles out to sea¹⁴ and to carry up to eight passengers.

¹¹Medway Ports is the statutory and competent harbour authority (SHA and CHA) for the River Medway (the Medway buoy to Allington Dock). It is part of the Peel Ports Group and is also referred to as Peel Ports Medway and Port of Sheerness Ltd.

¹² The PLA is the SHA for the tidal part of the River Thames.

¹³ The IIMS was an MCA approved Certifying Authority (CA) (see **Paragraph 1.14**).

¹⁴ *To sea* means beyond category D waters, or category C waters if there is no category D waters (as designated in the Merchant Shipping (Categorisation of Waters) Regulations 1992).

Endurance carried three self-inflating lifejackets, which were kept on a hook in the wheelhouse close to the wheelhouse door (**Figure 17**). A sign next to the wheelhouse door indicated that the lifejackets must be worn at all times when working on deck. The waist belt on each of the lifejackets had a steel eyelet that was designed to allow yachtsmen to attach themselves, via a lifeline/lanyard, to their boat. The vessel had not been fitted with jackstays and no lanyards or safety harnesses were carried on board.

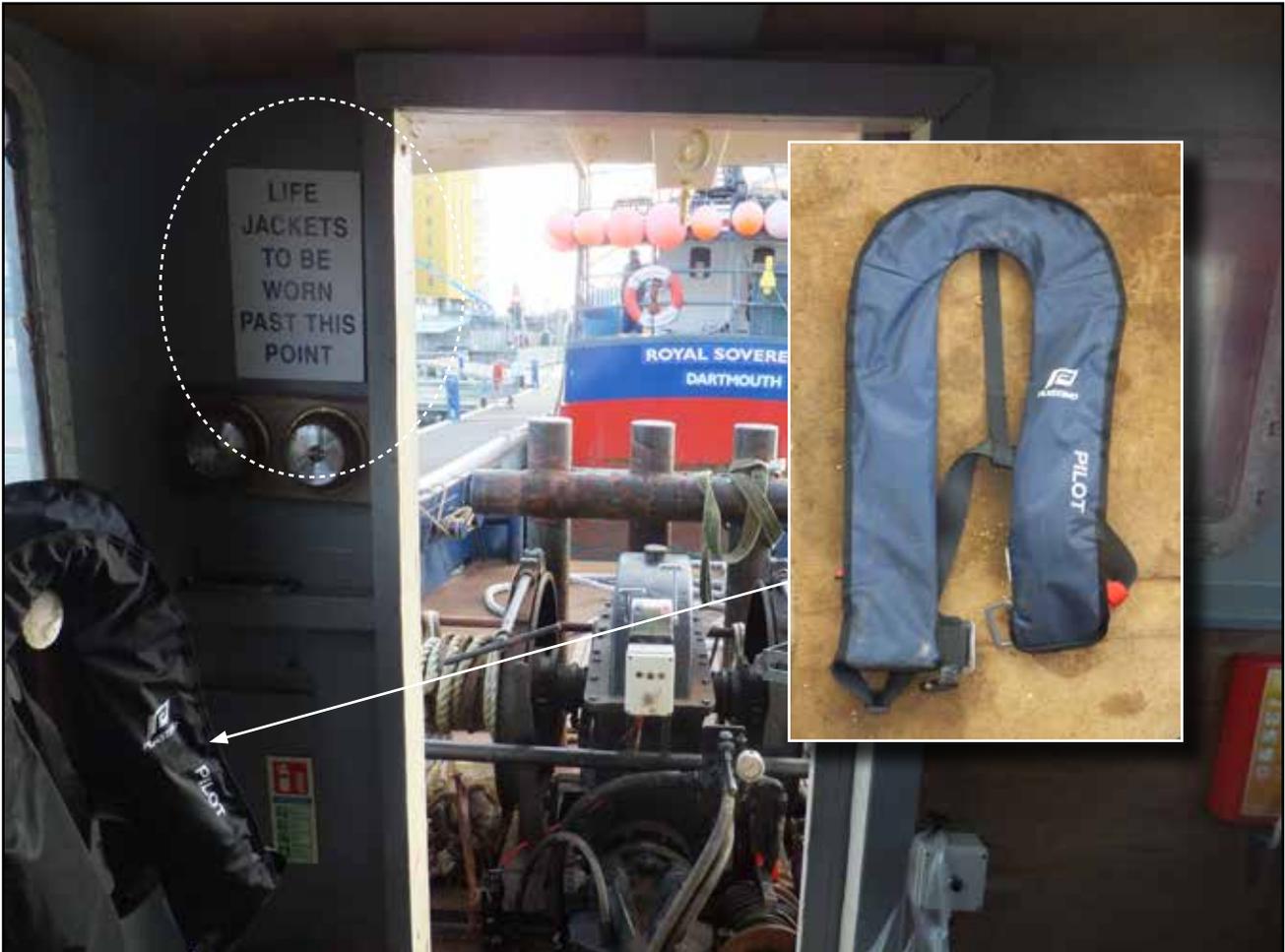


Figure 17: Lifejackets carried on board *Endurance*

The navigation equipment fitted on board *Endurance* included a Furuno 1832 radar, which was not working due to a fault on the antenna unit, a combined global positioning system (GPS) receiver, a chart plotter and echo sounder (Garmin GPSMAP 298), a fluxgate compass and 'Class A' AIS transponder. The vessel was not fitted with an autopilot.

For navigation, *Endurance's* skipper used the chart plotter and a EURONAV seaPro electronic chart software package he had installed on the vessel's laptop. No paper charts, tide tables or sailing directions covering the south coast of England were carried on board.

Endurance carried a Simrad RD68 VHF radio with an integrated digital selective calling (DSC) unit (**Figure 18**)¹⁵. The vessel also had an ICOM IC M59 VHF radio and hand-held ICOM IC M23 VHF radio with which the skipper used to

¹⁵ In an emergency a DSC distress call allows the operator to transmit a substantial amount of information, including the vessel's position, to the coastguard and nearby vessels without the need for voice communication.

communicate with a forward lookout when he was pushing objects which blocked his view ahead (**Figure 19**). A forward-facing closed-circuit television camera was also bolted to the vessel's mast to help the skipper to see over the top of some of the objects being pushed.



Fig 1.1 - RD68 Combined VHF & DSC

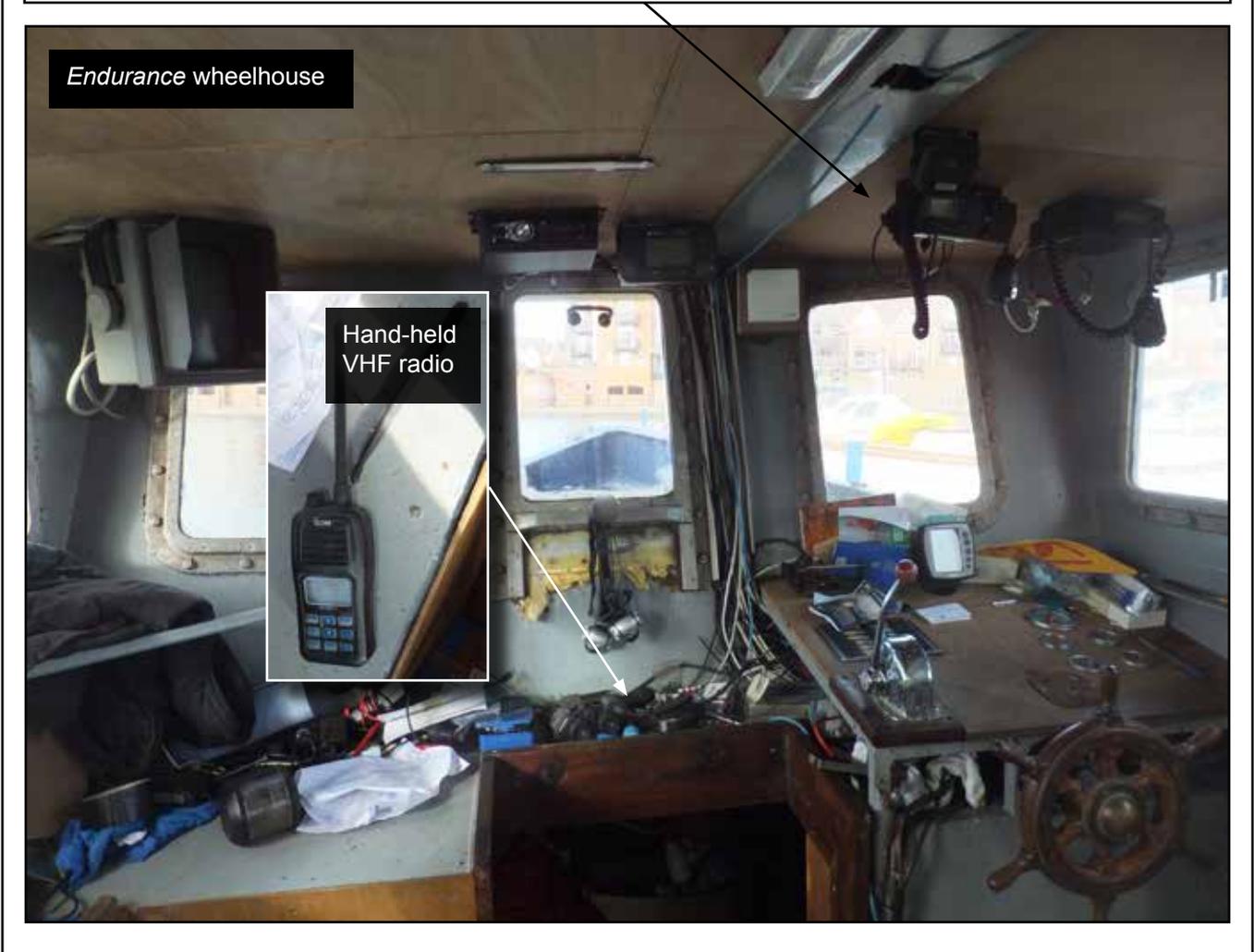


Figure 18: Combined VHF and DSC radio fitted on board *Endurance*

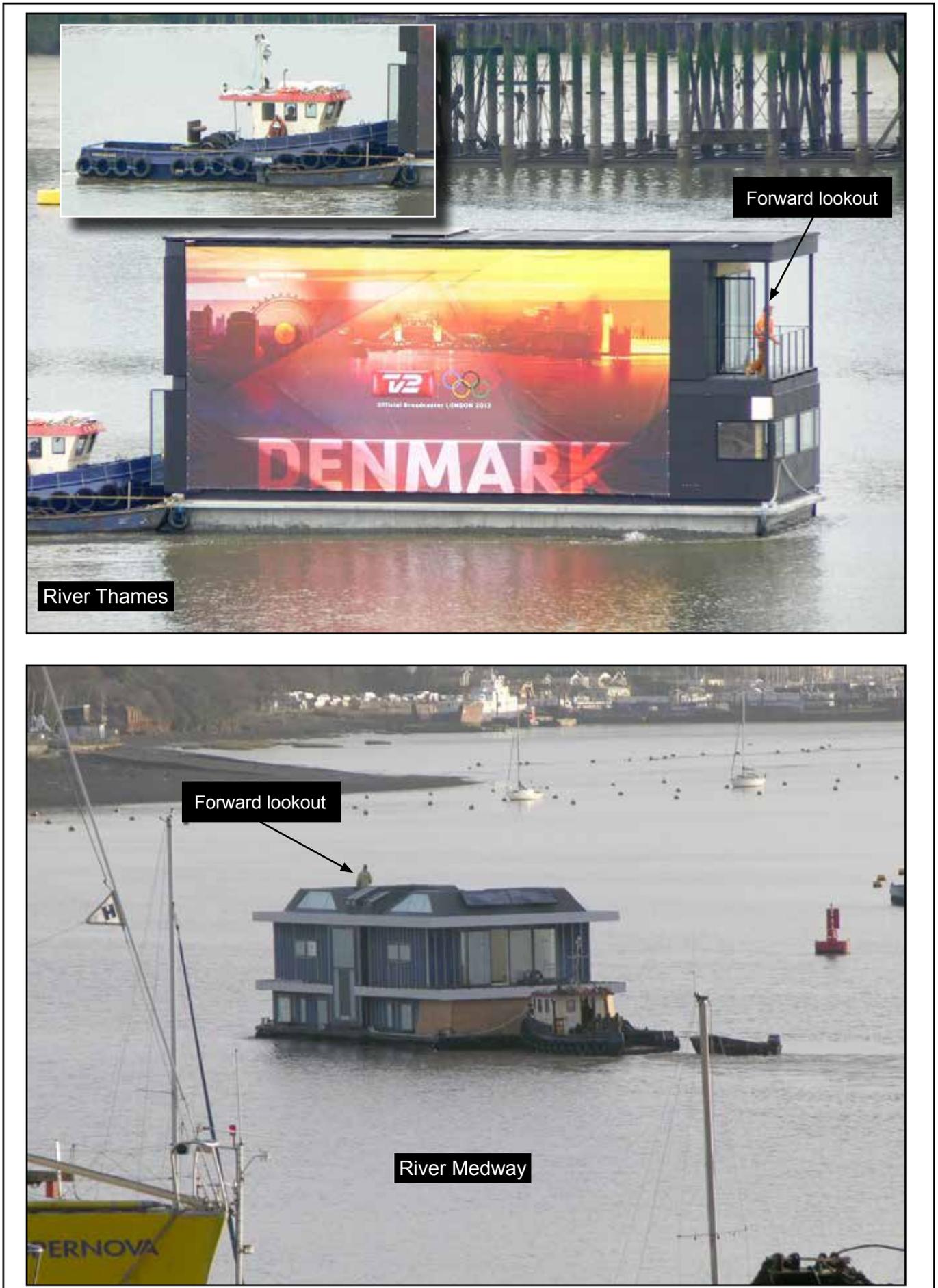


Figure 19: Examples of the types of previous pushing operations undertaken on the River Medway and the River Thames by the owner of *Endurance*

1.4.2 *Sirius M*

Sirius M was a *Triton Trawler* motor cruiser fitted with twin Gardner diesel engines. The vessel was 18m in length with a steel hull and was equipped to operate as a seagoing pleasure craft. However, *Sirius M* had been used as a houseboat for several years at Medway Bridge Marina.

Sirius M had through bulwark fairleads sited on the port and starboard sides of the foredeck (**Figure 20**). The vessel's forward mooring ropes were typically reeved through the fairleads and secured to a set of stainless steel bits located on the centreline of the foredeck. The edges of the bulwark fairleads had 20mm diameter steel rims to strengthen the structure and to help reduce the risk of rope chafe.

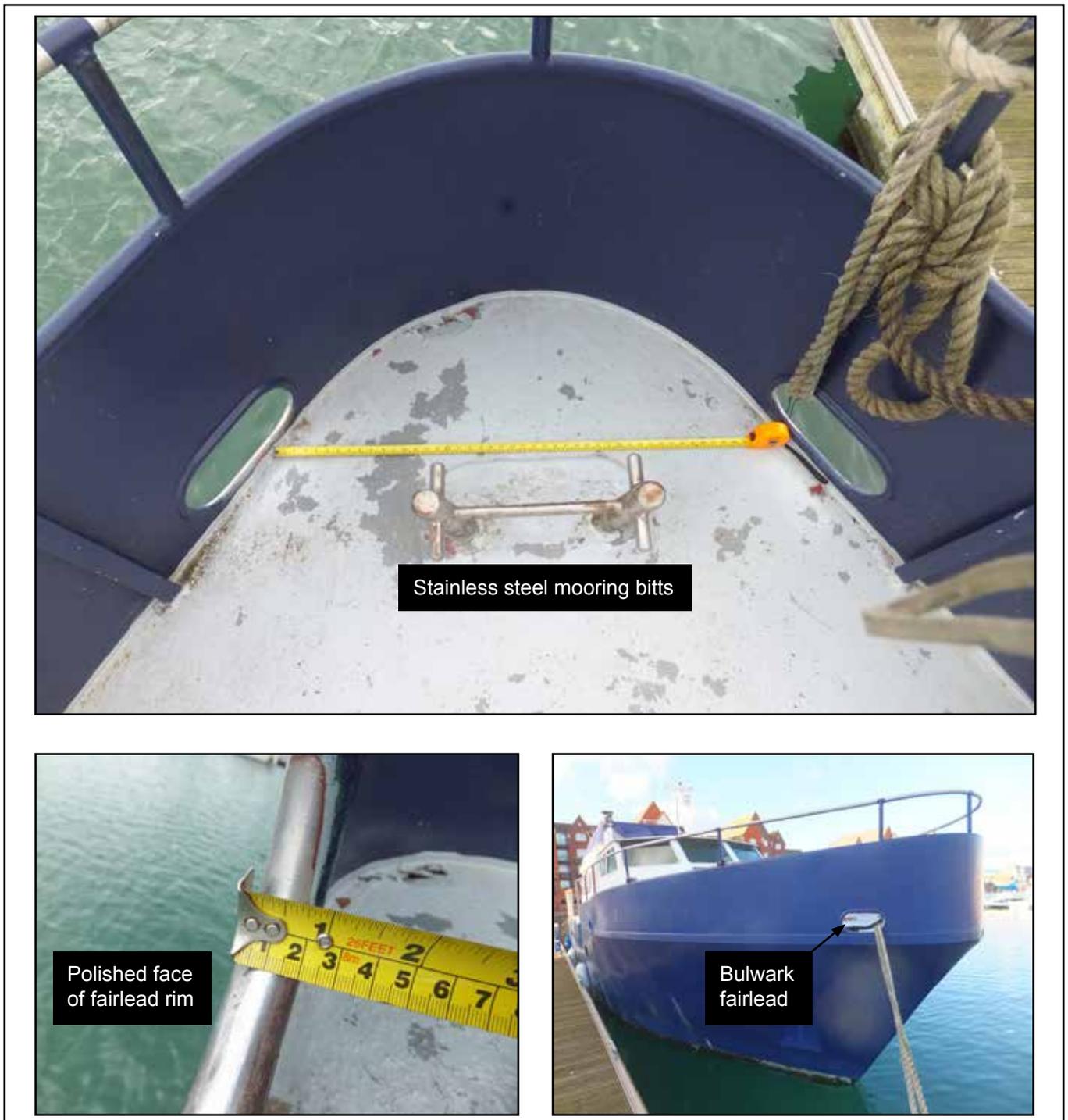


Figure 20: *Sirius M*'s foredeck layout

Sirius M had recently been sold and was being delivered to Brighton on behalf of the vendor as part of the sales agreement. Thames and Medway Marine Services Ltd was offered the opportunity to undertake the tow on 1 February 2013.

Sirius M was fitted with navigation lights appropriate for its length, but the lamps were removed from the vessel's side navigation lights by *Endurance's* skipper before the motor cruiser was moved from Rochester (**Figure 21**). When *Sirius M* was towed down the River Medway, only its stern light was illuminated (**Figure 4**).

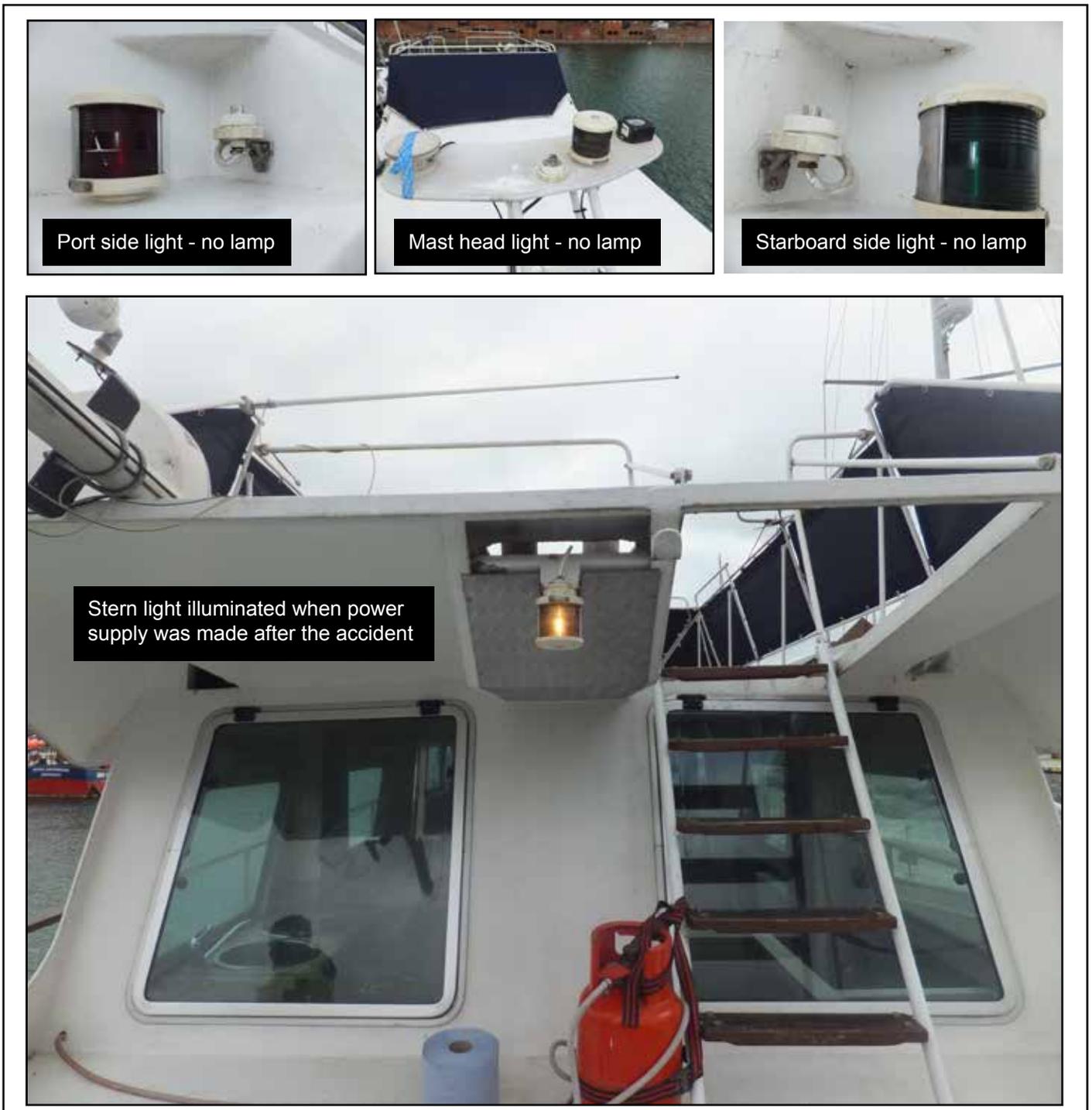


Figure 21: *Sirius M's* navigation lights

1.4.3 Towing arrangements

Endurance's skipper intended to rig a towing bridle¹⁶ to the bow of *Sirius M* for the tow to Brighton. However, after assessing the foredeck arrangement when he arrived on board the vessel at Medway Marina, he decided against this option. Instead, a towing eye was formed on the motor cruiser's bow using a 50mm diameter 8-strand polypropylene rope as shown at **Figure 22**. The bight of the towline was made fast to *Endurance's* towing post, leaving approximately 18m of rope between the vessels. The towline used was the largest diameter rope carried on board *Endurance*.

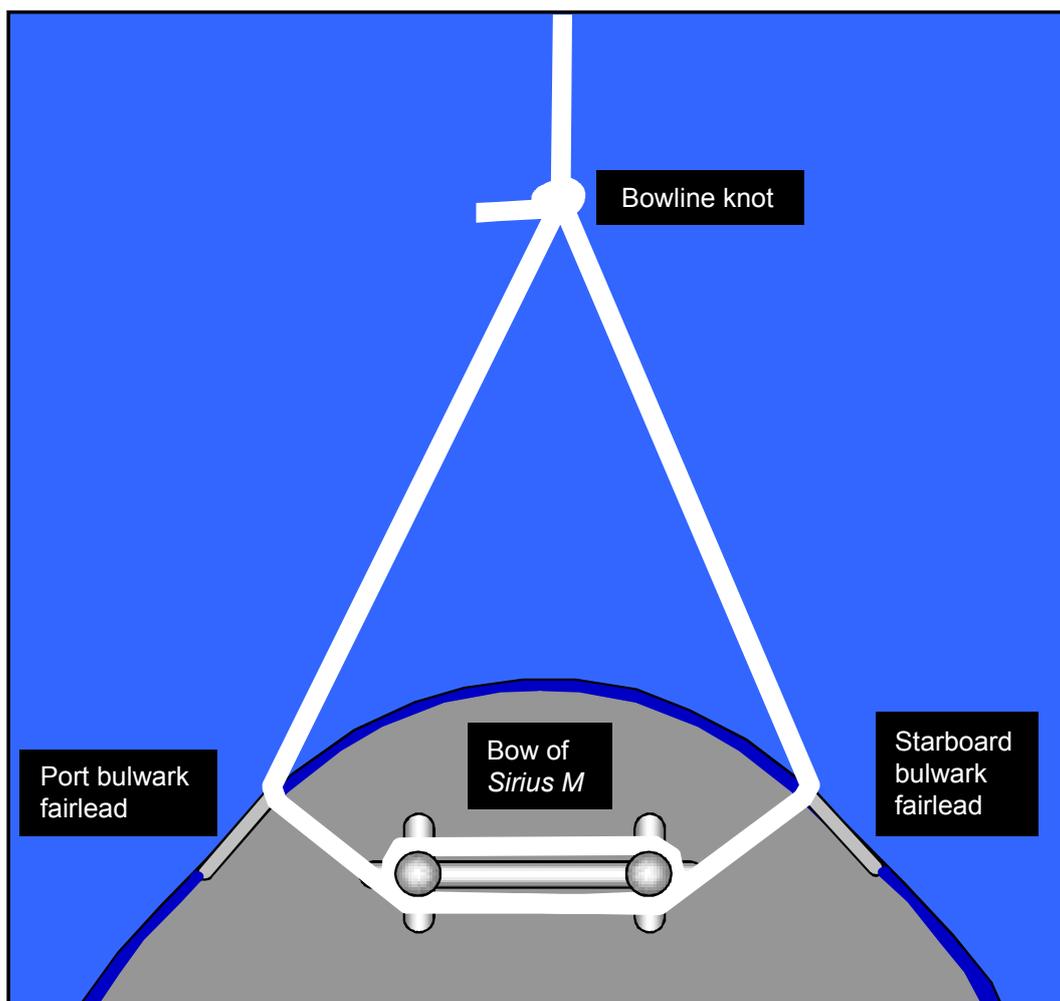


Figure 22: Towline securing arrangement

1.5 CREW

1.5.1 The skipper

Endurance's skipper was a UK national and was 37 years old. He had operated *Endurance* as a motor tug for almost 2 years, during which he had employed several different crew members and had carried out a variety of towing and pushing tasks on the River Medway, the River Thames and out to sea.

¹⁶ Towing bridle – a length(s) of wire, chain or rope for passing around a piece of a ship's structure to the ends of which the towline may be connected.

The skipper held a Tier 1 Level 2 boatmasters' licence (BML) with a 'radar' endorsement and a local knowledge endorsement for the River Thames¹⁷. He had completed navigation, radar, first-aid, fire awareness, oil spill response, and personal sea survival techniques training courses. The skipper last attended a sea survival course on 25 January 2013.

The skipper also worked full-time as a general duties deckhand with the PLA. He had been a general duties deckhand for 5 1/2 years and he typically worked 40 hours per week in 10 hour shifts. Between 1 and 3 February 2013, the skipper worked as a deckhand during the 1600 to 0200 shift. At 0015 on 3 February 2013, the PLA launch on which *Endurance's* skipper had been working, berthed in Gravesend. The skipper left the launch at about 0145 and went home. He was next due back at work with the PLA on 7 February 2013. He also had a medical appointment in London on the same day.

Before his employment with the PLA, the skipper had completed an engineering apprenticeship and undertook various jobs including working in boatyards, driving commercial goods vehicles and maintaining farm machinery.

1.5.2 The crewman

Steven Trice was a 55 year old UK national and a freeman of the River Medway; he came from a family of Medway Lightermen and had worked as a Medway Lighterman¹⁸. Steven was a self-employed mechanical engineer by trade and had carried out work on *Endurance* during its conversion and refit periods. Steven was *Endurance's* skipper's preferred crewman, and he had worked on board in this role many times. Steven had not completed any formal navigation, seamanship, maritime safety or sea survival training courses.

Steven was concerned about the weather conditions forecasted for the tow of *Sirius M* and borrowed an insulated flotation suit (**Figure 23**) from a relative. He also took dry biscuits on board with him because he was worried about becoming sea sick. Steven was less confident steering *Endurance* with *Sirius M* under tow so the skipper took the helm for the majority of the passage.

1.5.3 Use of lifejackets

Endurance's skipper was required to wear a self-inflating lifejacket at all times when working on board PLA vessels. However, neither he nor his crewman usually wore lifejackets or other personal flotation devices (PFD)¹⁹ on board *Endurance*.

1.6 LICENSING AND CERTIFICATION

1.6.1 Inland waterways operations

On 10 July 2009, a PLA surveyor conducted a pre-licensing inspection of *Endurance*. His report noted that the vessel was to be operated between *Teddington and the sea reaches, and round to and on the River Medway*. It also noted that the vessel was expected to tow standard Thames lighter barges. The report listed the

¹⁷See paragraph 1.9.

¹⁸Lighterman – a crewman who loads and discharges cargoes on lighter barges.

¹⁹PFDs are divided into two main types: those that support the wearer face-up in the water in all conditions (lifejackets); and those which require the wearer to make swimming and other postural movements to keep their face out of the water (buoyancy aids).



Figure 23: Flotation suit taken on board *Endurance* by Steven

remedial works the tug's owner needed to carry out and the additional equipment he needed to provide before a licence would be issued. These included a requirement to have stability and hydrodynamic calculations carried out and the fitting of guardrails to a height of 1m from the deck.

Almost 2 years later, *Endurance*'s skipper applied to Medway Ports for a licence to operate his vessel as a tug within its port limits. On his application for the licence, the skipper stated that he had 20 years of experience on the River Medway and the River Thames. The licence (**Annex A**) was subsequently issued on 1 April 2011.

On 16 August 2011, a PLA surveyor inspected *Endurance* to assess the vessel's fitness for purpose as a motor tug. Many of the items listed on the 2009 pre-licensing inspection report had been addressed, but no stability calculations had been completed and no guardrails had been fitted. The inspection report dated 16 September 2011 (**Annex B**) listed the remedial works and the additional equipment required prior to a licence being issued. The list of remedial works did not include the PLA's earlier requirement to provide stability calculations and guardrails.

On 28 December 2011, the PLA surveyor returned on board *Endurance* and was satisfied that all the remedial items during the previous visit had been addressed. At the skipper's request, the surveyor also assessed *Endurance*'s suitability to carry passengers.

Following the inspection, the PLA issued a licence which allowed the skipper to operate *Endurance* as a motor tug within its Category C²⁰ and Category D²¹ waters. It also provided a list of further remedial items that needed to be addressed before a passenger boat licence could be issued. These included:

- the completion of a heel test in accordance with Maritime and Coastguard Agency (MCA) guidelines²²
- the fitting of a secondary steering system for use in an emergency
- the implementation of a requirement for lifejackets to be worn at all times by all persons on deck
- the development of a safety management system.

A heel test was subsequently conducted on the vessel at Cuxton Marina on 17 January 2012 by an independent surveyor. However, *Endurance*'s skipper decided not to continue with his application to the PLA for approval to operate *Endurance* as a passenger vessel.

1.6.2 Seagoing voyages

During the heel test on 17 January 2012, *Endurance*'s skipper instructed the attending surveyor, who was registered as an authorised person with the IIMS certifying authority (CA), to examine the vessel with a view to certifying *Endurance* to operate at sea as a passenger carrying workboat. Accordingly, the surveyor examined *Endurance* against the requirements of the Small Commercial Vessel and

²⁰ Category C waters - tidal rivers, estuaries and large, deep lakes and lochs where the significant wave height could not be expected to exceed 1.2m at any time.

²¹ Category D waters - tidal rivers and estuaries where the significant wave height could not be expected to exceed 2m at any time.

²² For details see **paragraph 1.13.1**

Pilot Boat (SCV) Code²³. As part of the certification process, the CA surveyor also conducted an out of water inspection of the vessel at Denton Wharf, Gravesend during April 2012 (**Figure 16**).

On 2 August 2012, the surveyor submitted a completed *Application for Examination* form (SCV1) (**Annex C**), a *Compliance Examination and Declaration* report form (SCV2) (**Annex D**) and the heel test report (**Annex E**) to the IIMS CA committee for scrutiny. The paperwork forwarded to IIMS contained many clerical errors and factual discrepancies, including:

- The SCV1 and SCV2 forms and the heel test report were dated 28 June 2012.
- The owner's declarations on the SCV1 and SCV2 forms had not been signed by the owner.
- The initial vessel examination and out of water survey were incorrectly recorded as having been carried out in Newhaven and Cuxton respectively.
- The minimum required freeboard detailed on the SCV2 form was not correct for the vessel's length overall (LOA), and the freeboard measurements did not match the measurements recorded on the surveyor's heel test report.
- The name of *Endurance's* owner detailed on the SCV2 form was incorrect.

The surveyor later re-submitted a revised SCV2 declaration sheet which corrected the location of the vessel examination and also added:

Code Section 22.2.3.4 Bulwarks with an aft railing to transom 600 will impede operation as a buoy layer and service. All passengers and crew to wear harnesses when on deck. [sic]

Again, the name of the vessel owner was incorrect and the owner did not sign the declaration.

The paperwork submitted by the surveyor was scrutinised by IIMS but was not challenged. On 31 August 2012, the CA certified *Endurance* to be operated commercially and carry a maximum of eight passengers out to sea up to area category 2²⁴ with the following restrictions:

- to only operate the vessel in favourable weather²⁵
- to carry no more than 3 persons on board when working at sea for over 24 hours.

²³ The SCV Code was published in 2004 by the MCA as an annex to Marine Guidance Note (MGN) 280 (M): *Small Vessels in Commercial Use for Sport or Pleasure, Workboats and Pilot Boats – Alternative Construction Standards*. The SCV Code (frequently referred to as the 'harmonised SCV Code') was intended to supersede the existing codes of practice (Blue – Small Commercial Sailing Vessels, Yellow – Small Commercial Motor Vessels, Brown – Small Workboats and Pilot Boats, and Red – Small Vessels in Commercial use for Sport or Pleasure Operating from a Nominated Point of Departure). The SCV Code has not yet been enabled but it is accepted as an equivalent alternative standard to the existing codes of practice.

²⁴ Area category 2 – up to 60 miles from a safe haven.

²⁵ Definition of favourable weather given in MGN 280(M) - *wind, sea and visibility conditions which are deemed by the skipper to be safe for a small vessel to operate within the limits applied to it; or, in any other case means conditions existing throughout a voyage or excursion in which the effects either individually or in combination of swell, height of waves, strength of wind and visibility cause no hazard to the safety of the vessel, including handling ability.*

On 7 December 2012, *Endurance's* skipper submitted his annual self-certification survey report to the PLA in accordance with its licensing requirements. In the comments section of his survey report, the owner advised the PLA that *Endurance* had completed a heel test and was now coded as a *Category 2 SCV and could carry 10 passengers*.

1.7 POST-ACCIDENT SURVEYS AND INSPECTIONS

1.7.1 Towing arrangement

Examination of the parted towline indicated that the rope was old and in poor condition. MAIB inspectors reconstructed the towing eye in situ (**Figure 24**), and it was evident that the rope had parted at a point where it had been in contact with the steel rim of one of the motor cruiser's fairleads. The rope was also damaged where it had been in contact with the other fairlead (**Figure 25**). Paint on the forward edge of both fairleads had been removed and the base steel had a freshly polished

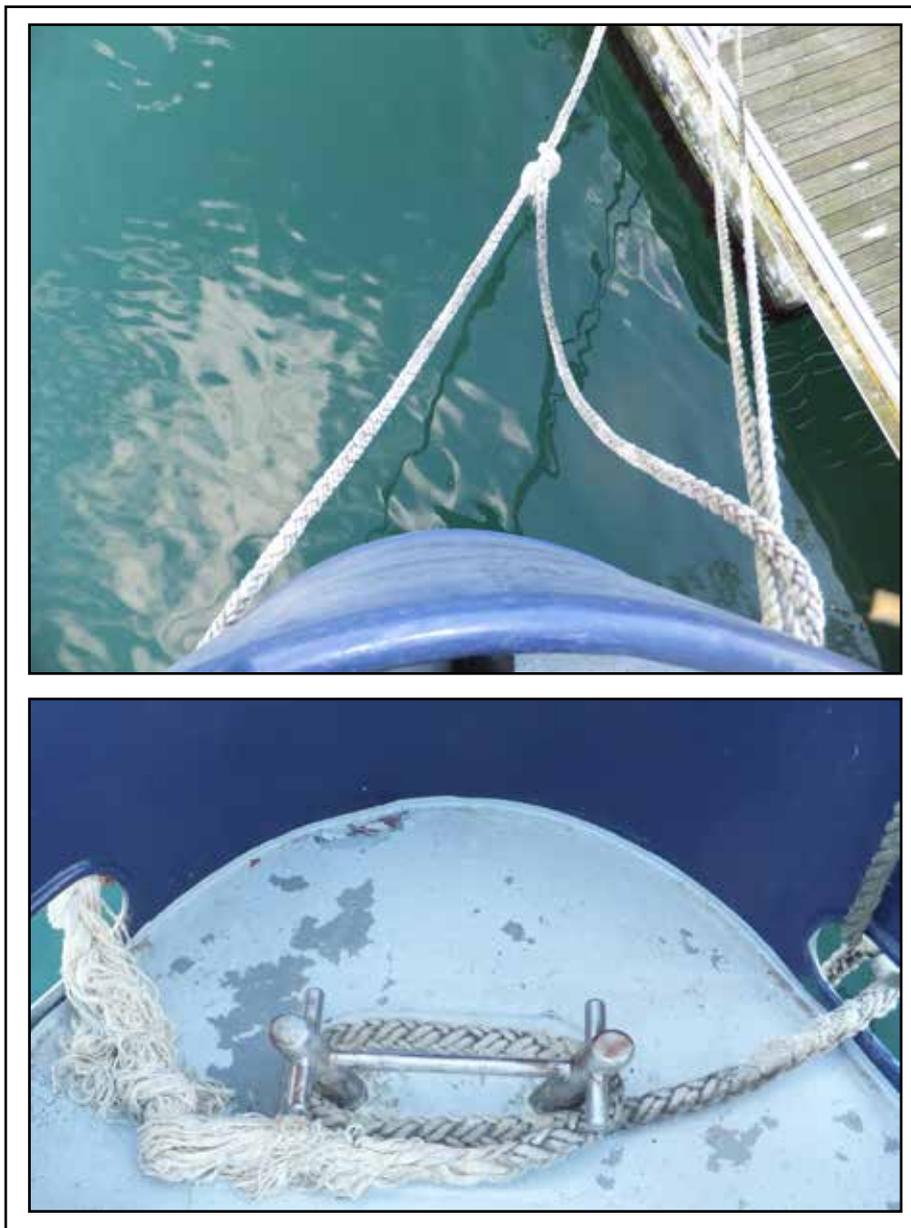


Figure 24: Tow rope securing arrangement reconstructed on *Sirius M's* foredeck



Figure 25: Tow rope chafe marks and frayed ends, and fraying at the bowline knot used to form the towing eye

appearance. Blue paint could be seen on the rope in the areas where it had rubbed against the steel rim of the fairleads. It was also noted that the length of rope within and around the bowline had started to fray and wear.

1.7.2 Maritime and Coastguard Agency

On 6 February 2013, the MCA inspected *Endurance* in Eastbourne. During the inspection, the MCA surveyor identified 12 deficiencies, including:

- the skipper's BML was not an adequate qualification for the voyage undertaken

- no safety harnesses were carried on board (minimum of 2 required)
- no paper charts or almanacs for the passage were carried on board
- no man overboard recovery ladder or net were carried on board
- the liferaft was overdue for service
- the engine room bilge alarm was not working.

The MCA surveyor also identified that the VHF radio's DSC unit was not connected to the GPS. The MCA informed the IIMS of the accident and of the findings of its inspection. As a result, the IIMS suspended *Endurance* from its CA Register.

1.7.3 International Institute of Marine Surveying

On 13 February 2013, *Endurance* was inspected by IIMS surveyors to assess the vessel's compliance with the SCV Code. The inspection established that, apart from the inadequacy of the skipper's qualification for the voyage undertaken, the deficiencies identified during the MCA's general inspection had been rectified. It also identified a number of other significant deficiencies, including:

- The emergency steering could only be accessed through the flush deck watertight hatch aft of the main weather deck winch (**Figure 26**).
- The hydraulic steering system had not been fitted with a bypass valve and therefore could not be operated manually in an emergency.
- No jackstays had been provided for use with safety harnesses.
- Radio procedures cards had not been provided.

A review by IIMS of the heel test report submitted in 2012 also identified several anomalies. In particular, the freeboard measurements were unusually uniform and the minimum required freeboard had not been calculated. Consequently, the IIMS surveyors concluded that *Endurance* should not have passed the simplified stability assessment.

1.7.4 Heel test and freeboard measurement

On 29 April 2013, *Endurance* was subjected to a further heel test and freeboard measurement. This was undertaken by an independent surveyor at the request of the surveyor who conducted the initial stability assessment in January 2012. The resulting test report concluded that *Endurance* did not have the freeboard required by the SCV Code to operate at sea.

1.8 MOTOR TUG LICENSING REQUIREMENTS

Tugs operating within the PLA's harbour limits are licensed by its licensing department, which is capable of conducting its own vessel surveys and inspections. Vessels surveyed and subsequently licensed to operate as motor tugs by the

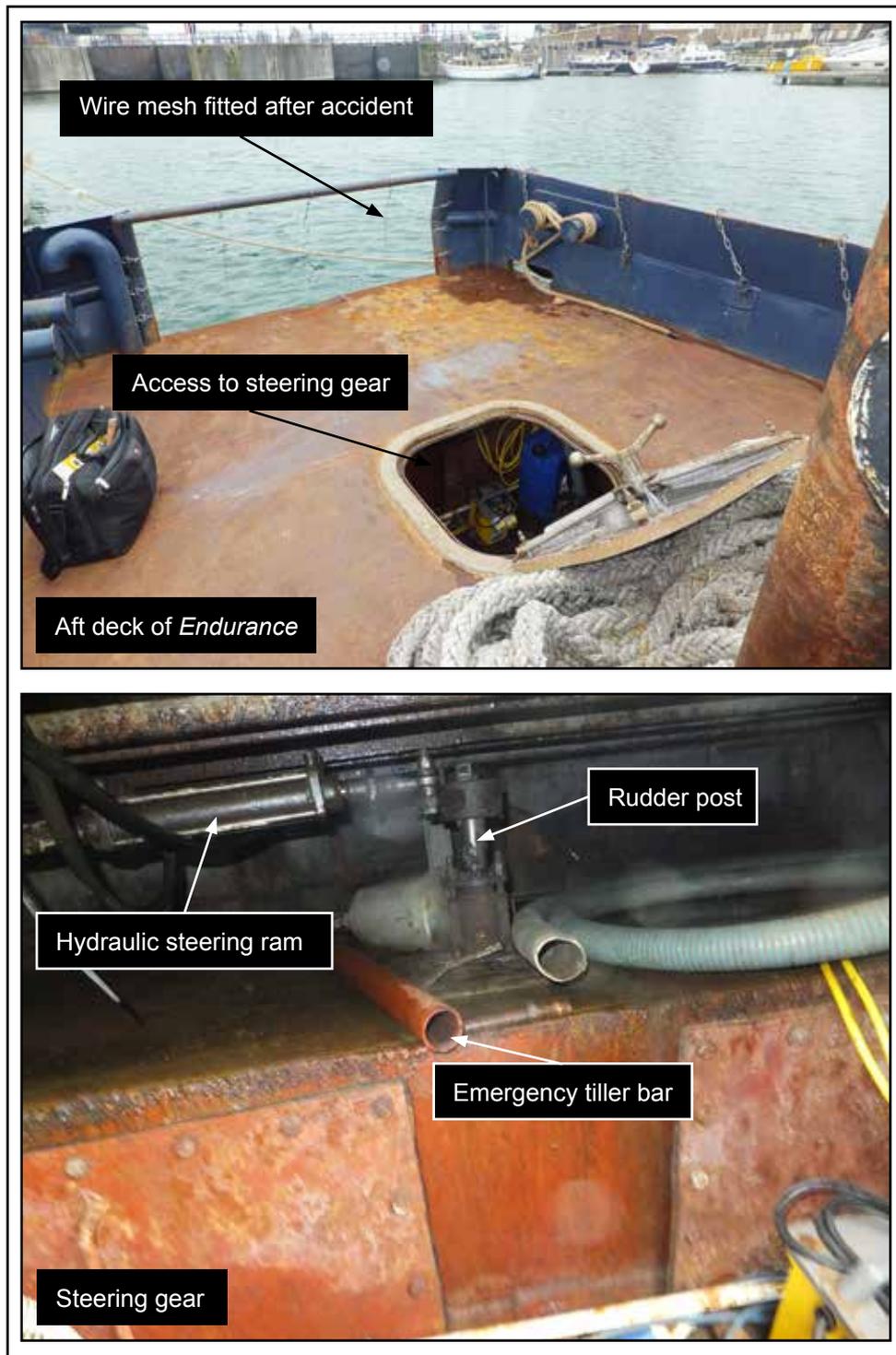


Figure 26: *Endurance's* steering gear arrangement

PLA are generally accepted and licensed by Medway Ports for operation on the River Medway without additional inspection, following the payment of a small administration charge.

The terms and conditions set out in Medway Port's tug licence (**Annex A**) require owners (or managers) to ensure that their vessels are:

- manned by a competent master and crew

- properly constructed, equipped and maintained
- classified by Lloyd's Register of Shipping or such other body approved by the port authority
- suitably insured for all aspects of its towing operations.

Medway Ports does not survey or inspect a vessel prior to a licence being issued but its staff have the powers to board vessels in order to verify compliance with the conditions set out on the licence. If an owner fails to comply fully, the port authority reserves the right to revoke the licence in whole or in part.

1.9 BOATMASTERS' LICENCE

1.9.1 General requirements

A BML is issued in accordance with requirements set out in the Merchant Shipping (Inland Waterways and Limited Coastal Operations) (Boatmasters' Qualifications and Hours of Work) Regulations 2006. Information on the structure of the BML and the requirements set out in the regulations is detailed in Merchant Shipping Notice (MSN) 1808(M).

The BML has two tiers: Tier 1 and Tier 2. The Tier 1 BML is a national licence which is transferable between different areas subject to local knowledge requirements. The Tier 2 BML is a local, operation-specific, qualification that restricts the holder to the waters and operation specified on the licence.

The Tier 1 BML has two levels. Level 1 is valid for Category A and B and non-linked Category C waters. Level 2 allows the holder to operate vessels anywhere within the UK's inland waterways and within limited coastal areas²⁶.

The Tier 1 BML has a modular structure comprising:

- a main generic section (for all candidates)
- ancillary safety training (for all candidates)
- specialist endorsements (for the types of vessel or operation on which the candidate will be working)
- a local knowledge endorsement (for operations in specified areas only).

1.9.2 Generic competencies and ancillary safety training

The generic licence covers the core competencies and the boatmanship skills needed for operating in the relevant water categories. On its own, the generic licence is considered by the MCA to be a suitable qualification for operating workboats and vessels carrying up to 12 passengers.

²⁶ Inland waterways means Categorised Waters A, B, C and D as defined and listed in MSN 1776, as amended; and any non-categorised inland waters. Limited coastal areas means no more than 3 miles from land and no more than 15 miles from point of departure.

The ancillary safety training comprises three basic safety courses: personal sea survival, first-aid and fire safety, and is an integral part of the competency requirements for the BML.

1.9.3 Specialist endorsements

A specialist endorsement is an additional requirement for BML holders that is intended for skippers on vessels engaged in certain types of operation. The specialist endorsements available are *cargo – general, oil cargoes, dredging, towing and pushing, passenger operations – general, large passenger vessel, fast craft and radar*.

The towing and pushing endorsement syllabus comprises four sections:

1. Preparation for towing/pushing – includes towing and pushing practices and techniques, the effects of wind and tide on the tow, and documentary requirements such as towage approval certificates and preparations such as a passage plan.
2. Securing and letting go of a tow – includes inspection of towage equipment prior to departure, use of emergency towlines, connecting and disconnecting a tow while underway, and ranging and caring of the towline during a voyage.
3. Manoeuvring and managing a tug and tow – includes methods for checking the tow rope for chafe, the monitoring of weather forecasts and the use and checking of appropriate towing/pushing lights.
4. Hazard identification and safety issues – includes awareness of snatching, the methods used for reducing the risk of snatching, and the rigging of an emergency tow outside of handrails.

1.9.4 Local knowledge endorsements

Local knowledge is defined in MSN 1808(M) as *knowledge of the features and characteristics within an area that present a hazard to safe navigation, and how to deal with them, beyond what might be expected under the BML generic skills*.

The areas for which local knowledge endorsements are required are listed in Marine Guidance Note (MGN) 334(M)²⁷ and include the tidal River Thames between Putney Bridge and the eastern limit of the Thames Barrier Control Zone, and Dover. A local knowledge endorsement is not required for the River Medway.

1.10 VOLUNTARY TOWAGE ENDORSEMENT SCHEME

There is no requirement for skippers of small commercial vessels engaged in towage operations at sea to hold a towing and pushing endorsement. In April 2013, the MCA, in collaboration with the UK towage and workboat industry, introduced a voluntary towage endorsement scheme which is intended to help ensure that masters and skippers engaged in towage operations have the necessary skills. The details of the voluntary scheme are contained in MGN 468 (M)²⁸.

²⁷ MGN 334(M) – *New National Boatmasters' Licence – Local Information and Local Knowledge*

²⁸ MGN 468 (M) – *Voluntary Towage and Endorsement Scheme*

The scheme comprises three types of towage endorsements:

- General towage endorsement – towing and pushing in categorised waters or in limited coastal areas.
- Ship assist towage endorsement – assisting with the berthing and un-berthing of vessels.
- Sea towage endorsement – towage of vessels or floating objects at sea.

These voluntary endorsements are intended to be used in conjunction with an appropriate Certificate of Competency (CoC). The scheme's examination syllabus and experience requirements for the *general towage endorsement* are similar to those of the BML towing and pushing endorsement and are accepted as an equivalent competence standard.

The sea towage endorsement is a higher standard than the BML endorsement and requires tug masters and workboat skippers holding general towage endorsements to complete a further 180 days' service in vessels engaged in sea towage (undertaking a minimum of 12 separate sea towage operations) before applying to sit an oral examination.

1.11 TOWAGE GUIDELINES

Under the specific duties listed in the Port Marine Safety Code (PMSC), UK port authorities are required to provide appropriate guidance on the use of harbour tugs. The PLA has published codes of practice for both ship towage operations and craft towage operations²⁹. The PLA's *Code of Practice for Craft Towage Operations on the Thames 2011* (Craft Towage Code) sets out the tug masters' responsibilities and provides guidance on navigational safety and best practice during towing and pushing operations. Due to the hazardous nature of towing and pushing craft on the tidal River Thames, the Craft Towage Code requires tug masters to ensure that:

- Risk assessments are completed and applied before engaging in towage operations.
- All crew are fit, have the correct personal protective equipment (PPE) and have been correctly trained for the tasks to be carried out.
- Towing gear is in good condition and prepared for use.

The Craft Towage Code also reminded vessel owners of their duty to ensure that vessel masters are appropriately qualified and hold the relevant endorsements, particularly a towing and pushing endorsement.

A paper copy of the PLA's Craft Towage Code was carried on board *Endurance*. At the time of the accident, Medway Ports had not issued towage guidelines.

²⁹ For the purpose of its towage guidance, the PLA considers craft to be dumb barges, pontoons and other similar floating objects.

1.12 LOAD LINE EXEMPTION CERTIFICATES

All vessels or floating objects that are going to be towed to sea from the UK are required to be surveyed and issued an appropriate load line (or load line exemption³⁰) certificate for the intended voyage. The survey covers the watertight integrity of the vessel to be towed and the towing arrangements. The voyage plan might also be reviewed.

A load line exemption certificate is usually issued for a single voyage and it documents the conditions under which the tow may be carried out. The generic conditions applied to load line exemption certificates issued by the MCA include:

- The watertight integrity of the towed vessel is to be checked before departure.
- The voyage is to be undertaken in stages, if necessary, and only when weather conditions and official weather forecasts are favourable.
- The towing vessel is to be under the command of a suitably qualified master.
- Towing lights and shapes are to be in accordance with the requirements set out in the International Collision Regulations (COLREGS).
- The towing vessel is to be certified for the intended tow.

The MCA typically also issues a covering letter with its load line exemption certificates giving its definition of favourable weather and examples of sources where masters could obtain official weather forecasts. For towage operations, the MCA defines favourable weather as:

Fine, clear, settled weather with a sea state such as to cause moderate rolling and/or pitching.

The MCA was not made aware of the intended towage of *Sirius M* by *Endurance* from Rochester to Brighton. Therefore, *Sirius M* was not surveyed and a load line exemption certificate was not issued.

1.13 REQUIREMENTS OF THE SCV CODE

1.13.1 Vessel examination and certification process

To operate commercially under the SCV Code a vessel must be certified by the MCA or an MCA approved CA. Details of the CAs approved by the MCA are listed in Marine Information Note (MIN) 456 (M)³¹ and include the PLA and the IIMS. The vessel examination and certification process is detailed in Section 27.2 of the SCV Code – Requirements and Procedures for Vessels to be Examined and Certified.

Owners (or managing agents) wanting to operate their vessels commercially under the SCV Code must first obtain an SCV1 form from a CA. Once the form has been completed, the owner must return the form to the CA and then agree a date for the vessel to be examined by one of the CA's authorised persons (surveyors).

³⁰ MCA load line exemption certificates are issued under the provisions of the International Convention on Load Lines, 1966, as modified by the Protocol of 1988.

³¹ MIN 456 (M) – *Codes of Practice – Authorisation of Certifying Authorities*

The CA's authorised person (surveyor) is required to examine a vessel, its machinery, fittings and equipment and ascertain compliance with the requirements of the SCV Code. Part of the examination has to be conducted with the vessel out of the water, and the vessel's arrangements, fittings and equipment have to be documented on an SCV2 form. If the vessel is compliant with the SCV Code, the authorised person and the vessel owner must sign their respective declarations at the end of the SCV2 form. The authorised person (surveyor) then forwards the completed SCV2 form and any additional stability documentation, to the CA, providing copies to the vessel owner.

The CA is required to scrutinise the SCV 2 and any associated documentation. If the paperwork is satisfactory a certificate may be issued. The certificates are valid for not more than 5 years from the date when a vessel is examined out of the water.

1.13.2 Stability

The stability requirements for small vessels operating commercially out to sea are detailed in Section 11 of the SCV Code. The standard of stability to be achieved is dependent on the maximum number of persons permitted to be carried and the intended area of operation. Vessels that are to be operated at distances greater than 60 miles from a safe haven, or tow objects greater than twice their displacement, are required to be provided with a stability information booklet. A simplified stability assessment is sufficient for vessels which are to be operated in area category 2 and towing objects less than twice their displacement.

The simplified stability assessment provided in the SCV Code involves a heel test and freeboard assessment. The aim of the test is to determine a vessel's angle of heel when fully loaded, with the intended number of persons to be carried assembled along one side of the vessel (the helmsman is assumed to be at the helm). For the purpose of the test, a mass of 75kg is used to represent each person. A vessel is judged to have an acceptable standard of stability if:

1. the angle of heel does not exceed 7°; and
2. the freeboard to deck is not less than 75mm at any point.

1.13.3 Protection of personnel

Section 22.2 of the SCV Code details the measures required to protect persons from falling overboard. In general, bulwarks, guardrails or handrails at a height of not less than 1000mm above deck have to be provided. However, in circumstances when such measures would impede the proper working of the vessel, alternative safety controls may be considered.

Where bulwarks or guardrails are not provided, or do not meet the requirements set out in the code, jackstays (fixed or portable) should be secured to strong points on each side of the vessel to enable crew members wearing safety harnesses to traverse the length of the weather deck in bad weather. In addition, motor vessels with guardrails lower than the required height may be accepted if the areas affected are restricted to crew use only and alternative arrangements have been provided for their protection.

1.13.4 Qualifications

In category 2 waters, skippers of small commercial vessels are required to hold either a *Yachtmaster Ocean* or *Yachtmaster Offshore* CoC, with a commercial endorsement.

1.13.5 Towing arrangements

The towing arrangements required in Section 25 of the SCV Code are:

25.2.2.1 The design of towing gear should minimise the overturning moment due to the lead of the towline.

25.2.2.2 The towing hook or towline should have a positive means of release which can be relied upon to function correctly under all operating conditions.

25.2.2.3 The towing hook (or equivalent fitting) and the supporting structure should be strong enough to withstand loads imposed during towing operations.

25.2.2.4 The release mechanism should be controlled from all conning positions and at the hook itself. The local control at the hook should be of the direct mechanical type capable of independent operation.

25.2.2.5 Towing arrangements should be appropriate to the task in hand and maintained to ensure that they are in an efficient working condition.

In order to allow the towing master to recognise any changes in the condition of his tow, the SCV Code also requires the towed vessel to be marked at its forward end with one or more white bars (**Figure 27**).

1.14 THE INTERNATIONAL INSTITUTE OF MARINE SURVEYING

The IIMS was formed in London in 1991 as an independent, non-political organisation, the membership of which was open to qualified mariners, marine surveyors and other marine consultants from any country in the world. The institute provides a forum for its members to advance their knowledge and professional status. In 1998 IIMS was approved by the MCA as a CA and currently has over 1,200 members in 98 countries.

To be appointed as a CA surveyor, IIMS members must meet certain professional criteria, follow an assessment process and then be approved by the institute's CA committee. In addition to being tasked by the IIMS to conduct SCV Code examinations, the institute's authorised persons (surveyors) often liaise directly with vessel owners to source such work for themselves.

The surveyor who examined *Endurance* in 2012 had completed the IIMS diploma course and had been on the institute's CA register as an authorised person for 7 years. He was also chairman of the IIMS' small craft surveying group and was a member of its executive board.

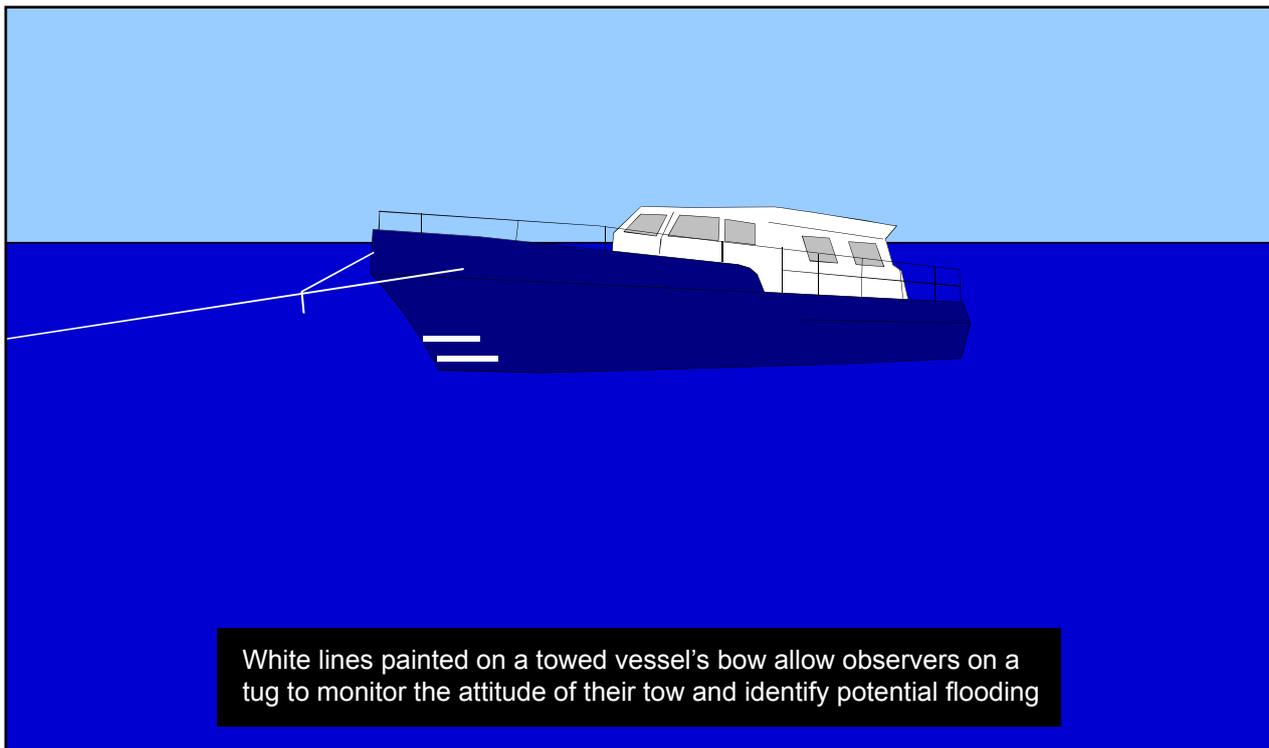


Figure 27: Example of the bow markings recommended in the SCV Code for unmanned towed vessels

1.15 NAVIGATION

1.15.1 Passage planning

The PLA requires tug owners to provide generic port passage plans for their routine operations. It also requires them to submit detailed passage plans for all non-routine towage operations³². The PLA provides guidance on passage planning for tug owners and skippers in Section 3 of its Craft Towage Code. The guidance emphasises the need to take weather forecasts into account when formulating a passage plan, the importance of navigating with the tide and avoiding strong winds. The Code also refers owners to the requirements of the convention on the Safety of Life at Sea (SOLAS) with regard to passage planning³³.

Endurance's skipper had not produced any generic passage plans for his operations on the River Medway or the River Thames. He also had not produced a passage plan for the voyage from Rochester to Brighton.

1.15.2 Navigation lights

The requirements for navigation lights and shapes are set out in Part C of the COLREGS. In accordance with Regulation 24, *Endurance*, as a power-driven towing vessel, was required to show:

³² The PLA defines non-routine towage operations as - *Any towage operation involving or likely to include a combination of two or more towing / pushing vessels in an arrangement not previously risk assessed and reviewed by the Harbour Master.* [sic]

³³ IMO resolution A.893(21) - *Guidelines for Voyage Planning* details four key components necessary to ensure the effective planning and achievement of a safe passage, appraisal (the gathering of all information relevant to the intended voyage such as tidal and weather information, planning (from berth-to-berth), execution and monitoring.

- two masthead lights (one on top of the other);
- side lights;
- a stern light, and;
- a towing light vertically above the stern light.

Sirius M, as a vessel being towed, was required to show side lights and a stern light. The Thames Byelaws requires craft being towed on the river to show a white all round light at the stern rather than side lights and a stern light.

1.16 SAFE WORKING PRACTICES

1.16.1 General duties

In accordance with Regulation 5 of the Merchant Shipping and Fishing Vessels (Health and Safety at Work) Regulations 1997, an employer has a general duty to:

ensure the health and safety of workers and other persons so far as is reasonably practicable.

In order to fulfil its general duties, an employer is required to endeavour to:

- avoid or minimise risks
- evaluate unavoidable risks and take actions to minimise them
- adopt safe work patterns and procedures.

1.16.2 Personal protective equipment

The PLA's Craft Towage Code explains that owners are responsible for the provision of PPE³⁴ and that individual crew members have a responsibility to ensure that they have the appropriate PPE, and use it properly.

In circumstances where there is a foreseeable risk of crew falling overboard, the recognised PPE includes safety harnesses and lanyards, personal flotation devices (PFD) and thermally-insulated immersion suits.

The Craft Towage Code states that:

When on deck personnel involved in craft towage operations should:

- *Wear approved and in-date self-inflating lifejackets and other appropriate PPE (eg hard hat, safety footwear, hi visibility clothing etc) throughout the operation.[sic]*

³⁴ As required by The Merchant Shipping and Fishing Vessels Personal Protective Equipment Regulations 1999.

1.16.3 Hours of work and rest

Annex 3 to MGN 280 (M)³⁵ advises vessel operators of their responsibility to ensure that all vessels certificated under the SCV Code are sufficiently manned to avoid the need to work excessive hours. The guidance also explains that:

the skipper is responsible for ensuring, so far as is reasonably practicable, that he/she and all crew members are properly rested when they begin work and obtain adequate rest when not on duty. The minimum hours of rest for anyone employed on board should be not less than:

1. 10 hours in any 24-hour period; and
2. 77 hours in any seven day period.

1.16.4 Emergency preparedness

The PLA Craft Towage Code explains that a vessel's generic passage plan and associated safety management system should incorporate tried and tested procedures for dealing with onboard emergencies and unforeseen circumstances. Examples of such events given in the Code include parted towlines and man overboard.

1.17 PREVIOUS ACCIDENTS

At 1100 on 14 November 2012, *Endurance*, crewed by the skipper and Steven, was pushing a barge on the River Medway when the vessel entered a tidal race off Gashouse Point. The barge was carrying a digger (**Figure 28**) and a steel refuse skip that the owner had used to clear a wooden wreck. As the barge rolled heavily in the tidal race, the digger and skip slid off the barge into the river.

Medway Ports was made aware of the incident and the deputy harbourmaster attended the scene. *Endurance's* skipper was told to submit an incident report form to the port authority and to provide a recovery plan. Accordingly, the digger and skip were recovered by contractors on 22 November 2012. Despite being reminded by the port authority, the skipper did not submit a report form and the MAIB was not informed of the incident.

On 29 December 2012, *Endurance* was pushing a steel pontoon on the River Medway when the skipper was forced to beach the pontoon on the riverbank after the pontoon started taking on water. The skipper had rigged portable salvage pumps within the pontoon at the start of the passage but these proved insufficient to cope with the water ingress through the pontoon's corroded steel structure. Again, the port authority was made aware of the incident, but the skipper did not submit an incident report form and the MAIB was not informed.

On 7 March 2013, Medway Ports completed its investigations into the accidents in November and December 2012. It found that *Endurance's* skipper did not have any documented risk assessments, generic passage plans or safety procedures for his operations on the River Medway or the River Thames. As a result, the port authority suspended the skipper's authority to conduct towing operations on the River Medway. Medway Ports did not inform the PLA of its findings or of the action it had taken.

³⁵ MGN 280 (M) – Annex 3: The manning of small vessels - Section 2.9 Hours of work provisions.



Figure 28: *Endurance* pushing a barge carrying a mechanical digger

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

Steven Trice died because he fell into the sea while trying to transfer from *Endurance*'s foredeck to the deck of *Sirius M* and his skipper was unable to recover him back on board. Steven's attempt to transfer from *Endurance* to *Sirius M* when both vessels were underway in rough seas and in darkness was extraordinarily dangerous. It was a desperate and ill-considered measure brought about by the use of poor towing practices, a disregard of the weather forecasts, and a lack of planning, risk assessment and emergency preparedness. In addition, *Endurance* was not certificated to operate in the sea conditions experienced and the skipper was not qualified to undertake the coastal part of the intended voyage.

2.3 EMERGENCY RESPONSE

2.3.1 Attempted recovery of the tow

By the time *Endurance*'s skipper realised the towline had parted, *Sirius M* was no longer in sight. The vessel's stern light was probably not lit because it had either not been switched on when the vessels left Dover, or the battery supplying its power had run out of charge. In the darkness, the unlit and unmanned motor cruiser was a potential danger to other vessels. However, *Endurance*'s skipper did not alert the coastguard to the situation and request assistance.

This was a significant omission given that the skipper had not rigged an emergency towline. Therefore, he had no means of re-securing the tow other than physically taking a replacement towline across to *Sirius M*. Although *Endurance*'s skipper discussed the situation with Steven, it is clear from the motor tug's approach to *Sirius M*, and the failure to take any precautions, that neither of the men appreciated or considered the considerable risks involved.

Sirius M was lying beam-on to the wind and waves. In such situations it is usual practice for a rescue vessel to approach a disabled vessel by passing close by its bow or stern (crossing the 'T') to avoid the leeward danger zone (**Figure 29**). In this case, *Endurance* approached *Sirius M* on the drifting vessel's leeward side, aiming amidships (**Figure 9**). Heading into the wind and sea possibly made *Endurance* a more stable platform, and the motor cruiser's superstructure would have provided some shelter. Nonetheless, the risk of *Sirius M* being set towards *Endurance* when the vessels were close was significant and predictable.

In view of the danger caused by the relative movement of the vessels in the rough seas, the darkness, and the difficulty in carrying the towline, it is clear that Steven's transfer across to *Sirius M* should not have been attempted. This is endorsed by the fact that during the SAR the coxswain of the Eastbourne ALB would not transfer one

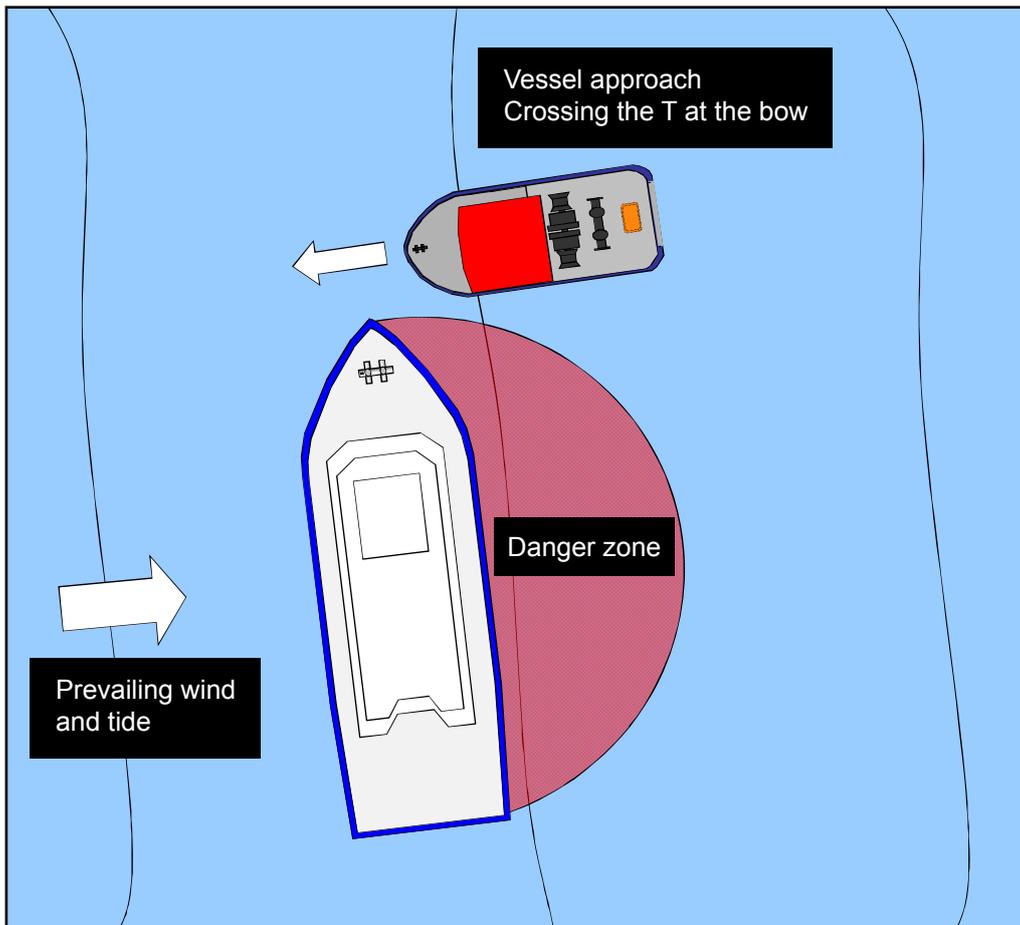


Figure 29: Crossing the 'T'

of his crew across to *Endurance* because it was not safe to do so. Given Steven's concern over the voyage, it is puzzling why he did not don his flotation suit and a lifejacket when faced with such a perilous task.

2.3.2 Man overboard and attempted recovery

It is not certain why Steven fell into the water. It is possible that he was impeded by the towline or that he misjudged the distance between the two vessels or their relative motions. Equally, he might have slipped or lost his grip on either vessel as he attempted to step or jump from one to the other.

The skipper's initial reaction of manoeuvring *Endurance* away from *Sirius M* when he realised that Steven had probably fallen into the sea, was positive. However, the skipper did not immediately alert the coastguard to the situation, which he could have easily done by pressing the DSC distress button before leaving the wheelhouse. He also did not throw a lifebuoy into the water, which might have assisted in the subsequent search.

In the rough sea conditions, the darkness and the continuing close proximity of *Sirius M*, it would have been virtually impossible for the skipper to recover Steven without assistance. Indeed, without a man overboard recovery device, it would have been difficult for the skipper to recover any person falling overboard from *Endurance* by himself, even in calm waters.

Initially, Steven was attached to the eye of the replacement towline, but the skipper had to divide his efforts between pulling him towards *Endurance* and avoiding *Sirius M*. As soon as Steven lost consciousness and slipped from the eye of the towline, the skipper had few options remaining; he was alone and had no means of recovering Steven back on board. It was only then that he alerted the coastguard to the man overboard and the lost tow.

Although the postmortem report was unable to establish the exact cause of Steven's death, it is most likely that he drowned. The sea temperature was less than 9°C and it is likely that Steven would have suffered from the effects of cold water shock to some degree³⁶. Survival times in rough seas without the support of a PFD or other buoyant object can typically be measured in minutes rather than hours. Steven's chances of survival were reduced considerably by him not wearing a lifejacket or his insulated flotation suit.

2.4 FATIGUE

Although the skipper and Steven had the opportunity to sleep well overnight in Dover, both men were likely to have been feeling tired as *Endurance* passed south of Beachy Head (**Figure 8**). By then, *Endurance* had been underway in heavy sea conditions for over 14 hours, and both of the men were sea sick. In addition, the skipper had spent about 32 of the previous 44 hours at the helm while the vessel was underway because Steven was not confident steering *Endurance* at sea while towing. Taking into consideration that the skipper had completed a near 10 hour shift as a deckhand on the River Thames only 2 hours before setting off from Cuxton Marina, his decision-making and behaviour were likely to have been affected by fatigue to some degree.

2.5 REGULATORY COMPLIANCE

Endurance was certified to operate as a motor tug on the River Medway and the River Thames by Medway Ports and the PLA respectively. The vessel was also certified, albeit erroneously, by the IIMS to operate under the SCV Code as a workboat up to 60 miles from a safe haven in favourable weather. As the sea state at the time of the accident was moderate to rough, with a 2m swell, the conditions were clearly outside the parameters of 'favourable weather' detailed in the SCV Code and the MCA requirements for towage operations. Indeed, during the SAR, the rolling was so severe that *Endurance's* skipper became concerned about losing the fuel supply to the main engine. The vessel should not have been at sea in such conditions.

In addition, *Endurance's* skipper's BML only allowed him to operate out to 3 miles from land and up to 15 miles from a point of departure. Therefore, he was not qualified to skipper his vessel during the intended passage between Dover and Brighton. Moreover, as the skipper had not added a 'towing and pushing' endorsement to his BML, he was not qualified to operate *Endurance* as a motor tug on the River Medway or the River Thames. He should also not have taken *Endurance* in and out of Dover without a local knowledge endorsement for the port.

³⁶ Cold water shock can occur following sudden immersion in water whose temperature is 15°C or below. The cold can paralyze muscles, cause muscle spasms, and a rise in heart rate and blood pressure resulting in a heart attack. The spasms and a gasp reflex can cause water to be ingested or for the breath to be held involuntarily.

2.6 TOWLINE FAILURE

It is clear from the recovered tow rope (**Figures 24 and 25**) that the rope parted due to chafe abrasion caused by the rubbing action of the rope against the steel rims of *Sirius M*'s bulwark fairleads. This undoubtedly occurred because the arrangements (**Figures 22 and 24**) did not follow good practice in safety-critical areas.

In particular, the towing eye arrangement had several potential chaffing points, but no chaffing protection devices were fitted. Towlines are particularly vulnerable to chafe abrasion, and potential chafe points must be identified and eliminated. When a chafe hazard cannot be avoided, it is common practice to use chafe protection devices such as chafe chains and chafe abrasion protection sleeves (**Figure 30**). Many seafarers also make their own chafe protection sleeves using materials such as plastic hoses, nylon rope, canvas sheets and leather.

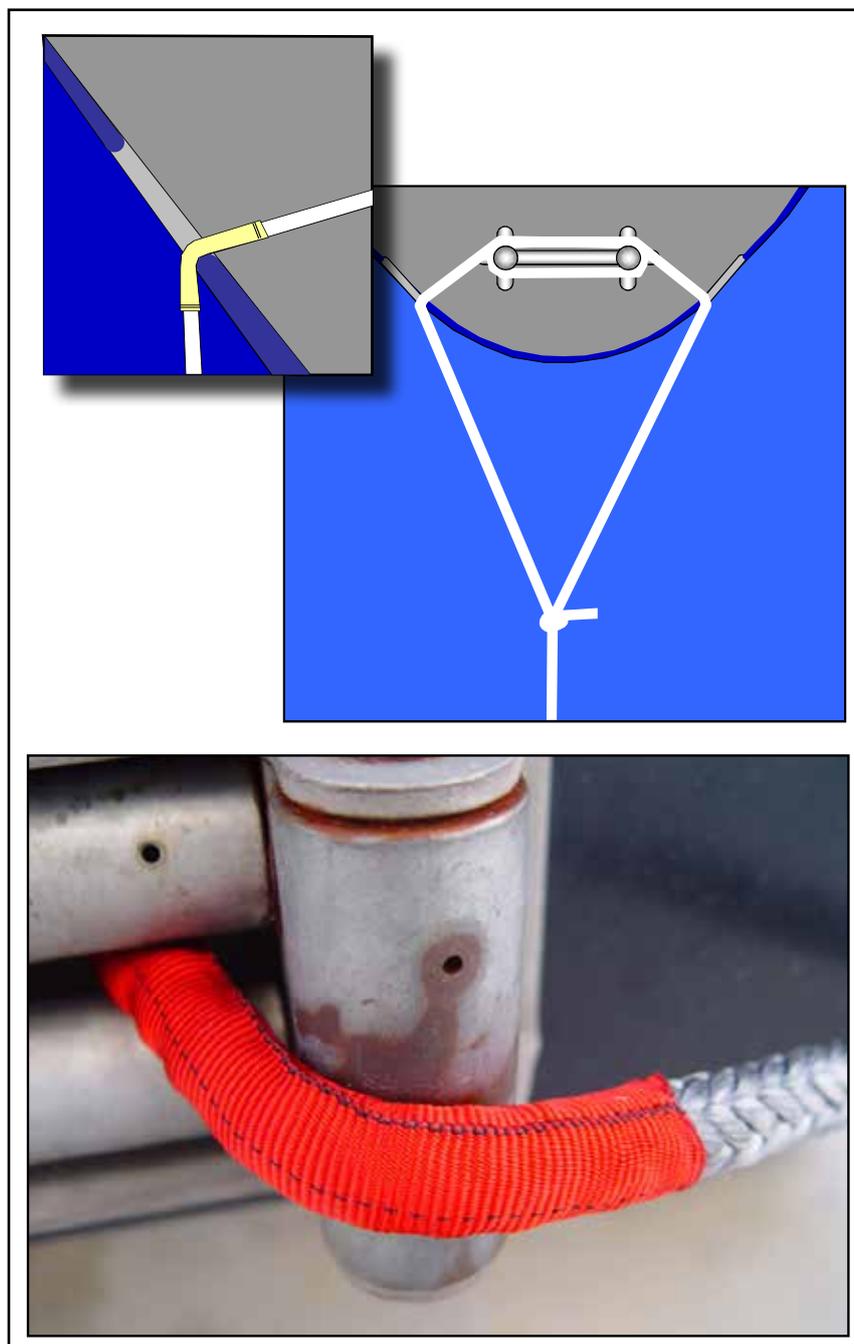


Figure 30: Chafe abrasion sleeves

In this case, the chafing would have been exacerbated by the snatching of the towline. The towline was less than 20m in length, which was insufficient to provide the catenary required for the towline to absorb the dynamic loading induced by the choppy seas (**Figure 7**). As *Sirius M* was not manned, *Endurance's* skipper had no way of monitoring the condition of the towline when the vessels were underway. The towline was possibly in a reasonable condition when inspected by the skipper in Dover. However, it is likely to have deteriorated quickly in the worsening conditions experienced during the evening of 4 February.

The use of a bowline knot to form the towing eye at the bow of *Sirius M*, rather than rigging a towing bridle, also was not in accordance with recognised good practice. The use of the knot created a weak point in the rope, which potentially reduced the towline's strength by up to 25% when the rope was under tension. It is evident from Figure 25 that the rope's condition had deteriorated significantly within and adjacent to the knot and it is likely that the towline would have parted in this area had the voyage been prolonged.

2.7 COMPETENCY IN TOWING

Endurance had been operated by its skipper on the River Medway and the River Thames for about 2 years. Nonetheless, his conduct of the towage of *Sirius M* brings into question his competency in this area. In addition to the poor towage arrangement, his lack of an in-depth knowledge of towage procedures was also evidenced by:

- The absence of an emergency towline, which could have easily been prepared by trailing a tow rope with a marker buoy attached behind *Sirius M*, as shown in **Figure 31**.
- The failure to apply for a load line exemption certificate, which would have given the MCA the opportunity to advise the skipper and, in this case, stop him from undertaking the tow.

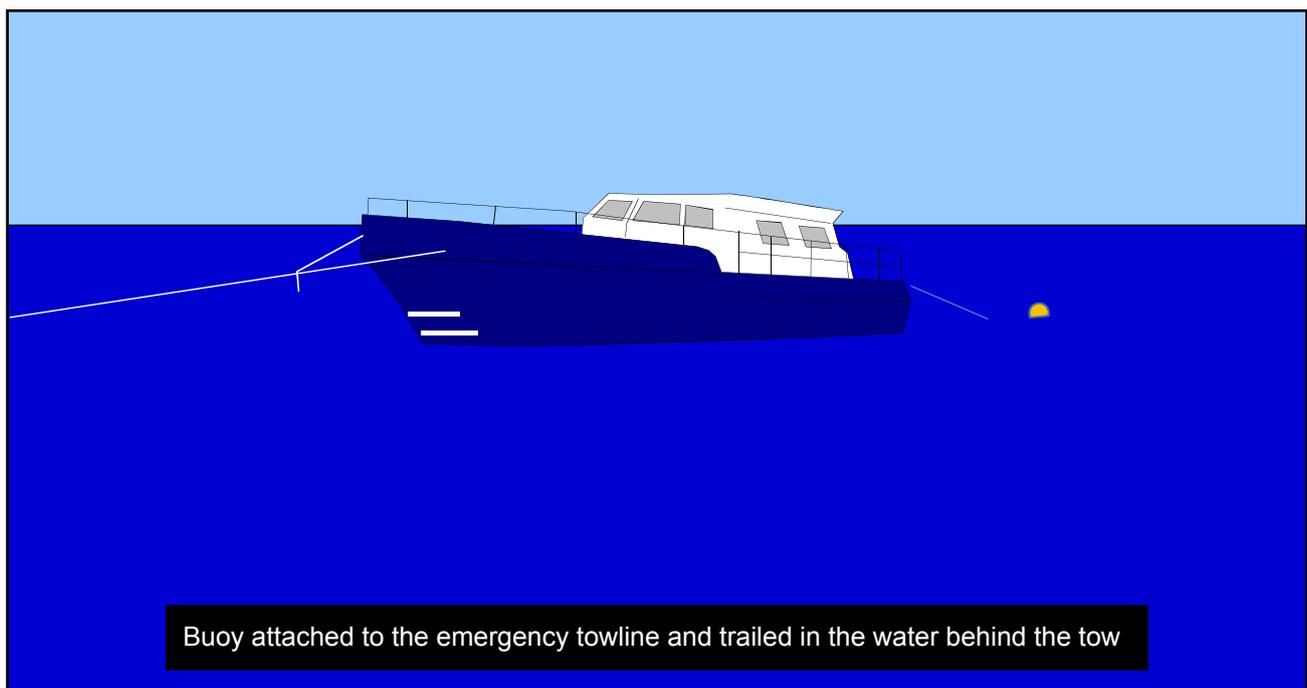


Figure 31: Example of an emergency towing line arrangement

- The removal of the lamps in the motor cruiser's sidelights, leaving only the stern light. Although this was probably a misplaced attempt to satisfy the PLA's requirement for an all-round white light, the light configuration fell significantly short of the requirements of the COLREGS.
- The failure to paint marks on the tow's bow to enable the monitoring of its freeboard (**Figure 27**) during the passage.

The skipper's apparent lack of competency in towing operations probably reflected his lack of formal training in this sphere of work. His knowledge and experience of towing was gained solely from his work with the PLA and the operation of *Endurance*. The skipper had not completed the BML 'towing and pushing' endorsement. However, even had he done so, he would not have been adequately prepared for towage operations at sea until he had completed the additional requirements for award of the voluntary sea towage endorsement.

2.8 APPROACH TO SAFETY

The contract to tow *Sirius M* from Rochester to Brighton was offered to, and accepted by, *Endurance's* skipper 2 days before the voyage was commenced. The skipper was working shifts with the PLA during this period and it is apparent that, from the outset, he was focused on completing the passage in time for him to attend a medical appointment and his next shift with the PLA on 7 February 2013. The passage was not planned, and no consideration appears to have been given to the risks or potential problems with undertaking the passage without a radar or an autopilot.

The vessels departed from Rochester as early as possible on the morning of 3 February to try and reach Dover before nightfall. However, no attempt was made to work with the tides, which was not surprising as no tidal information for the English Channel was carried on board. The skipper also ignored the weather forecasts relayed by Medway VTS on departure and the gale warning in force when leaving Dover. As a result, opportunities to shelter in Ramsgate and Eastbourne were missed.

It is evident from the above, that *Endurance's* skipper gave a low priority to safety in trying to achieve his goal. It is also apparent that he was either not aware of the rest requirements detailed in MGN 280, or that he ignored them. The skipper's lack of emphasis on safety on this passage mirrored his operation of *Endurance* on the River Medway and the River Thames where he failed to implement many of the fundamental requirements of the PLA's Craft Towage Code. In particular, he had not seen any need to complete the BML towing and pushing endorsement despite this being a PLA requirement, and that towing and pushing were his vessel's primary tasks. He had also not produced any generic passage plans or towage plans, or undertaken any risk assessments.

Furthermore, it is clear from the circumstances of this accident and the post-accident inspections by the MCA and IIMS (**paragraphs 1.7.2 and 1.7.3**), that *Endurance's* skipper had not enforced the use of appropriate PPE. Despite the rough sea and the low bulwark heights, neither Steven nor the skipper wore lifejackets or safety harnesses when working on deck. Therefore, the risk of either of the men being lost overboard at any time during the voyage was significant. It should also be noted that the jackstays to be used in conjunction with safety

harnesses, which were a condition of the vessel's SCV certification, were not even fitted. Although the skipper's return to the PLA, which indicated that *Endurance* was certified under the SCV Code to carry 10 rather than 8 passengers, was possibly an oversight, his failure to implement significant safety precautions was not.

2.9 WEATHER FORECASTS

Endurance's skipper used the *windfinder.com* website when operating on the River Thames and the River Medway. He also referred to the website prior to the intended passage to Brighton. However, there were significant differences between the wind speeds recorded at sea and the wind speeds recorded at the website's shore-based stations.

During *Endurance's* 11 hour passage from Dover to the Sovereign Light, the prevailing westerly wind steadily increased in strength. At 2000, force 7 winds were recorded in the English Channel whereas force 4 winds were recorded at *windfinder.com's* Eastbourne station. Similarly, about 1.5 hours after the accident, the Newhaven ALB recorded westerly winds of 31kts gusting to 57kts (force 11), whereas only 9kt (force 3) north-westerly winds were recorded at *windfinder.com's* Newhaven Cliffs station.

The *windfinder.com* website is intended for water sports enthusiasts looking for suitable conditions for their activities in sheltered bays and on inland waterways. Therefore, its use by the skipper when operating on the rivers was understandable. However, the differences between the wind speeds recorded inshore, and the speeds recorded offshore show that unofficial sources of weather information can be misleading and should not be relied upon by vessels at sea.

2.10 VESSEL CERTIFICATION

The post-accident inspections and surveys carried out by the MCA and the IIMS (**Paragraph 1.7**) identified that *Endurance* did not meet the construction, machinery, equipment, stability and operating requirements set out in the SCV Code. The significant deficiencies highlighted, particularly those with respect to the vessel's emergency steering arrangements, insufficient freeboard, and lack of jackstays and safety harnesses, jeopardised the safe operation of the vessel. Therefore, the examinations and heel test conducted on *Endurance* by the IIMS in 2012, which enabled the vessel to operate under the SCV Code up to 60 miles out to sea as a workboat with up to eight passengers on board, were clearly not robust.

The certification process detailed in the SCV Code was not followed; the skipper did not submit an SCV1 form to the IIMS or to the surveyor. Instead, he decided to seek an SCV certificate following conversations with the surveyor on 17 January 2012. Consequently, the first time that the IIMS was aware of the *Endurance* skipper's application was when it received the surveyor's completed forms and reports as a package in August 2012. Consequently, the CA was unaware that the examination process was being undertaken.

In addition, the application for *Endurance's* SCV certification submitted by the surveyor to the IIMS contained numerous errors and inaccuracies which were not challenged. Therefore, not only did the surveyor's inspections and tests lack rigour, the scrutiny by the CA of the associated paperwork submitted by the surveyor was ineffective.

The poor quality of IIMS's survey and internal scrutiny made it easier for the skipper to achieve his aim of carrying passengers on the River Thames by applying to the CA for a seagoing certificate, than it was to meet the local requirements of the PLA. More importantly, it allowed a vessel to operate in an area for which it was not fit for purpose.

2.11 ROLE OF THE PORT AUTHORITIES

2.11.1 Motor tug licensing and procedures

Medway Ports licensed *Endurance* to operate as a motor tug on the River Medway in April 2011 (**Annex A**). In doing so, it is apparent that the port authority did not take any action to ensure that the tug licence terms and conditions were met. Notably:

- The vessel was required to be manned by a competent master, but *Endurance's* skipper had not added the 'towing and pushing' endorsement to his BML.
- The vessel was required to be properly constructed, equipped and maintained, yet it failed to meet the minimum standards set by the PLA for a similar role on the River Thames until December 2011.
- The vessel was not endorsed by Lloyd's Register of Shipping or a similar body recognised by the port to undertake any commercial operations.

Medway Ports' policy of not surveying or inspecting a vessel before issuing a licence relied almost entirely on the accuracy of information provided by vessels' owners when submitting applications. This, along with the absence of towage guidelines, indicates that Medway Ports was not sufficiently focussed on the safety of towing operations on the River Medway.

2.11.2 Accident investigation

The PMSC requires port authorities to investigate accidents and incidents that occur within their port limits. Medway Ports was aware of the two accidents involving *Endurance* in November and December 2012, which are described in **Paragraph 1.17**. However, although the port authority had instructed the skipper to provide accident report forms, it was slow to take any further action. When Medway Ports eventually completed its investigations into these accidents on 7 March 2013, it found that *Endurance's* skipper did not have any documented risk assessments, generic passage plans or safety procedures for his operations on the River Medway or the River Thames. Had these deficiencies been identified sooner, the resulting suspension of *Endurance's* licence might have led to the vessel's skipper adopting a more safety-conscious approach to operations on board *Endurance*.

2.11.3 Sharing of information

The PMSC also requires port authorities to share information. In this case, although Medway Ports relied on the PLA's procedures regarding motor tug certification and operation, and many motor tugs are licensed by both authorities, it did not inform the PLA when it suspended *Endurance's* skipper's authority to conduct

towing operations on the River Medway on the completion of its investigations in March 2013. Consequently, *Endurance* was able to continue operating on the River Thames without a safety management system being in place.

The withdrawal or suspension of a skipper's or a vessel's certificate or licence by a port authority is a serious measure and is not a common occurrence. Therefore, given that the safety deficiencies which led to the suspension of *Endurance's* operations on the River Medway would also have been of concern to the PLA. Medway Port should have taken prompt action to notify its neighbouring port authorities of its findings and action taken.

SECTION 3 - CONCLUSIONS

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

1. The attempt to reconnect a towline between *Endurance* and *Sirius M* was a desperate and ill-considered measure brought about by the use of poor towing practices, a disregard of the weather forecasts, and a lack of planning, risk assessment and emergency preparedness. [2.2]
2. Neither the skipper nor the crewman appreciated or considered the considerable risks of the crewman transferring across to the unmanned tow. [2.3.1]
3. The crewman's chances of survival were reduced considerably by him not wearing a lifejacket or his insulated flotation suit. [2.3.2]
4. The skipper's decision-making and behaviour are likely to have been affected by fatigue to some degree. [2.4]
5. In accordance with the limitations of its certification, *Endurance* should not have been operating at sea in the conditions experienced. [2.5]
6. The skipper was not qualified to operate *Endurance* during the intended passage between Dover and Brighton. [2.5]
7. The tow rope parted due to chafe abrasion caused by the rubbing action of the rope against the steel rims of *Sirius M*'s bulwark fairleads. This undoubtedly occurred because the arrangements did not follow good practice in safety-critical areas. [2.6]
8. The skipper's apparent lack of competency in towing operations at sea reflected his lack of formal training in this sphere of work. [2.7]
9. *Endurance*'s skipper gave a low priority to safety both during the passage to Brighton and during his more usual operations on the River Medway and the River Thames. [2.8]
10. *Endurance*'s skipper referred to unofficial sources of weather information that were potentially misleading. [2.9]

3.2 OTHER SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT

1. When the crewman fell into the water, the skipper did not immediately alert the coastguard to the situation or throw a lifebuoy into the water. [2.3.2]

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

1. The skipper had not added a 'towing and pushing' endorsement to his BML and was therefore not qualified to operate *Endurance* as a motor tug on the River Medway or the River Thames. [2.5]
2. The examinations and heel test conducted by IIMS in 2012, which enabled

Endurance to operate 60 miles out to sea as a workboat with up to eight passengers on board, were not robust, and the certification process detailed in the SCV Code was not followed. [2.10]

3. The application for *Endurance*'s SCV certification submitted by the surveyor to the IIMS contained numerous errors and inaccuracies which were not challenged. Therefore, the scrutiny by the IIMS was ineffective. [2.10]

3.4 OTHER SAFETY ISSUES NOT DIRECTLY CONTRIBUTING TO THE ACCIDENT

1. When Medway Ports licensed *Endurance* to operate as a motor tug on the River Medway in April 2011, the port authority did not take any action to ensure that the tug licence terms and conditions were met. [2.11.1]
2. Medway Ports was slow to investigate two accidents involving *Endurance* in November and December 2012. [2.11.2]
3. Medway Ports did not inform the PLA when it suspended *Endurance*'s skipper's authority to conduct towing operations on the River Medway on the completion of its investigations in March 2013. Consequently, *Endurance* was able to continue operating on the River Thames without a safety management system being in place. [2.11.3]

SECTION 4 - ACTION TAKEN

The Maritime and Coastguard Agency has:

- Carried out an extraordinary audit of the IIMS CA's processes and procedures.
- Reminded CAs of the SCV certification process prescribed in MGN 280(M) and the need to ensure that:
 - the details on vessel certificates are correct
 - SCV1 forms are submitted promptly by surveyors that have been approached directly by vessel owners.

The International Institute of Marine Surveying has:

- Issued a guidance note to all its CA surveyors reminding them of the procedures for conducting heel tests and taking freeboard measurements.
- Delivered targeted training to its scrutineers on heel test and freeboard assessments.
- Identified and reviewed the files and simplified stability data of all vessels coded by the CA that had been examined by the surveyor who examined *Endurance*.
- Documented the expertise of its CA scrutineers with regard to vessel type and stability assessment, and amended its selection procedure for scrutineers.
- Provided a standard heel test and freeboard measurement report format for use by its surveyors.
- Provided additional training, incorporating lessons learned from this accident, to its surveyors.
- Checked a 10% sample of the motor vessel simplified stability assessments scrutinised by the CA over the previous 2 years.
- Written to all its surveyors reminding them of the importance of SCV2 forms and stability data being fully complete and accurate prior to their submission to the CA, and advising them of the penalties if serious or repeated mistakes are found.

Medway Ports has:

- Reviewed and revised its tug licensing procedures to:
 - Record vessel certification, tug master qualifications and vessel insurance details on its electronic database.
 - Subject vessels that fall outside of classification society or MCA/PLA coding to its own coding process.

- Inspect un-coded vessels prior to the issuing of a licence.
- Produced ship towage guidelines.

The Peel Ports Group has:

- Introduced a new group-wide safety management system and Port Risk Incident Management System that was designed to satisfy the requirements of the Port Marine Safety Code and deliver a consistent and efficient approach to accident reporting and investigation procedures across its UK port authorities.
- Put in place a Group harbourmaster whose role includes working closely with the organisation's local harbour authority management teams to improve and harmonise the management of safety and share good practice across the group.

The owner/skipper of *Endurance* has:

- Gained a BML towing and pushing endorsement.
- Provided a set of generic risk assessments, passage plans and safety procedures for his towing and pushing operations on the River Medway and River Thames.

SECTION 5 - RECOMMENDATIONS

The owner/skipper of the motor tug *Endurance* is recommended to:

- 119/2014 Ensure that any vessel he owns or skippers is operated safely, taking into account the circumstances of this accident including, inter alia:
- limitations of his maritime qualifications
 - limitations and conditions of his vessels' certification
 - local requirements in the area of operation
 - the importance of passage and towage planning, and risk assessments
 - the importance of adequate rest periods
 - the use of personal protective equipment.

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

Medway Ports' motor tug licence for *Endurance*



MEDWAY PORTS

LICENCE FOR TUGS

LICENCE N° 23

Port of Sheerness Limited ("POSL") the Statutory Harbour Authority for the River Medway hereby grants a licence to use or employ the tug or tugs, nominated in the attached schedule (the "Licensed Tugs"), for moving vessels within the limits of the port as defined in the Medway Ports Authority Act 1973 ("the Port") to:-



(the "Operator")

pursuant to Section 11 (Power to license tugs, etc) of the Medway Ports Authority Act 1973 for the period of one year or part thereof from the 1st April 2011.

This licence is given subject to the following terms and conditions:-

1. Compliance at all times with any Acts of Parliament, Byelaws, Directions, Rules and Regulations which are applicable within the Port.
2. The Licensed Tug shall be manned by a competent Master and crew when employed within the Port.
3. The Licensed Tugs shall at all times be properly constructed, equipped and maintained, shall be classified by Lloyds Register of Shipping or such other body approved by "POSL" and shall comply in all respects with the Merchant Shipping (Life Saving Appliances) Rules 1980.
4. Licensed Tugs shall at ALL times be suitably insured to cover ALL aspects of the towage operations that they undertake within the Port.

5. POSL's duly authorised representative shall have the right to board any of the Licensed Tugs in order to ensure compliance with the conditions of this licence and the operator shall supply such authorised representative with any documents and other information he may reasonably require.
6. POSL may revoke this licence in whole or in part if the operator fails to comply with any or all of the conditions of this licence and in any event on giving to the operator 2-months notice of its wish to so revoke.
7. POSL hereby acknowledges receipt of the fee of £5 in respect of each tug nominated in the attached schedule.

Signed:


Harbour Master
For and on behalf of
Port of Sheerness Ltd

Date:

06.05.11

Port of London Authority inspection report dated 16 September 2011

VESSEL LICENSING



To:	[REDACTED]
From:	[REDACTED]
Email:	[REDACTED]
Date :	16 th September 2011
No. Pages:	3

LONDON RIVER HOUSE
ROYAL PIER ROAD
GRAVESEND
KENT DA12 2BG UK

SWITCHBOARD: +44 (0)1474 562252

Vessel Licensing
Direct Line: +44 (0)1474 562365
Mobile +44(0) 07725 289495
Fax +44 (0)1474 562277
Email: [REDACTED]

This message may be confidential and is intended only for the person or entity named above. If you have received this message in error, do not read, use or copy this message, or permit it to be read, used or copied by others. Please telephone us immediately on [REDACTED], and destroy this message.

MESSAGE:

Dear [REDACTED]

Fitness for Purpose Inspection of the Motor Tug – 'ENDURANCE I' on the 16th August 2011

Following my inspection of your vessel " ", under Byelaw 7.1 of the Craft & Boat Registration & Regulation Byelaws 2000 (as amended) the vessel " " is not to be worked, navigated, let for hire or used for the purpose for which it is licensed other than in accordance with the restriction(s) set out below until the following remedial works have been carried out to it to my reasonable satisfaction.

Restrictions on use of the vessels

- All items to be completed before a license will be issued.
Please inform this office by email to licensingenquiry@pla.co.uk when the remedial items have been completed.

A licence will not be issued until the Marine Surveyor is satisfied that the items listed in (a) above have been suitably addressed.

1. All markings to be displayed in conformance with the PLA Craft & Boat Registration and Regulations Byelaws 2000 (as amended):-

Vessel Name: ENDURANCE I
Owner's Name: [REDACTED]
Owner Number: TBC
PLA Reg. Number: TBC

2. The main engine turbo unit (non water cooled) should be suitably lagged.
3. The remote fuel-shut(s) located in the wheel house should be suitable marked.
4. A remote fuel shut-off which can be operated outside the wheelhouse should be installed.



5. The missing sections of exhaust lagging should be suitably re-instated.
6. It noted was noted during the inspection that the wiring was undergoing a refit; this should be completed before the remedial inspection is conducted.
7. The wasted section of wheel house plating located on the port side, should be appropriately repaired.
8. The sections of wheelhouse floor boards should be protected to an A15 fire rating. In addition the floorboard should be able to be secured and provide an adequate seal, to prevent the passage of, flame, smoke or vapour.
9. A high water bilge alarm should be provided in the engine room, which is audible from the wheel house.
10. When inspected it was observed that there was a small weep coming from the hydraulic main unit (casing); this should be investigated further and suitably addressed.
11. The towing post should be provided with appropriate supports/gussets to insure that it adequate for it's intended use.
12. The following Life Saving Apparatus should be provided onboard:
 - Two Hand Held Red Flares & Two buoyant smoke signals: (3 minute type)
 - One Lifebuoy with 30 M float line attached (vessel name to be displayed)
 - One Lifebuoy with a battery powered light: (unable to be extinguished by water) - (vessel name to be displayed).
 - One 30 M heaving Line
 - Life jackets/Floats for all crew & passengers
 - Water Resistant Torch
 - A Pair of Binoculars (Min rating of 7 X 50)
 - A Sound Signal / Horn device
 - First Aid Kit Containing a Minimum:
 - Two Triangular Bandages
 - Two Standard Dressings
 - One Extra Large Unmedicated Dressings
 - A Minimum of 15 Assorted Elastic Adhesive Dressings Medicated BPC
 - One Sterile Eye Pad with Attachment
 - One Packet containing 10 grammes Sterile Cotton Wool
 - One Pair of Large size Disposable Polyethylene Gloves
13. It was noted during the inspection that the two of the onboard fire extinguishers were depleted. The following configuration of fire extinguishers should be placed onboard: Note the fire extinguishers should have a minimum fire rating of 5A/34B.

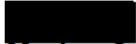
(a) In the wheelhouse:	1 portable fire extinguisher;
(b) Close to each means of access to the deck and accommodation;	1 portable fire extinguisher;
(c) Close to each means of access to service premises that are not accessible from the accommodation, and which contain heating, cooking or refrigeration equipment using solid or liquid fuels:	1 portable fire extinguisher;
(d) At each entrance to the engine room and boiler rooms:	1 portable fire extinguisher;
(e) At suitable points in engine rooms and boiler rooms such that no position in the space is more than 10 metres away from an extinguisher, unless this provision is meet by (d).	1 portable fire extinguisher;
(f) By the galley	1 fire blanket.

14. Appropriate PLA publications including PLA Byelaws, Permanent Notice to Mariners, General Directions for Navigation, Code of Practice for Ship Towing Operation on the Thames & Notice to Mariners should be provided onboard, these can be downloaded from the PLA website free of charge. Alternatively please telephone on 01474 562269 or email regulationsenquiry@pla.co.uk for hard copies of these publications. Hard copies will incur a small charge to cover printing costs..

Valid Insurance - Please forward a copy of your Insurance Certificates for the vessel, including your Third Party Liability cover. When the policy is renewed, a copy of the new policy should be provided for our records..

Please note that working, navigating, letting for hire or using the vessel for the purpose for which it is intended in contravention of Byelaw 7.1, without reasonable excuse, is a criminal offence under Byelaw 7.2 of the Craft & Boat Registration & Regulation Byelaws 2000 (as amended).

Should you have any questions, or require clarification of any of the above requirements then please do not hesitate to contact this office.



Marine Surveyor



Endurance's SCV1 form



Maritime and Coastguard Agency

INTERNATIONAL INSTITUTE of MARINE SURVEYING
ISSUED BY THE COMMITTEE OF THE IIMS CERTIFYING AUTHORITY
(Authorised by the Maritime and Coastguard Agency)
THE SAFETY OF SMALL COMMERCIAL MOTOR AND SAILING VESSELS - MGN280 Code of Practice



APPLICATION FOR EXAMINATION

(May also be used to notify change of Owner/Managing Agent for a vessel with a valid Certificate in which case this should be clearly stated on the form)

(All Sections of this form must be completed before submission)

SCV1

Vessel Unique Number C12MV1104904 TBA (from IIMS Examiner)

Section 1.

Vessel Name: Endurance
Vessel Type: Steel workboat with forward accommodation.
Builder Name Plymouth Dock Yard
Location: Plymouth
Year Built: 1985
Registered Vessel N (if Yes complete this section)
Details of Flag Registration: Flag State:
Date of Registration:
Overall Length: 10.5 m Breadth: 3.7 m
Load Line Length if over 24 m m
Official Number (or SSR)
Hull Identification Number PLA/VL/1181
Call Sign 2EZSN MSSI (if known) 235089449
Motor
Vessel's email address:
Base Port: Cuxton Medway
Nominated Departure Point for Cat 5 & 6
Number of Persons to be aboard:
Passengers: 8 Crew: 2

Section 2.

Section 3.

Name of Owner Thames and Medway Marine Services
Address:
Tel Number
Fax Number
Email:
Name of Managing Agent
Address:
Tel Number
Fax Number
Email:

Section 4. Code Applied For: (See MGN 280 or discuss with IIMS Examiner)

Category Applied For: (Circle One) 2

Section 5. DECLARATION BY OWNER/MANAGING AGENTS

I, The owner/Managing Agent of the vessel described above apply to have the vessel examined and accepted under the appropriate Code of Practice for Small Commercial vessels and agree to pay all charges in respect of the Certification of the vessel to IIMS Certifying Authority and for the survey of the vessel.

Date...28/06/2012 Signature of Owner/Managing Agent

When completed attach registration fee and IMMEDIATELY forward to:

Certifying Authority Administrator, IIMS Head office, Murrills House, 48 East Street, Portchester Hampshire, PO16 9XS - All Enquiries to: Tel 023 9238 5223 Fax 023 9238 5224, email: ca@iims.org.uk

SCV1
June 2012

Inv: 884

Endurance's SCV2 form



INTERNATIONAL INSTITUTE of MARINE SURVEYING

Certifying Authority Administrator, Administration Office
Murrills House 48 East Street, Portchester, Hampshire PO169XS
Tel +44 (0)239 238 5223 Fax +44 (0)239 238 5224
www.iims.org.uk – ca@iims.org.uk

THE COMMITTEE OF THE IIMS CERTIFYING AUTHORITY

(Authorised by the Maritime and Coastguard Agency using MGN 280 – Small Vessels in Commercial Use for Sport or Pleasure, Workboats and Pilot Boats)

SCV 2 COMPLIANCE DOCUMENT

This document requires completion by both Owner/Managing Agent and the Surveyor and follows the paragraph numbering in the Code of Practice indicated in the margin.

The IIMS Examiner should complete the sections describing the vessel and the equipment carried. The Examiner will confirm the statements made by initialling in the appropriate columns and completing the section dealing with the material condition of the vessel. **On completion the form should be signed by both the Owner/Managing Agent. The Surveyor must forward the form to IIMS for checking prior to the issuing of the appropriate Certificate.** The information on the form is the property of IIMS and is not to be used for any purpose other than for the issue of a Certificate for the Code of Practice. **Please note that change of ownership invalidates the certification.**

Vessel Unique Number _____ Applied for

C12MV1104904

Ownership Details	Vessel Details
Thames & Medway marine services [REDACTED]	Name of Vessel Endurance Type of Vessel Workboat
Email address thamesandmedway@gmail.com	Port of Registry
Telephone Number [REDACTED]	Official Number or SSR none
Fax Number	Hull Identification Number (HIN) PLA/VL/1181
	Call Sign 2EZSN
Category 2	Vessel Email address (if known)
Operating Distance 60 Miles From safe haven	Builder Plymouth Dockyard
	Year Built 1985
Maximum number of persons on board Passengers 8 Crew 2 Total 10	Model or Design Class Harbour workboat
	Overall Length 10.5 m
Operating Restrictions Favourable weather Accommodation for 3 only for over 24 hr working	Beam 3.7 M
	L/L if over 23 m
	Motor

Code
Para

STABILITY CRITERIA

11

**Surveyors must indicate which
Stability system has been used.**

Motor vessels

Has a heel test been witnessed by the surveyor? Yes

Has a heel test certificate been issued? **Yes submitted.**

Has the ISO 122217-1 been used in lieu of Heel Test?

Have any davits/cranes (personnel recovery devices) been included in test?

Sailing vessel options: (Circle option provided)

Full stability booklet (Non ISO/Cat 0/Cat 1)

ISO122217-2 certificate

Stix number

Stops number.

Ribs. ISO 6185 certificate or swamp test.

Workboats (Carrying more than 1000kg cargo or crane) & **Pilot boats** must submit full stability book.

Is there a MCA A5 stability guidance booklet on board? (All vessels) Yes

**A COPY OF THE SELECTED STABILITY
INFORMATION MUST BE ATTACHED**

Code Para	DETAILS CONSTRUCTION & STRUCTURAL STRENGTH	Surveyor's Use
4	<p>Watertight weather deck</p> <p>Built in general accord with a vessel of at least 5 years safe history</p> <p>Has more than 5 years history of safe operation in commercial use YES</p> <p>If NO provide other factors to be taken into account</p>	
4.3	<p style="text-align: center;">DECKS, RECESSES & COCKPITS</p> <p>Measured volume of recess or cockpit (Sail & Motor) cu m</p> <p><u>Sailing vessel</u> <u>Maximum volume allowed</u> (L x B x Freeboard abreast cockpit x 0.10) cu m</p> <p>Measured drain area (Cat 0 & 1 20 sq cm remainder 10 sq cm) sq cm</p> <p><u>Motor vessel</u> <u>Minimum required drain area</u> (Volume of the cockpit in cu m x 20) sq cm</p> <p>Measured drain area sq cm</p> <p>Are cockpit lockers and deck accesses weather tight and secure? YES/NO</p>	
4.4	<p style="text-align: center;">WATERTIGHT BULKHEADS.</p> <p>State number of watertight bulkheads, positions, watertight doors if relevant. Wheelhouse bilge to engine room and aft of engine room to motor room .</p>	
4.5.1	<p>RIBS.</p> <p>Built to ISO 6185?</p> <p>Seating for 100% carried?</p> <p>Enclosed shelter if cat 3?</p> <p>Pressure tested annually?</p>	

	<p align="center">HATCHES (All types)</p> <p>List position, size and function 1-aft of engine box bilge. Amidships. Freeman hatch 750 x 750 Lockable</p> <p align="right">Lockable?</p> <p>"TO BE KEPT SHUT AT SEA" marked as appropriate? Yes</p>	<p align="center">Surveyor's Use</p>
5.2	<p align="center">DOORWAYS</p> <p>List position, construction material and size Aft facing with sliding door just off centreline 800 x 1.5m With 500 upstand wooden.</p> <p align="right">Hinge Position</p>	
5.2	<p align="center">COMPANIONWAYS</p> <p>Indicate width, distance off centreline, coaming height above cockpit sole.</p> <p>Washboards fitted?</p>	
5.3	<p align="center">SKYLIGHTS</p> <p>Indicate distance off c/l, opening or fixed None</p> <p>Are skylights adequately strong If used as escapes openable from both sides.</p>	
5.4	<p align="center">PORTLIGHTS</p> <p>List positions, size and material. None</p> <p align="right">Blanks fitted ?no</p>	

Code Para 5.	<p style="text-align: center;">WINDOWS</p> <p>Indicate, position, sizes, glass & frame description + sketch.</p> <p>Windows alloy frames with toughened glass. 400 x 300 port and starboard facing forward. Central opening hatch fwd 500 x 350 Port side 400 x 300 forward and aft windows with central window 500 x 350 Starboard side 400 x 300 forward and aft windows with central window 500 x 350. Aft 500 x 350 to port side.</p> <p>See pictures.</p> <p>Are blanks provided? (50% required for Categories 0 & 1) NO</p> <p>Surveyors Comments on adequacy of Windows - Strong</p>	<p style="text-align: center;">Surveyor's Use</p> <div style="background-color: black; width: 100px; height: 100px; margin: auto;"></div>
5.6	<p style="text-align: center;">DECK VENTILATORS</p> <p>Indicate No, position, compartment served and means of closure.</p> <p>Port and starboard aft swan necks with bungs as closurers serving aft bilge separate from engine room.</p>	<div style="background-color: black; width: 100px; height: 100px; margin: auto;"></div>
5.6	<p style="text-align: center;">ENGINE SPACE VENTILATION</p> <p>Detailed description</p> <p>To starboard side of wheelhouse. Grill with a steel closure fitted with rubber gasket.</p> <div data-bbox="667 1178 895 1659" style="text-align: center;"> </div>	<div style="background-color: black; width: 100px; height: 100px; margin: auto;"></div>

5.6	<p align="center">ENGINE EXHAUST</p> <p>If the exhaust is below the weather deck circle the means of preventing back flooding.</p> <p>Dry exhaust to top of wheelhouse as vessel has keel cooling.</p> <p><u>Other notes.</u></p>	
Code Para 5.7	<p align="center">AIR BREATHER PIPES</p> <p>List tank Exit location. Fuel tanks port and starboard in engine room venting via swan necks to under bulwarks 10mm.</p> <p>If over 10mm diameter indicate the means of closure</p>	<p align="center">Surveyor's Use</p>  
5.8	<p align="center">BELOW W/L SEACOCKS</p> <p>List function, position and type. Note that valves in the engine space must be metal.</p> <p>None</p> <p>Do all above waterline discharges have a means of emergency closure? Yes</p>	
5.8	<p align="center">TOILET PIPE WORK & FITTINGS</p> <p>Is the rim of the heads bowl 300 mm or more above W/L? n/a chemical toilet.</p> <p>If below, describe anti siphon measures</p> <p>Are the pipes looped to the underside of the deck (Sailing vessels)</p> <p>If closed system describe.</p>	
5.9	<p align="center">PIPE WORK & VALVES WITHIN ENGINE SPACES</p> <p>Can the inlet valves be operated from outside the engine space? N/A</p> <p>or is the pipe work adequately lagged, metal or to ISO 7840?</p>	

WATER FREEING ARRANGEMENTS

bulwark behind which water might be trapped 8.5 sq m

Total area of freeing ports (minimum = 4% of bulwark area) 1.6 sqm

If a motor vessel under 12m has a well deck aft and is only fitted with two freeing ports in the transom each of 225 sq cm is dispensation requested to operate only in "favourable weather"?

Are alternative means of clearing water acceptable to the Surveyor, in accordance with para 6.5?

**Code
Para
7**

MACHINERY

**Surveyor's
Use**

Engines, make and model Ford Sabre 250 hp diesel fresh water cooled
Renovated in 2010

Engine location In bilge with engine hatch.

Two means of starting (circle that fitted - electric only) Yes

Describe battery bank layout. Twin batteries in engine room 1 in aft bilge separate from engine room.

Bridging switch? Yes

Fuel tank location In engine room 1 port and 1 starboard

Position of fuel shut off valves Shut off in aft bilge separate from engine.

Fuel pipe fireproofing, describe Copper to iso 7840

Are all petrol containers clearly marked and easily jettisonable? N/A
12kva diesel generator in aft bilge separate to engine room keel cooled

8

ELECTRICAL INSTALLATION

Is the wiring, switchgear and circuit protection adequate? Yes

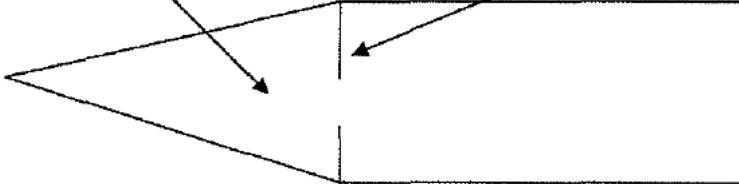
Describe emergency lighting arrangements Torches

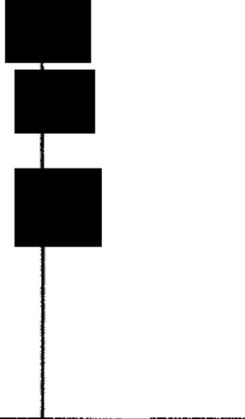
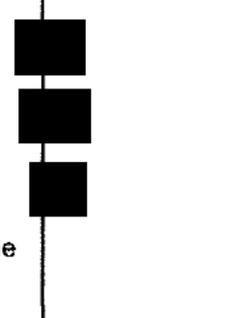
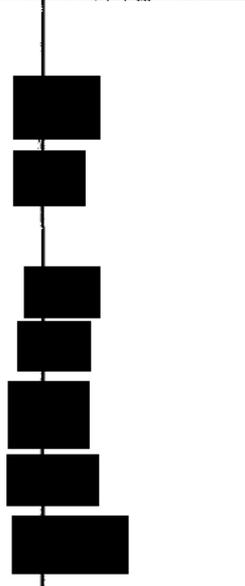
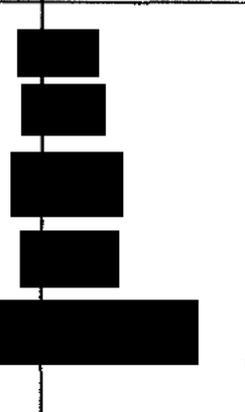
Describe battery stowage & ventilation.
Engine and domestic -2 in engine room bilge venting to engine room
1 in aft bilge separate from engine room venting to the bilge.
Are the batteries adequately secured? Yes

Isolating arrangements. Switch.

Is the battery capacity and charging adequate for the radios fitted. Yes

Code Para	LIFESAVING APPLIANCES continued	Surveyor's Use
Code Para 14	<p>STRUCTURAL FIRE SAFETY</p> <p>Is the engine space separate from accommodation spaces? yes</p> <p>Is insulation material within the engine space non combustible? Yes</p> <p>Are combustible materials stored in the engine space No</p> <p>Describe the means to retain fire extinguishant in the engine space</p> <p>Engine room vent is closed with a steel plate with rubber gaskets.</p>	<p>Is the engine space separate from accommodation spaces? <input type="checkbox"/></p> <p>Is insulation material within the engine space non combustible? <input type="checkbox"/></p> <p>Are combustible materials stored in the engine space <input type="checkbox"/></p> <p>Describe the means to retain fire extinguishant in the engine space</p> <p>Engine room vent is closed with a steel plate with rubber gaskets.</p>
	<p>SART. (Categories 0 and 1 only) Make and model. (See annex 2, note 8)</p> <p>General alarm. (Vessels carrying 15 persons)</p> <p>SOLAS tables. 2 copies No 2</p> <p>Training manual. Containing the following information? yes</p> <p>Donning and use of lifejackets Launching and boarding of life raft Use of flares Use of the life raft radar reflector Use of the portable VHF radio, and EPIRB and SART (if carried) Use of the life raft drogue Hazards of exposure and use of warm clothing Use of life raft equipment Helicopter rescue, including the use of strop and stretcher Garbage disposal plan.</p> <p>Instructions for on-board maintenance of lifesaving appliances. (Required for vessels on bare boat charter) <u>Manual containing the following?</u> Check list for use when carrying our inspections yes Maintenance and repair instructions Log for records of inspection and maintenance</p>	<p>SART. <input type="checkbox"/></p> <p>General alarm. <input type="checkbox"/></p> <p>SOLAS tables. <input type="checkbox"/></p> <p>Training manual. <input type="checkbox"/></p> <p>Donning and use of lifejackets <input type="checkbox"/></p> <p>Launching and boarding of life raft <input type="checkbox"/></p> <p>Use of flares <input type="checkbox"/></p> <p>Use of the life raft radar reflector <input type="checkbox"/></p> <p>Use of the portable VHF radio, and EPIRB and SART (if carried) <input type="checkbox"/></p> <p>Use of the life raft drogue <input type="checkbox"/></p> <p>Hazards of exposure and use of warm clothing <input type="checkbox"/></p> <p>Use of life raft equipment <input type="checkbox"/></p> <p>Helicopter rescue, including the use of strop and stretcher <input type="checkbox"/></p> <p>Garbage disposal plan. <input type="checkbox"/></p> <p>Instructions for on-board maintenance of lifesaving appliances. <input type="checkbox"/></p> <p>(Required for vessels on bare boat charter) <input type="checkbox"/></p> <p><u>Manual containing the following?</u> <input type="checkbox"/></p> <p>Check list for use when carrying our inspections yes <input type="checkbox"/></p> <p>Maintenance and repair instructions <input type="checkbox"/></p> <p>Log for records of inspection and maintenance <input type="checkbox"/></p>

Code Para	OPEN FLAME GAS APPLIANCES	Surveyor's Use
14.1.6 21.2.5 Annex 3	<p>Make and models of all gas appliances fitted</p> <p>None Microwave</p> <p>Is the cooker secure?</p> <p>Are flame failure devices fitted on all burners?</p> <p>Are combustible materials at safe distances from the cooker?</p> <p>Describe ventilation.</p> <p>Describe the gas bottle stowage, draining and venting arrangement.</p> <p>Does gas installation comply with ISO 10239?</p> <p>Is the emergency action card displayed?</p> <p>Are gas detectors fitted in all compartments with gas appliances?</p>	
14.1.7	<p>ACCOMMODATION SPACES (risk assessment)</p> <p>Is furnishing upholstery fire resistant? Yes</p> <p>Describe escape routes / plan all cabins. Forward cabin is open to wheelhouse has opening window to deck and sliding door to weatherdeck</p>  <p>Are smoke detectors fitted in lieu of secondary escape? N/a</p> <p>Describe.</p>	

15 & Annex 4	FIRE FIGHTING EQUIPMENT Details of equipment including machinery protection	Surveyor's Use
	<p>1 x 6.0 kg dry powder – 27a 114 b . . 2 x 1 kg dry powder 5a 34b and a fire blanket. 2 Fire Buckets .</p> <p>3 automatic dry powder 1 kg in the engine room</p> <p>2 automatic dry powder 1 kg in the aft bilge separate from engine room All in date.</p>	
Code Para 16	<p>RADIO EQUIPMENT (fitted, portables are listed later)</p> <p>Make and model of VHF radio. ICOM m59 Simrad RD 68</p> <p>Confirm DSC facility on new vessel. YES</p> <p>Is an emergency aerial carried? (see para 16.1.2) YES</p> <p>For vessels operating in Categories 0, 1 & 2 where there is a low density of shipping describe the additional radios carried to comply with para 16.1.3 & 16.1.4</p>	
17	<p>DOT APPROVED LIGHTS, SHAPES ETC</p> <p>Circle the lights, shapes and sound signals carried</p> <p>Lights</p> <p>(Port) (Starboard) (Steaming) (Stern) (Anchor) Yes</p> <p>(N U C (over 12m))</p> <p>Shapes Yes</p> <p>(Bell)</p> <p>(Anchor) Motor Sailing N U C (over 12m)</p> <p>Sound signal, describe: (If over 20m the sound signal should be DOT approved.)</p> <p>Air horn</p>	
18	<p>NAVIGATIONAL EQUIPMENT</p> <p>Is the steering compass visible to the helmsman? Yes</p> <p>Is the compass adequately lit? Yes</p> <p>Deviation table? No Fluxgate compass</p> <p>Hand bearing compass? Yes</p> <p>List radio navigational aids, log and echo sounder fitted. Chart plotter GPS Garmin 298 Euro nav seaprove plotter, Feruno 1832 RadarRadar . Log and echosounder. AIS Class A</p>	

Code Para 19	<p style="text-align: center;">NAUTICAL PUBLICATIONS</p> <p>Vessels under 12 metres length</p> <p>Up to date charts for the area of operation corrected regularly. Yes</p> <p>Nautical Almanac complying with the requirements of para 19.1.2 Yes</p> <p>Vessels over 12 metres length</p> <p>Up to date charts for the area of operation corrected regularly</p> <p>Tide tables</p> <p>Tidal stream atlas</p> <p>Sailing directions</p> <p>List of radio signals</p>	<p style="text-align: center;">Surveyor's Use</p> <div style="background-color: black; width: 100px; height: 100px; margin: 0 auto;"></div>																																				
19	<p style="text-align: center;">MISCELLANEOUS EQUIPMENT</p> <p>Signalling lamp or searchlight Yes</p> <p>Wire cutters (sailing vessels only)</p> <p>Radar reflector (Complying with M Notice 1638) or as amended Yes</p> <p>Barometer Yes</p>	<div style="background-color: black; width: 100px; height: 100px; margin: 0 auto;"></div>																																				
20	<p style="text-align: center;">ANCHORING EQUIPMENT</p> <p>Is a windlass fitted? (Compulsory if anchor over 30kg) Yes</p> <p>Is the inboard end of the anchor cable adequately secured Yes</p> <p>Is an anchor fairlead or roller fitted with a retaining pin? Yes</p>	<div style="background-color: black; width: 100px; height: 100px; margin: 0 auto;"></div>																																				
Code Para 20	<p style="text-align: center;">ANCHORS AND CABLES</p> <p>Length for determining anchors and cable = $\frac{LOA + LWL}{2} = \dots\dots\dots 9.5\dots\dots m$</p> <p>Note that anchor cables for vessels under 15m may be of chain and warp but there must be a minimum of 10 metres of chain. The length of the anchor cable should not be less than 4 x LOA or 30 metres, whichever is the longer, for each of the main and kedge anchors</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 15%;">Main Anchor</th> <th style="width: 15%;">Main Chain</th> <th style="width: 15%;">Kedge Anchor</th> <th style="width: 15%;">Kedge Chain</th> <th style="width: 15%;">Towline</th> </tr> </thead> <tbody> <tr> <td>Req size</td> <td>15</td> <td>8</td> <td>5</td> <td>6</td> <td></td> </tr> <tr> <td>Fitted size</td> <td>15</td> <td>8</td> <td>7</td> <td>6</td> <td></td> </tr> <tr> <td>Length req</td> <td></td> <td>chain 10m</td> <td></td> <td>chain 10m</td> <td></td> </tr> <tr> <td>Length Fitted</td> <td></td> <td>10m</td> <td></td> <td>10m</td> <td></td> </tr> <tr> <td>Warp to each of 50 m</td> <td colspan="5">12 mm rope as required under code.</td> </tr> </tbody> </table>		Main Anchor	Main Chain	Kedge Anchor	Kedge Chain	Towline	Req size	15	8	5	6		Fitted size	15	8	7	6		Length req		chain 10m		chain 10m		Length Fitted		10m		10m		Warp to each of 50 m	12 mm rope as required under code.					<div style="background-color: black; width: 100px; height: 100px; margin: 0 auto;"></div>
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**REPORT BY THE SURVEYOR ON THE
MATERIAL CONDITION OF THE VESSEL.**

Surveyors Use

This vessel has been used at initial survey

A current out of water photograph must accompany this survey.

The surveyor is to circle the appropriate entry to indicate the condition of the vessel when seen out of the water. The headings below are for guidance and may not be applicable to the vessel concerned. The Surveyor is at liberty to add as seen fit. Should the Surveyor find deterioration sufficient to preclude the issue of a Certificate they are to refer the matter back to the Owner/Managing Agent and is not to sign the form until repairs are completed to their satisfaction.

Each section to be classed as either:-

- A.** Condition satisfactory, no sign of significant deterioration at present.
- B.** Deterioration evident, but not to an extent which will immediately compromise the safety of the vessel. The Owner/Managing Agent is to be informed and is to initial the entry to confirm his awareness of the problem.

EXTERNAL EXAMINATION

- | | | |
|----------------------------------------------------------|---|---|
| 1. Keel and keel to hull joint | A | |
| 2. Rudder blade and hangings | A | |
| 3. Shaft, propeller and associated stern gear | A | |
| 4. Skin fittings | A | |
| 5. Underwater hull | A | |
| 6. Cathodic protection | A | |
| 7. Topsides | A | |
| 8. Deck | A | |
| 9. Deck fittings | A | |
| 10. Chain plates and shroud anchorages | | |
| 11. Windows | A | |
| 12. Steering gear | A | |
| 13. Mast and rig (general condition views from the deck) | A | B |
| | A | B |

INTERNAL EXAMINATION

- | | | |
|---------------------------------------------------------------------------------------------------------------|---|---|
| 14. Skin fittings including pipe work and toilets | A | |
| 15. Structural bonding, including bulkheads, framing, floors and longitudinals. Engine bearers and deck joint | A | |
| 16. Shroud attachment and reinforcement | | |
| 17. Engine mounting | A | |
| 18. Engine pipe work | A | |
| 19. Stern glands, stern tube and propeller shaft | A | |
| 20. Cathodic protection | A | |
| 21. Electrical wiring | A | |
| 22. Keel attachment and surrounding area | A | |
| 23. Steering gear and emergency steering | A | |
| 24. Tanks | A | |
| | A | B |
| | A | B |
| | A | B |

DECLARATIONS

A. By the Surveyor

I have examined the vessel ___ Endurance _____ Unique Number ___ tba _____
at (location) ___ pla gravesend

On (date of out of water survey) _____ out of water photograph to be attached)

I believe that the vessel complies with the requirements of the 'The Safety of Small Commercial Sailing/Motor Vessels, a Code of Practice MGN 280.'

I submit the equivalent provisions as follows:

Code Section ___ 22 2 3 4 Bulwarks with aft railing to transom 600 will impede operation as buoy layer and service. All passengers and crew to wear harnesses when on deck

Date ___ 28/06/2012

Name of IIMS Nominated Surveyor _____

Signature _____

B. By the Owner/ (Delete as appropriate).

I declare that the vessel is designed, built and equipped as described on this form and I hereby undertake:

1. To maintain the vessel in a sound and seaworthy condition.
2. To report any changes to the details shown on this form.
3. To notify the Certifying Authority of any collision or grounding, fire or other event causing major damage. (Any repairs must be approved by the IIMS)
5. To make the vessel available for examination by the MCA inspectorate or to the Certifying Authority at any time during the validity of this certificate.
6. The Owner agrees to comply with the Marpol Clean Seas Act and the Vessel Manning Procedures contained within MGN280.
7. To submit a photocopy of this page with the appropriate fee on the due date in return for an annual hard card Certificate. (A three month period of grace is given before the certificate will be cancelled.)
8. To keep the SCV certificate, the SCV2, and the annual card certificate on board the vessel at all times.
9. That the manning and operation of the vessel complies with annex 3 in MGN 280.
10. That I will inform the IIMS IMMEDIATELY if the Vessel is sold at which point this certificate will be cancelled.

Signature of Owner/Managing Agent (Delete as appropriate)

Signature _____ Print Name ___ Thames towage ___ Dated ___ 28 06 2012 ___

Cat 0 & Cat 1 vessels plus all work and pilot boats require annual examinations by an IIMS surveyor.

ANNUAL REVIEW SIGNATURE SECTION

First annual examination-to be carried out by: Owner/Agent/Marine Surveyor's (delete as Rqd)

signature _____ Print name _____

Date Review Carried out _____

Second annual examination-to be carried out by Owner/Agent/Marine Surveyor's (delete as Rqd)

signature _____ Print name _____

Date Review Carried out _____

Third annual examination must be carried out by an IIMS Examiner

signature _____ Print name _____

Date Review Carried out _____

Fourth annual examination-to be carried out by Owner/Agent/Marine Surveyor's (delete as Rqd)

signature _____ Print name _____

Date Review Carried out _____

Fifth Year Survey must be carried out by an IIMS Examiner. This is an out of water survey that must be completed by _____.

Endurance's heel test report

[REDACTED]

Authorised by the IIMS Certifying Authority to undertake examinations
in connection with the Maritime and Coastguard Agency Code Of
Practice for Small Commercial Vessels.

**SIMPLIFIED HEEL TEST FOR VESSELS COMPLYING WITH
MGN 280 SECTION 11.1.1.3.**

Endurance

**FOR: Thames & Medway Marine Services.
Cuxton, Kent.**

TEST CARRIED OUT ON THE 28 th June 2012

AT Cuxton

BY

[REDACTED]

[REDACTED]



VESSEL PARTICULARS

The vessel is a steel workboat with accommodation and wheelhouse forward and aft weather deck with bulwarks and guardrails.

GENERAL DIMENSIONS

LOA	-	10.5 M
BEAM	-	3.7 M
DRAFT	-	1.7 M

CONDITION OF VESSEL DURING TEST.

2X500 LITRE FUEL TANKS FITTED TO PORT AND STARBOARD BOTH FULL.

WEATHER CONDITIONS

Sunny. Wind Speed 10Kts. Wind direction 050°. Sea state calm.

TIDE CONDITIONS

High water. Slack.

PERSONS ONBOARD

Examiner on CL at pendulum plus a 1 mt. IBC containing 750 litres of sea water alongside the gunwale amidships.

MOORING

Moored by the head by single line to mooring Vessel laid head to wind mooring lines slack.

FREEBOARDS

The freeboards were taken port and starboard just aft of the wheelhouse bulkhead from waterline to weatherdeck scuppers.

Freeboards Lightship: All mm

Port Fwd	260
Stbd Fwd	260
Port Aft	260
Stbd Aft	260

Freeboards loaded:

Port Fwd	75
Stbd Fwd	75
Port Aft	75
Stbd Aft	75

