ACCIDENT REPORT

MAIB MARINE ACCIDENT INVESTIGATION BRANCH

Report on the investigation of the contact and grounding of the bulk carrier *Amber* at Gravesend Reach, River Thames on 15 November 2012

SERIOUS MARINE CASUALTY | REPORT NO 22/2013 | OCTOBER 2013

The assistance of the Maltese Marine Safety Investigation Unit (MSIU) during the investigation of this accident is gratefully acknowledged.

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
ARPA	Automatic Radar Plotting Aid
BPG	Bridge Procedures Guide, 4th edition 2007
CHA	Competent Harbour Authority
CoC	Certificate of Competency
COG	Course over the ground
COLREGS	International Regulations for Preventing Collisions at Sea, 1972, as amended
DPC	Duty Port Controller
EBL	Electronic bearing line
GH_z	gigahertz
GPS	Global Positioning System
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ICS	International Chamber of Shipping
IMO	International Maritime Organization
INS	Information Service
ISM	International Safety Management Code
knots	measurement of speed: 1 knot = 1 nautical mile per hour
kW	kilowatt
MCA	Maritime and Coastguard Agency
MSIU	Maltese Marine Safety Investigation Unit
MSN	Merchant Shipping Notice
NAS	Navigational Assistance Service
nm	nautical miles
OOW	Officer of the watch
PLA	Port of London Authority
PMSC	Port Marine Safety Code

SMS	Safety Management System
SOG	Speed over the ground
SOLAS	International Convention for the Safety of Life at Sea 1974, as amended
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW Convention)
SVDR	Simplified Voyage Data Recorder
t	tonnes
TOS	Traffic Organisation Service
TPS	Tilbury power station
UTC	Universal Co-ordinated Time
VHF	Very High Frequency (radio)
VRM	Variable range marker
VTS	Vessel Traffic Services

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

SYNOPSIS

At 0559 on 15 November 2012, the bulk carrier *Amber* made contact with moored craft and grounded on the south shore of the River Thames shortly after departing from Tilbury power station. The vessel's bridge team lost situational awareness in dense fog as the vessel manoeuvred from the berth on the north shore, before grounding on the opposite side of the river.

At 0230 a pilot boarded *Amber* for the vessel's outward passage but, restricted visibility due to dense fog meant that the vessel was unable to depart at that time. At 0510 the visibility improved slightly and preparations for departure began. The pilot and master discussed the passage plan and a tug was made fast to *Amber*'s stern to assist the manoeuvre.

Amber left the berth at 0550 but crossed the river more quickly than anticipated, and at 0555 Vessel Traffic Services warned the pilot that the vessel was south of the fairway. The pilot acknowledged the warning and advised that he believed *Amber*'s engine was not responding, despite a rapid increase in speed as the vessel headed towards shallow water.

At 0559 *Amber* made contact with moored barges and grounded off Denton Wharf, Gravesend Reach. Although several attempts were made to refloat the vessel with the assistance of tugs, this was not achieved until 0845 on the rising tide.

Amber's shell plating was holed above the waterline as a result of the contact damage, and the vessel was out of service for 2 weeks while repairs were carried out. A number of barges and other craft were damaged by the contact and one was set adrift when its moorings were broken. No environmental damage occurred as a result of the accident.

The MAIB investigation found that the accident was caused by the bridge team's loss of situational awareness as the vessel left the berth in restricted visibility. The roles and responsibilities of the bridge team had not been confirmed before departure, no continuous radar watch was kept and the vessel's position, course and speed were not effectively monitored during the manoeuvre.

Recommendations have been made to the vessel's managers, the harbour authority, the tug operator and the International Chamber of Shipping which are designed to improve the performance of bridge teams and pilots when manoeuvring in harbours, particularly when operating in conditions of restricted visibility.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *AMBER* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	*Amber*
Flag	Malta
Classification society	Lloyd's Register
IMO number	9085895
Type	Cargo vessel - bulk carrier
Registered owner	Amber Marine Limited, Malta
Manager(s)	SC Cosena S.R.L., Romania
Construction	Steel
Year and place of build	1997, Xingang, China
Length overall	143.50m
Gross tonnage	10,490
Light ship tonnage	4,482
Minimum safe manning	9
Authorised cargo	Bulk cargo
VOYAGE PARTICULARS	
Port of departure	London
Port of arrival	Not applicable
Type of voyage	Commercial
Cargo information	In ballast
Manning	21
MARINE CASUALTY INFORMATION	
Date and time	15 November 2012, 0559
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	Gravesend Reach, River Thames, UK
Place on board	Hull
Injuries/fatalities	None
Damage/environmental impact	Vessel holed above waterline, no environmental impact
Ship operation	Normal
Voyage segment	Departure
External & internal environment	Restricted visibility - fog
Persons on board	21

Image courtesy of Ken Smith

Amber

1.2 BACKGROUND

On 31 October 2012, *Amber* had loaded a cargo of wood pellets in Sines, Portugal for discharge at Tilbury power station (TPS) on the River Thames. While in Sines, the master had requested a radar service engineer to attend the vessel as her 3 gigahertz (GH_z) S-band radar was not operational. The engineer was unable to repair the radar, which was fitted with an automatic radar plotting aid (ARPA), due to a lack of spare parts. The vessel subsequently sailed without ARPA capability.

1.3 NARRATIVE

1.3.1 Arrival

Amber anchored in the River Thames on 5 November 2012 to await berth readiness at the TPS. A pilot had been employed to anchor the vessel and he reported to the Port of London Authority (PLA) that one of the vessel's radars was non-operational.

The vessel left the anchorage and arrived at the TPS berth on 13 November, where she began discharging her cargo directly to the power station's biomass furnace.

1.3.2 Cargo operations

The cargo discharge rate was adjusted on several occasions to meet the demands of the power station. On 14 November, the master was requested to sail with some residual cargo remaining on board to allow a waiting vessel to use the berth. However, the master refused this request, the discharge continued and cargo operations were completed at 0205 the next day.

1.3.3 Preparations for departure

The pilot for the vessel's departure was scheduled to board at 0230 on 15 November. He had completed an act of pilotage on 13 November after which he had returned home, arriving before midnight. On 14 November the pilot had rested from 0005-0800 and from 2000-2350.

At 0150 on 15 November, the pilot arrived at the port control centre, Gravesend **(Figure 1)**, where he prepared his passage planning paperwork. He then visited the Vessel Traffic Services (VTS) operations room to obtain traffic information before travelling to the vessel. There was dense fog in the river at this time.

At 0230 the pilot arrived at the TPS berth and spoke with jetty staff about the visibility. It was confirmed that *Amber* would not sail as the tug allocated to assist her departure was not permitted to operate in dense fog. During the conversation, the pilot was made aware that a loaded vessel was scheduled to replace *Amber* on the berth later in the day to ensure that the power station did not run out of fuel.

The pilot then boarded the vessel and was met by the officer of the watch (OOW) and the master. The pilot informed the master that the vessel could not sail due to the dense fog but that, in accordance with local rules, he would remain on board in case the visibility improved for a 'waiting time'[1] of up to 3 hours.

[1] 'Waiting time' refers to the time a PLA pilot will remain on a vessel to begin an act of pilotage. The terms of the pilotage agreement between the port and the vessel's owners state that if the pilotage act has not commenced within 3 hours, the pilot will leave the vessel.

Reproduced from Admiralty Chart BA 1186-0 by permission of the Controller of HMSO and the UK Hydrographic Office

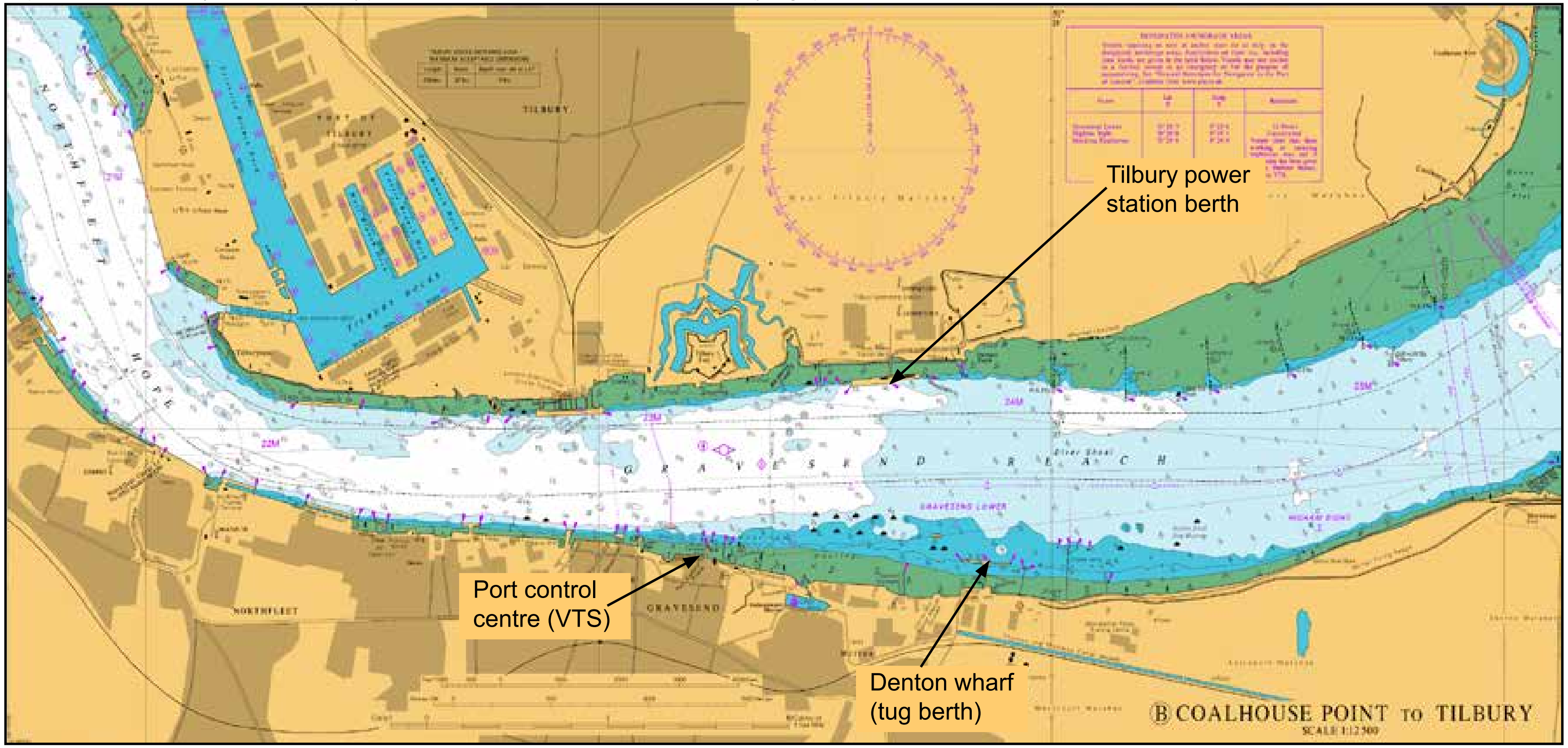


Figure 1: Chartlet of Gravesend Reach

The master then went to rest and the pilot and OOW made their way to the bridge where they waited for an improvement in the visibility. While waiting in the wheelhouse they talked about the vessel's next port, the passage and other topics.

At about 0445 the VTS Duty Port Controller (DPC) left the operations room for a rest break. At about this time, the pilot contacted the PLA pilotage co-ordinator to clarify the situation regarding his 'waiting time', and suggested that consideration should be given to removing him from the vessel. The pilotage co-ordinator replied that the decision would be taken at 0515.

At 0512 a VTS operator observed that the visibility had improved slightly as the lights of TPS were visible, across the river, from the port control centre.

The VTS operator contacted the master of *Svitzer Cecilia*, the tug allocated to assist *Amber*'s departure, and asked if he was prepared to attend *Amber*. During the conversation, the VTS operator made reference to TPS being at risk of shutdown due to lack of fuel if *Amber* did not sail. The tug master checked the visibility and, as he could see the TPS lights from the tug's berth at Denton Wharf, a distance of about 0.4 nautical mile (nm), he agreed to attend.

The VTS operator then contacted *Amber*'s pilot, informed him that the visibility had improved and that the tug would attend the vessel if he, the pilot, was willing to undertake the manoeuvre. The pilot agreed that *Amber* could get underway and asked the OOW to call the master and crew, and make preparations for departure.

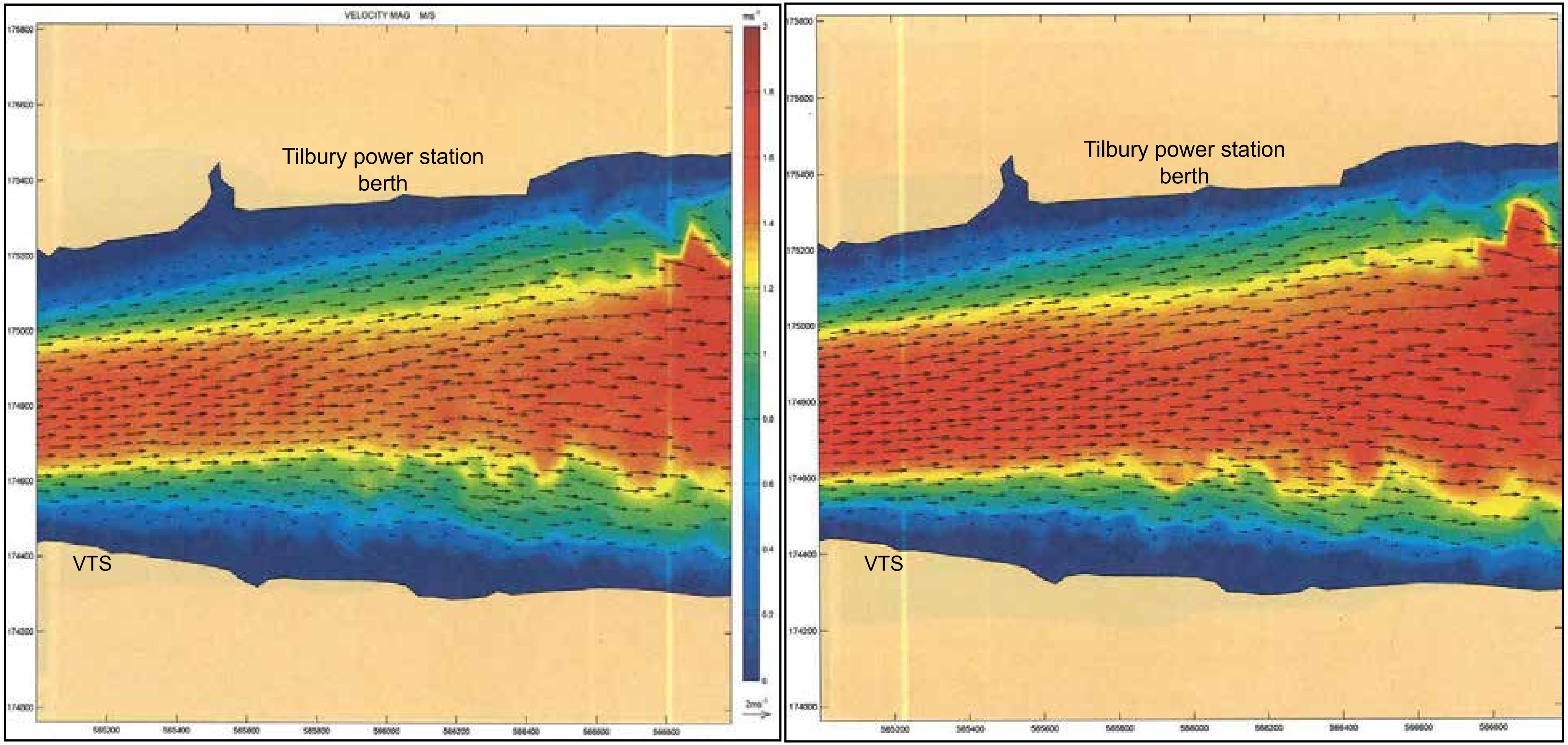
At 0522 *Amber*'s master arrived on the bridge. The pilot informed him that the vessel could depart as the visibility had improved slightly and that another vessel was due on the berth to ensure TPS did not run out of fuel. The master acknowledged this and remarked that he was aware of TPS's requirements for an uninterrupted fuel supply.

The master told the OOW to turn on the radar and prepare the other bridge equipment for departure and asked why that had not been done earlier. A deck cadet, who had joined the vessel the previous day, arrived on the bridge at this time, but he was not allocated a role.

The master and pilot then discussed the pilot's plan **(Annex A)** for unmooring and departure. *Amber* was lying port side alongside the berth and the tide was ebbing **(Figure 2)**. The master and pilot agreed that the forward spring would be the last mooring rope to be let go and that the vessel would then move stern-first into the fairway. The tug would be made fast at the stern and would assist the vessel into the centre of the river. The tug would be released once *Amber* was clear of the jetty and making headway downriver.

The vessel's bridge equipment was prepared for departure and the pilot requested the radar **(Figure 3)** to be set up on the 1.5nm range, north-up with the variable range marker (VRM) set to 0.14nm and the electronic bearing line (EBL) set to 090º.

The OOW was unable to set up the VRM and EBL as requested and the pilot, master and OOW spent several minutes at the radar until the settings requested by the pilot were achieved.



HW +4.0H (~LW -2.5H)
15th November 2012 0510 UTC

HW +4.5H (~LW -2.0H)
15th November 2012 0540 UTC

Figure 2: Tidal stream at time of accident

Images courtesy of the Port of London Authority

Figure 3: *Amber*'s bridge showing port radar set

At 0528 the pilot contacted VTS and reported that visibility from the vessel had reduced. The pilot called the tug master, on Very High Frequency (VHF) radio, to ask if he was content to proceed with the manoeuvre. The tug master replied that he was willing to continue as he was mid-river and could see shore lights on both sides of the river.

The pilot acknowledged the tug master's response and advised him that the tug would be made fast through *Amber*'s centreline fairlead aft. *Svitzer Cecilia* completed connecting to *Amber* at 0533.

1.3.4 Departure

At 0536, *Amber*'s crew began to single up the vessel's mooring lines and the pilot informed VTS that the vessel was preparing to leave the berth. At 0545 the pilot remarked to the master that the fog was coming in patches and that he had not expected the vessel would be able to sail, but as the tug was prepared to work then he was also content.

At 0546, VTS gave approval for *Amber* to leave the berth; at 0548 the pilot ordered the engine to dead-slow-ahead and the rudder hard-to-port. The vessel's stern lifted off the berth and the final mooring line was let go at 0550.

At this time the master and pilot were on the port bridge wing and the OOW was operating both the helm and the engine telegraph[2], the engine being controlled from the engine room. The duty helmsman was with the aft mooring party and was not on the bridge for the initial part of the manoeuvre.

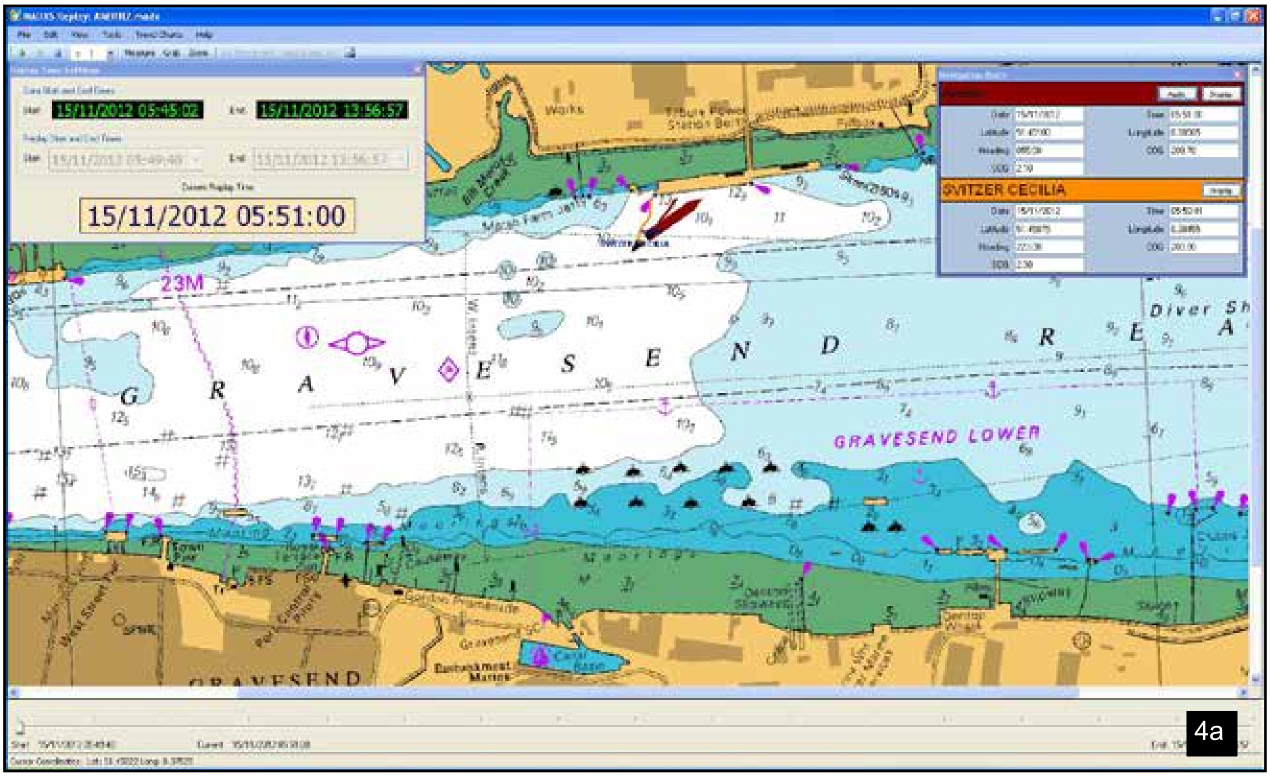
At 0551 **(Figure 4a)** the master and pilot entered the wheelhouse: the pilot ordered the engine to slow-astern and *Amber*'s speed over the ground (SOG) increased to 2.1 knots on a course over the ground (COG) of 210º. As the vessel moved astern and swung to port, the radar screen became cluttered as the trails from the land on both sides of the river moved relative to the vessel.

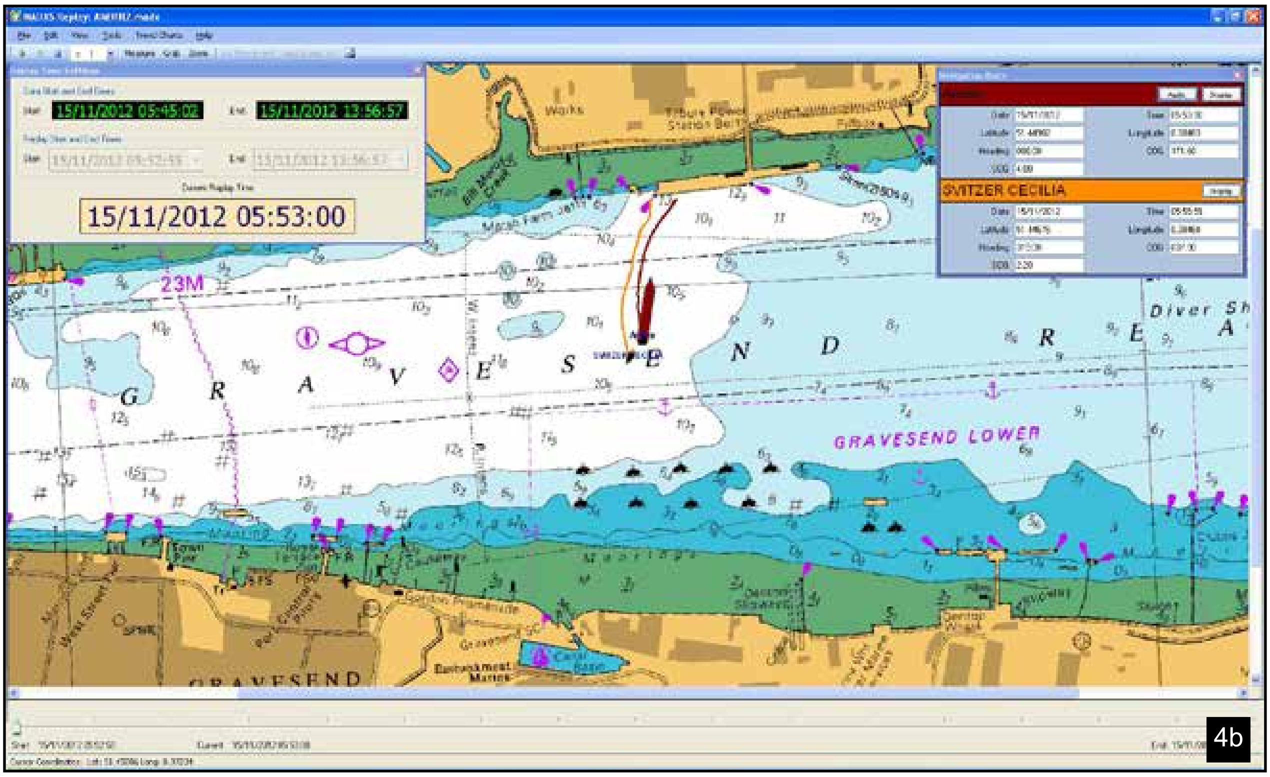
At 0553, *Amber*'s engine was stopped and the pilot ordered 'dead-slow-ahead' and the helm hard-to-starboard: the SOG was 4.0 knots and COG 171º **(Figure 4b)**. The pilot requested *Svitzer Cecilia* to pull on the port quarter at 25% power and, at 05:53:40, ordered the tug to increase to 50% power. At that time, *Amber*'s SOG was 4.0 knots on a COG of 163º **(Figure 4c)**. At 0554 the pilot ordered *Amber*'s engine to slow-ahead and a few seconds later to half-ahead.

1.3.5 Contact and grounding

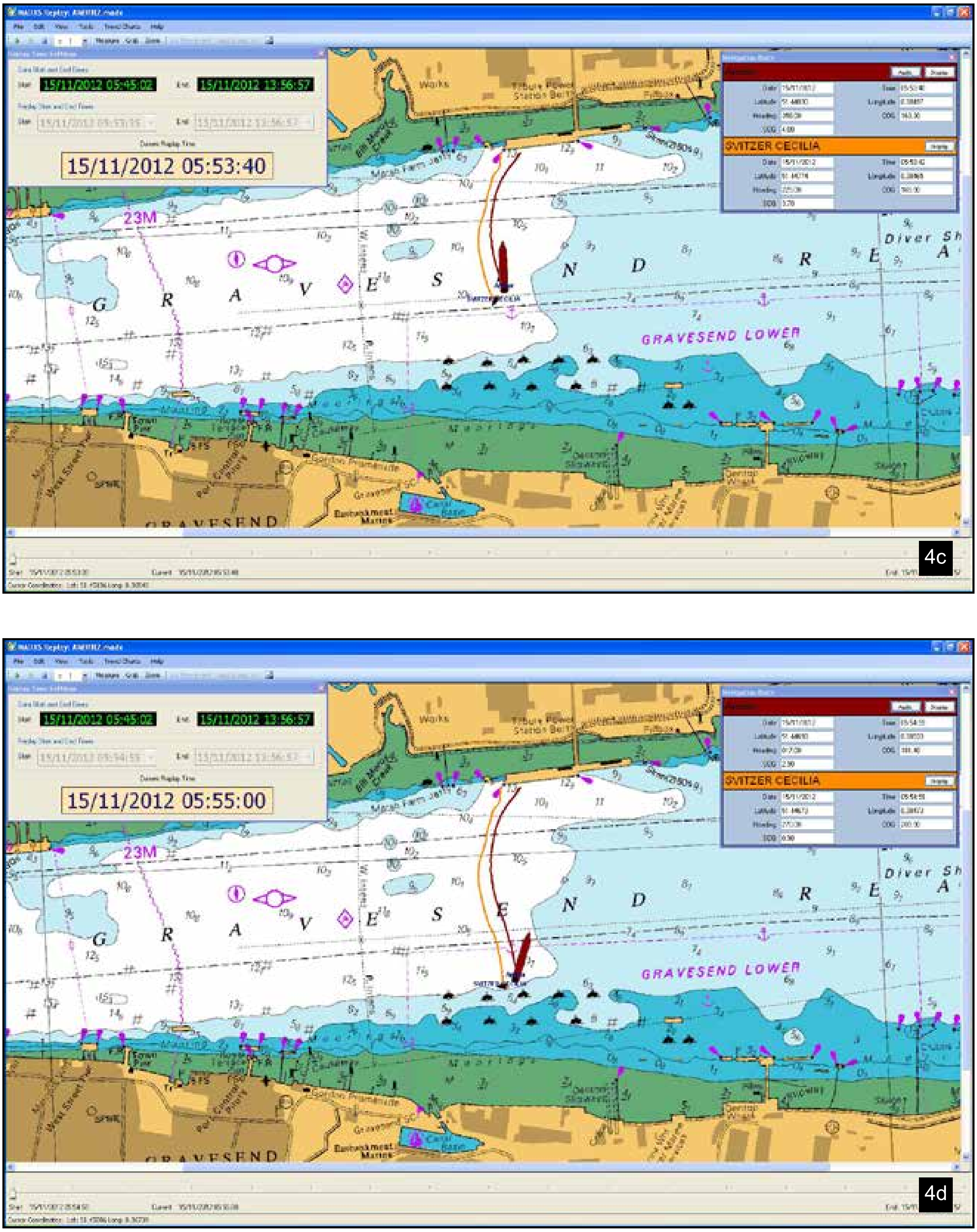
At 0555 VTS warned *Amber*'s pilot by VHF that the vessel was south of the fairway **(Figure 4d)**. The pilot attempted to reply from the VHF radio set in the centre of the bridge. However, the handset was defective, so he moved to use the set on the starboard side of the wheelhouse from where he informed VTS that he was aware of the vessel's position. The pilot then ordered *Amber*'s engine to full ahead and for the OOW to steer a heading of 073º.

[2] Engine telegraph, the system used by the bridge team to request specific engine power settings, answered by the duty engineers, who then adjust engine settings accordingly.





Figures 4a and 4b: *Amber*'s manoeuvre from departure to accident



Figures 4c and **4d:** *Amber*'s manoeuvre from departure to accident

At 0556 the pilot ordered *Amber*'s helm to be put hard to port and the engine to full ahead **(Figure 4e)**. He then instructed *Svitzer Cecilia*'s master to stop his tug pulling and to take up station on the port quarter. He also informed the tug's master that he considered *Amber* was not responding correctly.

At 0557 *Amber* was swinging quickly to starboard **(Figure 4f)**; the pilot again ordered the helm hard-to-port, the engine to full ahead and the OOW to steer a heading of 071º. At this time, the pilot was standing at the radar and he remarked, to no one in particular, that he could not see the vessel's speed on the radar display. The pilot then called VTS and reported that *Amber*'s engine was not responding. VTS asked if the vessel required assistance, to which the pilot requested a second tug.

At 0558 **(Figure 4g)** *Amber* was continuing to swing to starboard at 3.5 knots SOG, the helm was hard-to-port and the engine was set to full-ahead, when the helmsman arrived on the bridge to replace the OOW at the helm. At 05:58:20 the master informed the pilot that the vessel's engine was working normally and that he had instructed the engineers to increase power to full sea speed[3].

A short time later *Amber*'s master suggested, in a soft voice, that the engine should be stopped, but no action was taken. At 0559 the forward mooring party reported that there were small craft close ahead and recommended that the vessel be stopped. The master relayed this information to the pilot, who responded that he was aware of the situation but that there was nothing that could be done.

At 0600 *Svitzer Cecilia*'s master advised the pilot to stop *Amber*'s engine, following which the pilot immediately ordered "stop engine". *Amber* then made contact with moored barges and small craft before running aground **(Figure 4h)**.

At 0601 *Svitzer Cecilia*'s master reported to VTS that *Amber* had made contact with moored barges off Denton Wharf and that one of them had broken adrift from its moorings. The pilot then ordered the tug's master to pull *Amber* astern.

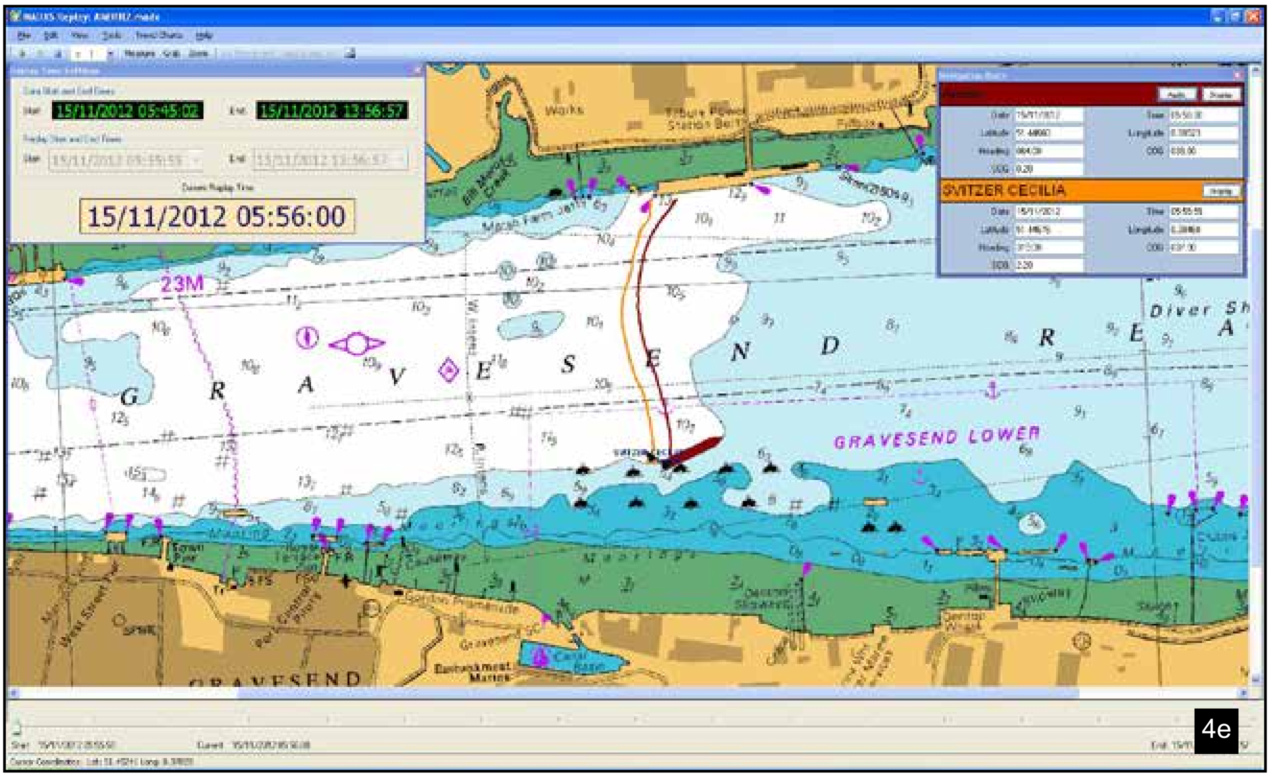
At 0605 the pilot reported the contact incident to the DPC, who had been called back to the operations room from his rest break.

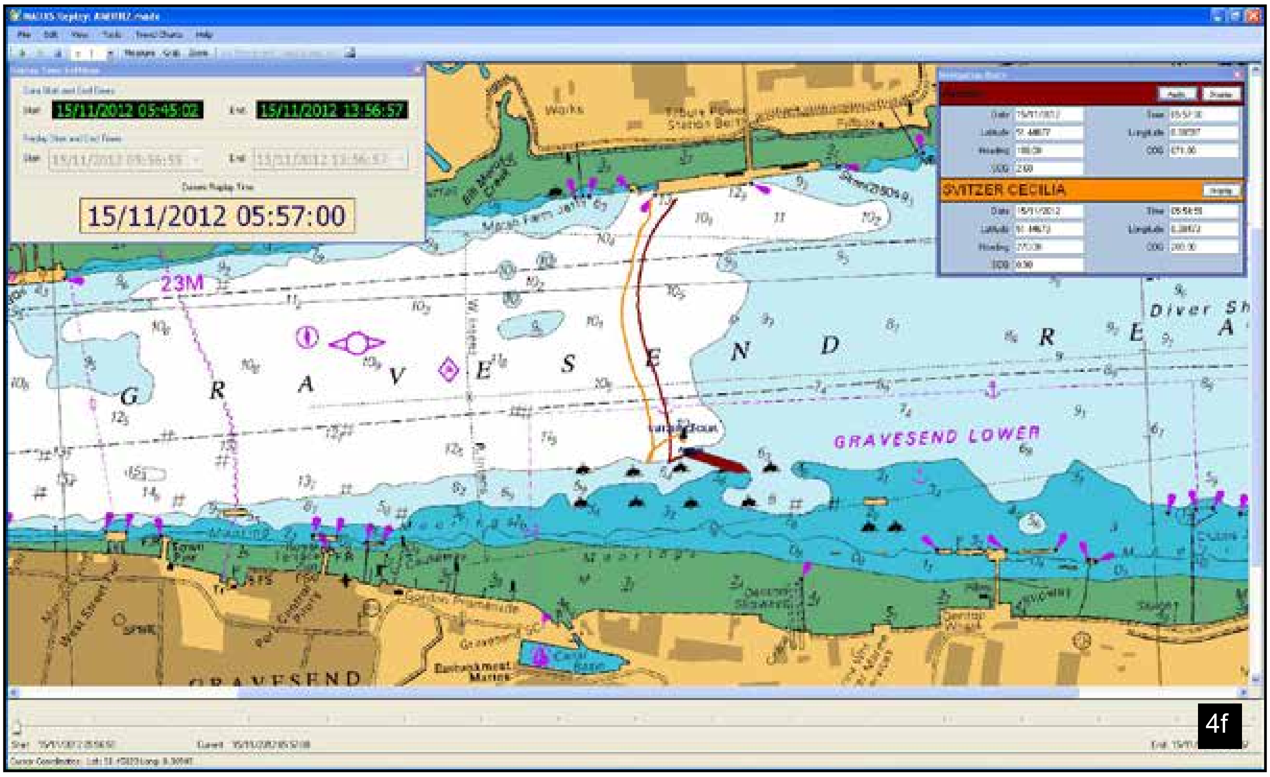
1.3.6 Refloating

At 0607 *Amber*'s engine was put slow-astern and the pilot instructed *Svitzer Cecilia*'s master to apply 75% power in a continued attempt to refloat the vessel. In response, the tug's master informed the pilot that it was unlikely that the vessel could be refloated as the tide was falling, which was acknowledged by the pilot. A short time later *Svitzer Cecilia*'s master informed VTS that *Amber* appeared to be aground as he was applying full power and the vessel was not moving.

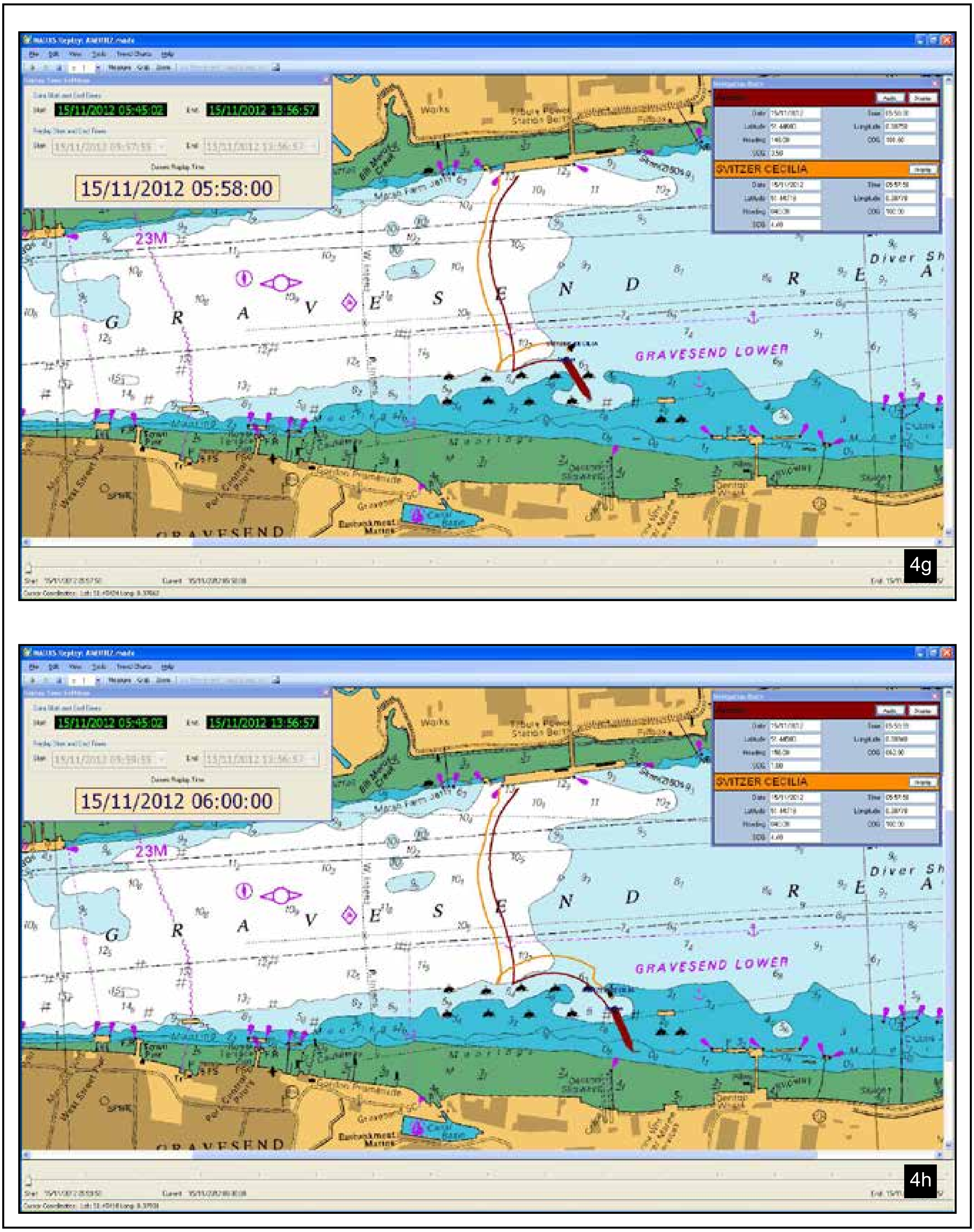
Svitzer Cecilia continued to pull astern, with no movement from *Amber*, and at 0642 the tug *Millgarth* was also made fast aft. Both tugs were ordered to apply 75% power and *Amber*'s engine was put to full astern, but the vessel did not move **(Figure 5)**. The forward mooring party reported that a barge, which had been close to the vessel's port side, made further contact with the vessel's hull at this time.

[3] Sea speed is the setting of a vessel's engine which delivers maximum power; this is greater than the power settings used when the vessel is operating in confined waters, at manoeuvring speed.





Figures 4e and **4f:** *Amber*'s manoeuvre from departure to accident



Figures 4g and **4h:** *Amber*'s manoeuvre from departure to accident

Images courtesy of the Port of London Authority

Figure 5: Tugs attempting to refloat *Amber*

At 0702 the pilot informed VTS that *Amber* was aground and that no further attempt to refloat her would be made until after low water (0759). The pilot confirmed that there was dense fog at the vessel's location and enquired about the type of anchors used on the moorings in the immediate area as he was concerned that the vessel's bottom might have been damaged.

At 0704 *Amber*'s master instructed the crew to take soundings of the vessel's ballast and fuel tanks and to check around for damage.

At 0708 VTS informed the pilot that there were exposed anchors on some of the moorings in the area of the grounding and advised that the crew should check the vessel for damage. The pilot confirmed that the crew had already begun to check the tank soundings and had commenced pumping out the forward ballast tanks.

PLA marine services staff were mobilised to recover the barge that had broken adrift and to check the damage caused to other moored craft in the area. At 0745 it was noted and reported to *Amber* that the vessel had been holed on the port side, above the waterline, in way of number 2 cargo hold **(Figure 6)**. The pilot and ship's staff were unaware of this damage before they received this report.

Image courtesy of Port of London Authority

Figure 6: Shell plating damage to *Amber*

At 0845 *Amber* refloated on the rising tide with assistance from the tugs. The vessel was manoeuvred back across the river to the Tilbury Landing Stage, where the vessel's classification society undertook a survey of the damage.

Maritime and Coastguard Agency (MCA) surveyors boarded *Amber* and completed a port state control inspection, after which the vessel was moved into Tilbury Dock for repairs to the hull and the 3GHz radar.

Repairs to *Amber* were successfully completed on 30 November when the vessel left port to resume service.

1.4 ENVIRONMENTAL CONDITIONS

Wind: Light airs

Visibility: Restricted, dense fog at time of accident

1.4.1 Tidal information (Tilbury)

High water: 0115 6.7m

Low water: 0759 0.6m

The tidal range at the time of the accident was 6.1m, which exceeded the spring tide mean range at Tilbury of 5.9m.

1.4.2 Tidal stream

East-going stream (ebb tide); rate: 2 to 3 knots

The rate increased towards the south side of the fairway.

1.5 BRIDGE TEAM

1.5.1 Pilot

The pilot was 45 years old and held an STCW II/2 Certificate of Competency (CoC) as master (unlimited). He had joined the PLA as a pilot in 2007 and qualified as a Class 1 pilot (unrestricted) in January 2012. He had attended a bridge team management training course (for pilots) in 2007 and a marine resource management (for pilots) course in 2009.

The pilot had experience as a shiphandler and chief officer on a variety of vessels. He had also held a number of marine-related shore-based positions before joining the PLA.

1.5.2 Master

Amber's crew were all Romanian. The master was 55 years old and had first joined *Amber* in December 2011 when the vessel had been purchased by its current owner. The master was on his second tour of duty on board *Amber,* which he had re-joined in July 2012 after a period of leave.

He held an STCW II/2 CoC as master (unlimited) and a Maltese flag endorsement for the certificate. He had served as master for 13 years and had been employed by the vessel's owner for 12 years, which included 3 years as the company's safety manager.

The master passed a 5-day International Safety Management Code (ISM) training course in August 2012, held a valid radar and bridge teamwork training certificate, and he had attended a bridge team management training course in 2004 which had remained valid to 2009.

1.5.3 Chief officer

The chief officer was 57 years old and had held an STCW II/2 CoC for 15 years. He had been employed by the vessel's owner for 12 years as a chief officer and was on his second tour of duty on *Amber*, which he had re-joined in August 2012 following a period of leave.

He was the OOW for the 0400-0800 and 1600-2000 bridge watches while the vessel was at sea, and worked as required in port as he was responsible for cargo operations. He held a valid radar and bridge teamwork training certificate.

1.5.4 Deck cadet

The deck cadet was 22 years old and had joined *Amber* the day before the accident. He had previously completed a 7-month tour of duty on board another bulk carrier. He was on the bridge for departure but had not been assigned a specific role; he had been on the 2000-2400 deck watch the previous day.

1.5.5 Helmsman

The helmsman was 57 years old and had joined *Amber* in August 2012. He kept the 0400-0800 and 1600-2000 watches and was a member of the aft mooring party for arrival in and departure from port.

1.6 *AMBER*'S RADAR

The only operational radar on *Amber*'s bridge at the time of the accident, was a JRC 8000 JMA 8313 series 3cm, X-band radar.

This radar, located on the port side of the vessel's bridge, did not have a Global Positioning System (GPS) input and was set in the north-up, relative motion display mode at the time of the accident.

The pilot had not encountered this type of radar before and was not familiar with the display screen layout or controls. The pilot had checked the quality of the radar picture and was able to identify groynes and navigation buoys on the north shore of the river just before the vessel got underway.

1.7 RADAR CARRIAGE REQUIREMENTS

1.7.1 SOLAS Chapter 5, regulation 19, s2.8

This regulation required that all ships of 10,000 gross tonnage and more should have a $3GH_z$ [S-band] radar and an ARPA connected to a device to indicate speed and distance through the water and to determine collision risks.

At the time of the accident the $3GH_z$ radar and associated ARPA were not operational on *Amber*.

1.7.2 General Directions for Navigation in the Port of London 2011

Direction 21 'Conduct in restricted visibility' stated that:

> *"A vessel of more than 40 metres in length overall, which is not equipped with an operational radar installation shall not enter the Thames in conditions of restricted visibility, and shall not be navigated in the Thames in such conditions except to proceed to the nearest safe anchorage or berth".*
>
> Restricted visibility was defined in the General Directions as *"all circumstances when visibility is less than 0.5 nautical miles".*

1.8 MERCHANT SHIPPING (PORT STATE CONTROL) REGULATIONS 2011

Merchant Shipping Notice (MSN) 1832 was issued by the MCA in 2011 to provide information to shipowners, agents, port authorities, pilots and others, on the Merchant Shipping (Port State Control) Regulations 2011.

Section 15 of these regulations was entitled "*Reports from pilots on apparent anomalies*" and 15.1 stated that "*UK pilots engaged in berthing or unberthing a ship or engaged on a ship bound for a port in the UK or in transit within UK waters must immediately inform the port authority authorising them, or the MCA... whenever they learn in the course of their normal duties that there are apparent anomalies which may prejudice the safe navigation of the ship.."*

Section 16 was entitled "*Reports from port authorities on ships with apparent anomalies*" and 16.1 stated that "*Port authorities which in the course of their normal duties learn that a ship within their port has apparent anomalies which may prejudice the safety of the ship or which poses an unreasonable threat of harm to the marine environment must immediately inform the MCA. Reports received from pilots referred to in 15.1 above should also be forwarded to the MCA*".

When *Amber* arrived in the Thames Estuary on 5 November, the pilot informed the PLA that the vessel's $3GH_z$ radar and ARPA were not operational. This information was not passed to the MCA by the PLA, as required by MSN 1832.

1.9 *AMBER* - ENGINE/MANOEUVRING DATA

Amber was fitted with a B&W 2 stroke diesel engine type 6L35MC, developing 3950kW at 210rpm which drove a fixed pitch (right-handed) 4 blade propeller of diameter 3.68m and pitch 2.284m.

The vessel's manoeuvring data gave the following rpm/engine speeds:

Engine Order	RPM	Speed Loaded	Speed Ballast
Full Sea Ahead	185	11.5	12.0
Full Ahead (Harbour)	130	8.8	9.3
Half Ahead	110	7.2	7.7
Slow Ahead	77	4.9	4.3
Dead Slow Ahead	70	3.4	4.1
Critical RPM 81-103 . Minimum RPM 68			
Dead Slow Astern	70	-	-
Slow Astern	77	-	-
Half Astern	110	-	-
Full Astern	145	-	-

1.10 *AMBER* EMERGENCY CHECKLIST - GROUNDING

The owner's Safety Management System (SMS) included a range of checklists which were required to be consulted for routine operations and also in the event of an emergency. The bridge team did not consult the checklist for grounding/stranding **(Annex B)** following the accident.

1.11 *SVITZER CECILIA* - BRIDGE LAYOUT AND MANNING

1.11.1 Bridge layout

Svitzer Cecilia's bridge was equipped with VHF radios, a JRC radar and a Transas chart plotter capable of displaying vessels with Automatic Identification Systems (AIS). The radar display and chart plotter were located on a pillar between two windows on the port side of the wheelhouse **(Figure 7)**. When towing, the master sat at the control console and looked aft towards the vessel under tow, with the radar and chart plotter on his right hand side.

1.11.2 Manning

The tug was manned by three crewmen at the time of the accident: the master, mate and engineer. The master and mate were on the bridge during the manoeuvre and the engineer was on deck. This was the normal operating complement required by the owner.

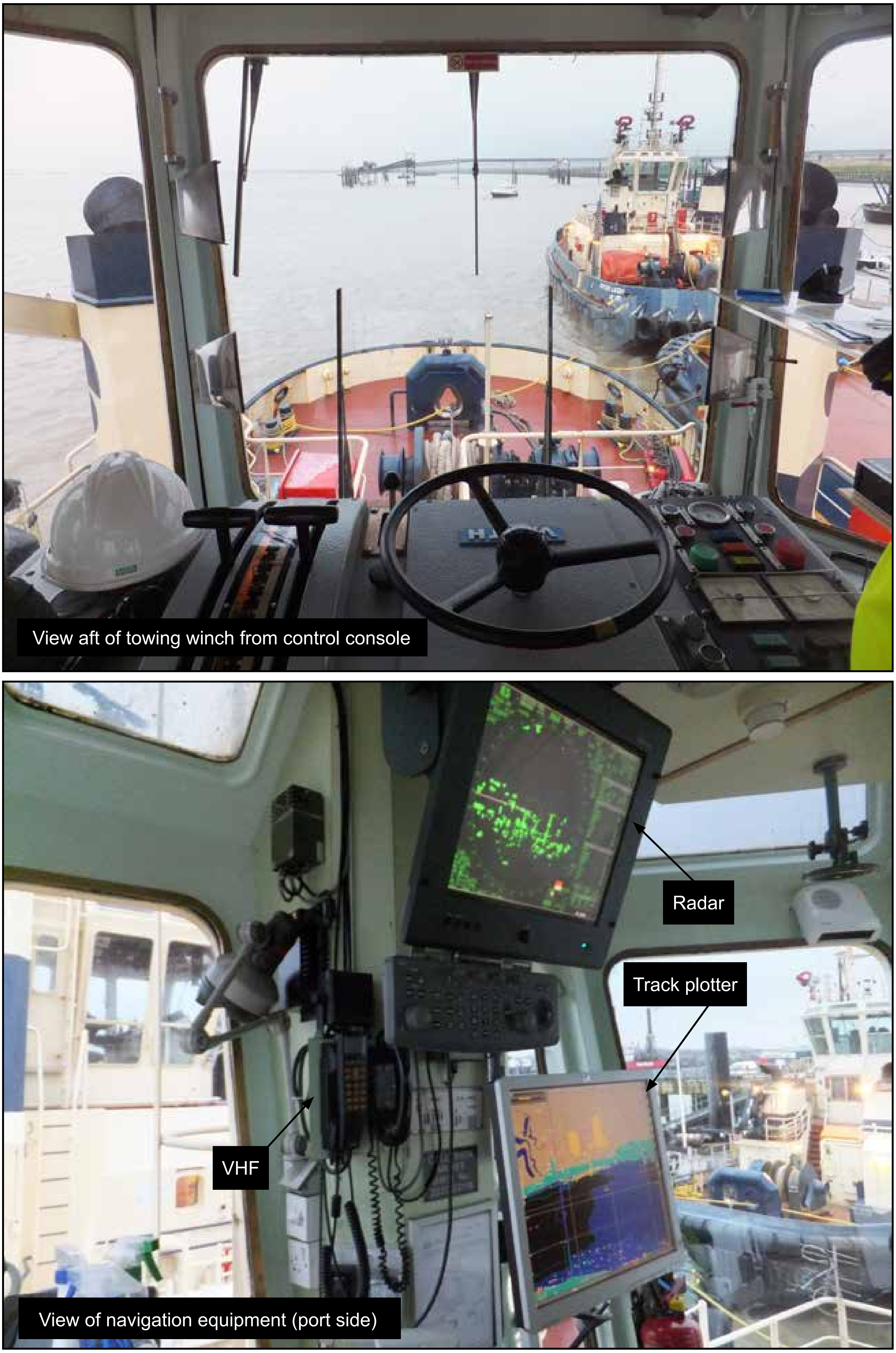


Figure 7: *Svitzer Cecilia* - bridge layout

The duties of the master and mate were divided such that the master was responsible for manoeuvring the tug from the control console and for monitoring the radar and chart plotter. The mate was responsible for the operation of the towing winch and acted as radio operator and lookout.

1.12 *SVITZER CECILIA* - ENGINE/MANOEUVRING DATA

Svitzer Cecilia was fitted with two Rushton diesel engines which jointly developed 3,480kW at full power and drove two Voith Schneider propulsion units.

The tug's bollard pull was 53 tonnes (t) at full power, 39.75t at 75%, 26.5t at 50% and 13t at 25%.

1.13 CODE OF PRACTICE FOR SHIP TOWAGE OPERATIONS ON THE THAMES 2010

In accordance with the requirements of the Code of Practice for Ship Towage Operations on the Thames (the Code), issued by the PLA, only one tug, with a minimum bollard pull of 55 tonnes, was required to assist the unberthing of *Amber*.

Section 7: Towage in Fog (Annex C)

The purpose of this section of the Code was: "*to clarify, in good time, what towage services will be available to vessel Masters and Pilots when Fog exists or is expected to exist in or in the vicinity of, the areas of the Port where tugs will assist vessels"*.

The definition of fog in the Code was: "*Fog means all circumstances when visibility is less than 0.2 nautical miles*".

1.14 SVITZER INTEGRATED MANAGEMENT SYSTEM - TOWAGE IN RESTRICTED VISIBILITY

The owner of *Svitzer Cecilia*, Svitzer Marine Limited, had undertaken risk assessments for the operation of its vessels in normal visibility. The owner required its masters to carry out a specific risk assessment for operating in restricted visibility and listed a number of potential hazards that had to be included in this risk assessment **(Annex D)**.

The owner had also issued a local operating procedure for towage in restricted visibility on the Thames **(Annex E)**. This referred to the port authority's 'restricted visibility' procedure, which stated that towage operations would be suspended when visibility was below 0.2nm.

In conjunction with this procedure, the owner had issued a Restricted Visibility Bridge Card/Checklist, which its masters were required to consult when considering getting underway in restricted visibility **(Annex F)**.

1.15 BRIDGE TEAM MANAGEMENT

1.15.1 PLA pilot training programme

PLA pilots undertook revalidation training every 5 years, comprising a variety of continuation training elements. These included: bridge team management, marine resource management, electronic chart display and information system training. In addition, regular "tool box" talks were held with the aim of keeping pilots' knowledge updated.

The pilots were required to undertake ship simulator training exercises every 24-30 months. These exercises focused on general pilotage and ship towage aspects and were often undertaken in conjunction with tug masters.

The ship simulator training scenarios did not include restricted visibility berthing and unberthing operations.

1.15.2 Bridge Procedures Guide (4th edition 2007)

The Bridge Procedures Guide (BPG) was produced by the International Chamber of Shipping (ICS) to "*bring together the good practice of seafarers with the aim of improving navigational safety and protection of the marine environment*".

The BPG provides guidance to masters and navigating officers on subjects including bridge organisation, passage planning, duties of the OOW, operation and maintenance of bridge equipment and pilotage.

Section 4.1 emphasises the importance of "*watchkeeping officers being completely familiar with all navigational and communications equipment on board*".

Section 6.3, Master/Pilot Information Exchange, states that the exchange of information regarding pilotage and the passage plan should include "*clarification of the roles and responsibilities of the master, pilot and other members of the bridge team*".

Checklist B4 in the BPG lists the checks to be made by a vessel's bridge team for pilotage. One of the checks required is: "*Have the responsibilities within the bridge team for the pilotage been defined and are they clearly understood?*"

1.15.3 International Maritime Organization (IMO) Resolution A.960 (23)

Resolution A.960 (23) made recommendations on training and certification on operational procedures for maritime pilots, other than deep-sea pilots.

Annex 2 of Resolution A.960 (23) stated that "*It is important that, upon the pilot boarding the ship and before the pilotage commences the pilot, the master and the bridge personnel are aware of their respective roles in the safe passage of the ship*".

1.16 DESIGNATION OF VTS STATIONS

MSN 1796, issued by the MCA in April 2006, designated VTS stations in the UK for the purpose of requiring compliance by shipping with regulations 6 and 7 of the Merchant Shipping (Vessel Traffic Monitoring and Reporting Requirements) Regulations 2004, as amended.

The notice specifies the types of service which VTS stations offer to vessels operating within their area of jurisdiction. These are defined as:

- Information Service (INS):

  "A service to ensure that essential information becomes available in time for on-board navigational decision making".

- Traffic Organisation Service (TOS):

  "A service to prevent the development of dangerous maritime traffic situations and to provide for the safe and efficient movement of vessel traffic within the VTS area".

- Navigational Assistance Service (NAS)

  "A service to assist on-board decision making and to monitor its effects, especially in difficult navigational and meteorological circumstances or in the case of defects or deficiencies".

1.17 LONDON PORT CONTROL CENTRE, GRAVESEND

The Port Control Centre at Gravesend provided VTS services, incorporating INS, TOS and NAS to vessels on the River Thames from Crayford Ness to the seaward limits of the London VTS area.

The operations room **(Figure 8)** was staffed by the following personnel:

- Duty port controller (VTS supervisor): The duty port controller holds IALA[4] V-103/1 VTS operator, V-103/2 VTS supervisor and a V-103/3 Local Area Endorsement for the London VTS area. The duty port controller is also a PLA Class 1 (unrestricted pilot) performing the delegated functions of the harbourmaster whilst on duty.

- Three VTS operators: The VTS operators hold, as a minimum, IALA V-103/1 VTS operator and a V-103/3 Local Area Endorsement for the London VTS area. One VTS operator is responsible for the management of traffic between the seaward limit of the London VTS area and Sea Reach No.4 buoy and the second is responsible for the management of traffic between Sea Reach No.4 buoy and Crayfordness. The third VTS operator undertakes administrative or other duties to support the operation of the Port Control Centre.

- Pilot co-ordinator: The pilot co-ordinator deals with the administration of orders for pilots as well as with pilot allocation arrangements.

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[4] IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities) develops and reviews VTS documentation related to training of personnel.

- Shipping co-ordinator: The shipping co-ordinator deals with the advance planning and co-ordination of vessel movements dealing with vessel agents, berth operators and other allied services. A shipping co-ordinator is available for 20 hours a day between 0600 and 0200 inclusive.

Figure 8: Port Control Centre - Gravesend

1.18 PORT MARINE SAFETY CODE

The Port Marine Safety Code (PMSC) was issued by the Department for Transport in 2000 and was last revised in December 2012. The PMSC established "*the principle of a national standard for every aspect of port marine safety with the aim of enhancing safety for those who use or work in ports, their ships, passengers and the environment*".

The PMSC is supported by the "Guide to Good Practice on Port Marine Operations" (the Guide) which provides ports with generic advice concerning how they might comply with the code.

Section 8.3.3 of the Guide states:

Expectation of Bridge Team/Pilot performance.

> *"A pilot's primary duty is to use his skill and knowledge to protect ships from collision or grounding by safely conducting their navigation and manoeuvring while in pilotage waters. Nonetheless, the master and bridge team are always responsible for the safe navigation of the ship. Bridge procedures and bridge resource management principles still apply when a pilot is onboard. The bridge team must conduct a pre-passage briefing with the pilot to ensure a common understanding of the Passage Plan prior to its execution. Pilots, masters and watch keepers must all participate fully, and in a mutually supportive manner.*
>
> *The master and bridge team have a duty to support the pilot and monitor his/her actions. This includes querying any actions or omissions by the pilot or any members of the bridge team, if inconsistent with the passage plan, or if the safety of the ship is in any doubt."*

1.19 PLA - SAFETY MANAGEMENT SYSTEM

In accordance with the aims of the PMSC, the PLA has developed a safety management system based on a formal assessment of hazards and risks to marine operations within its area of jurisdiction.

The assessment identified 117 potential hazards that were ranked in order of severity. Specific risk assessments were undertaken for each hazard, which were reviewed by the PLA's hazard review panel on a regular basis.

Several potential hazards for vessels underway were identified for the accident area, including grounding, contact with a moored vessel/structure, or contact with a navigation/mooring buoy **(Annex G)**.

The risk assessment for contact with navigation/mooring buoys, ranked 22nd of the 117 hazards, identified a number of possible causes that included:

- Failure to follow procedures, especially position monitoring and passage planning
- Failure to keep a proper lookout
- Adverse weather
- Poor bridge management
- Loss of situational awareness.

The risk assessment for grounding, ranked 40th of 117, identified other possible causes including:

- Failure to adequately monitor position, provide support for pilot/con.

The risk controls in place for these hazards included:

- Pilot training/experience
- Pilot simulator training
- VTS staff training/expertise.

1.20 TILBURY POWER STATION

In 2011 TPS was converted from a coal-fired power station and began generating power from 100% sustainably sourced renewable wood pellets.

The station required a consistent supply of wood pellets for its generating units which burnt about 2 million tonnes of pellets per annum. Due to limited on-site storage, the supply of pellets had to be maintained by careful scheduling of vessels alongside the power station's river berth. In order to maintain the supply of wood pellets, it was normal practice for a vessel to be alongside discharging cargo with another loaded vessel waiting at anchor.

The station was due to close in mid-2013 and its owner has submitted planning applications to extend its life for a further 10-12 years; this option would result in the provision of increased on-site storage.

1.21 INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA, 1972, AS AMENDED (COLREGS)

The following regulations were applicable to the conduct of the vessel at the time of the accident:

Rule 5: Look-out, Rule 6: Safe speed, and Rule 7: Risk of Collision **(Annex H)**.

1.22 PREVIOUS ACCIDENTS

CMA CGM Platon – MAIB Report 26/2011

CMA CGM Platon, with pilot embarked, made contact with a quay on the south shore of the River Thames shortly after leaving a berth on the north shore. The MAIB report found that the master and pilot had not carried out a sufficiently detailed exchange of information before the manoeuvre.

Vallermosa – MAIB Report 23/2009

Vallermosa, with pilot embarked, made contact with two oil tankers as she was manoeuvred to abort her approach to a terminal on Southampton Water. The MAIB report found that the pilot's effectiveness was reduced due to increasing stress, and that the master and bridge team did not provide adequate support to the pilot during the manoeuvre.

The report concluded that due to the lack of information exchanged between the pilot and master, the principles of bridge resource management could not be applied during the pilotage.

A recommendation (Number 2009/172) was made to the UK Major Ports Group, British Ports Association and UK Marine Pilots Association to jointly define their expectations of bridge team and pilot performance. A recommendation (Number 2009/174) was also made to the MCA to disseminate information on the expected levels of support which should be provided by bridge teams when a pilot is embarked.

Sichem Melbourne - MAIB Report 18/2008

Sichem Melborne made contact with a mooring dolphin as she departed from her berth on the River Thames on an ebb tide, with a pilot embarked. The MAIB report found that there was an inadequate exchange of information between the master and pilot before commencing unmooring operations. It also concluded that there were poor communications between members of the bridge team.

A recommendation (Number M2008/166) was made to all UK Competent Harbour Authorities to ensure that sufficient time was allowed for a full exchange of information between the pilot and the ship's bridge team.

Sea Express 1 / Alaska Rainbow - MAIB Report 22/2007

Sea Express 1 and *Alaska Rainbow* collided on the River Mersey in dense fog; a pilot was embarked on one of them. The MAIB report found that the pilot had not been proactive in requiring support from the master and OOW who did not support the pilot, thereby unnecessarily increasing his workload. The report also identified failings with the port's VTS structure which did not adequately support the bridge teams on either vessel.

A recommendation (Number 2007/188) was made to the Mersey Docks and Harbour Company to review its compliance with the port Marine Safety Code, with particular reference to VTS operations in restricted visibility. It was also recommended that pilots should be proactive in requiring support from a vessel's bridge team.

Skagern / Samskip Courier MAIB Report 6/2007

The vessels collided in the Humber estuary in dense fog; pilots were embarked on both vessels. The MAIB report found that the masters became over reliant on the pilots and that there was poor interaction and communication among the bridge teams of both vessels.

A recommendation (Number 2007/122) was made to the Port Marine Safety Code Steering Group to promulgate to port authorities the need for pilots to maintain dialogue with the bridge team. A recommendation (Number 2007/125) was also made to the ICS to ensure masters were aware of the importance of effective dialogue with pilots and of the need to challenge pilots at an early stage when corrective action is required during a manoeuvre.

Flying Phantom – MAIB Report 17/2008

While assisting the bulk carrier *Red Jasmine* transit the River Clyde in thick fog, *Flying Phantom* was girted and sank with the loss of three of the vessel's four crew. *Flying Phantom* had been acting as the bow tug, but due to the poor visibility the skipper had allowed his tug to move wide of *Red Jasmine*'s bow and into a position where girting was likely. The investigation found, among other factors, that the tug's crew had received insufficient training in poor visibility towing, and the company's procedures for such an evolution were inadequate. A recommendation (Number 2008/164) was made to Svitzer Marine Ltd to derive limitations and associated necessary guidelines and training for the operation of tugs in restricted visibility, and to ensure that ports and pilots were aware of such limitations and guidelines.

1.23 VOYAGE DATA RECORDER - RECOVERY AND DATA

Amber was fitted with a Netwave NW 4000 Simplified Voyage Data Recorder (SVDR) which recorded date, time, position, speed, heading, bridge audio, communications audio and AIS data. The vessel's radar was not required to be connected to the unit.

The accident data from the SVDR was saved following a request from the MSIU and MAIB and was successfully downloaded and used to inform the narrative and reconstruct the vessel's track leading up to the accident.

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 FATIGUE

There is no evidence to indicate that the pilot or any of the crew were suffering from fatigue and, therefore, it is not considered a contributing factor to this accident.

2.3 SUMMARY

Amber made contact with moored barges and went aground in Gravesend Reach just 10 minutes after departing from the TPS berth. Although there had been a temporary improvement in visibility when the decision was taken to depart, the fog, which had affected the area for several hours, soon returned.

Despite the reduced visibility, the pilot and master decided the vessel would leave the berth, and a tug was made fast to assist the manoeuvre. The bridge team were aware that another vessel was scheduled onto the berth to ensure continuity of fuel supply to the power station.

The pilot and master discussed the manoeuvre, and the agreed plan was to move the vessel off the berth stern-first into the fairway and to then gain headway, release the tug and proceed outwards to sea. However, after she left the berth, *Amber* quickly gathered sternway and crossed the river. No permanent radar watch had been set by the master, so this movement went unnoticed by the bridge team until VTS warned the pilot that the vessel had left the fairway.

In the absence of information from the bridge team, the pilot assumed that the vessel's engine was not responding and incorrectly advised VTS that this was the case. The collective loss of situational awareness, and poor standard of communications within the bridge team, led to the vessel making contact with moored barges and grounding.

2.4 PREPARATIONS FOR DEPARTURE

2.4.1 Pilot

The requirement to test bridge equipment is fundamental when preparing a vessel for departure. If *Amber*'s OOW had turned the radar on while waiting for the visibility to improve, there would have been ample opportunity for the pilot to have become familiar with its operation and displays. Similarly, if the VHF radio sets had been tested before departure, the fact that the reliable VHF set was on the opposite side of the bridge from the one operational radar, could have been discussed at the master/pilot exchange.

The pilot and OOW were on *Amber*'s bridge for almost 3 hours before the decision to sail was made. During the time, the opportunity to test the bridge equipment and for the pilot to become familiar with its use was not taken.

2.4.2 OOW

Amber's OOW called the master and crew once it had been confirmed that approval had been given for *Amber* to sail, and he then began to prepare the bridge equipment. When the master arrived on the bridge, the radar had still not been turned on and the master queried this omission with the OOW.

The OOW was then relieved by the chief officer, who continued preparing the bridge equipment for departure. However, he was unable to set the radar display to the pilot's requirements, and had to be assisted by the master, thereby creating an unnecessary distraction for both the master and pilot as they prepared for the vessel's departure.

The Bridge Procedures Guide states that watchkeeping officers should be completely familiar with all navigational equipment on board. In this instance, none of the watchkeeping officers that were on the bridge for *Amber*'s departure in restricted visibility were sufficiently familiar with the operation of safety critical bridge equipment.

2.4.3 Master/pilot exchange

The exchange of information between *Amber*'s master and the pilot for the vessel's departure included the sequence for letting go the mooring lines, the manoeuvre off the berth and the use of the tug. The pilot used the PLA form **(Annex A)** to guide the discussion. However, the form did not include checking the roles and responsibilities the bridge team would take, and this was not discussed. If the team's respective roles had been considered it should have been evident that, as the designated helmsman was at the aft mooring station, one of the senior officers would have to undertake that role.

It should also have been apparent to the master and pilot that no-one was available either to maintain a continuous watch on the radar, an essential requirement in the prevailing conditions of restricted visibility, or to maintain a proper lookout as required by the COLREGS. Although a cadet was present on the bridge, he had only just joined the vessel and was not allocated a specific role.

Checklists can help to ensure that all relevant considerations have been addressed before commencing a task or evolution.

Had either the PLA's master/pilot information and passage planning exchange form, or the owner's master/pilot information exchange checklist included the need to check on roles and responsibilities, as recommended by the BPG, it is probable that an officer would have been allocated to maintain a continuous radar watch during the vessel's departure.

2.5 THE ROLE OF VTS IN THE DECISION TO SAIL

Aware that the TPS needed a sustained supply of fuel, when the visibility appeared to be improving a VTS operator contacted *Svitzer Cecilia*'s master to determine whether he was willing to attend *Amber*. During this conversation a reference was made to the importance of keeping the power station supplied with fuel.

The tug's master checked the visibility which, at more than 0.2nm, was acceptable for towage operations with *Amber,* and confirmed that he was willing to proceed. The pilot co-ordinator then contacted the pilot and advised him that the tug was willing to attend if he was content for the vessel to depart; which the pilot confirmed he was.

By contacting the tug and securing agreement from the tug's master to assist *Amber*'s departure, pressure was inadvertently placed on the pilot to agree to sail the vessel. The pilot was aware he was approaching the end of his 'waiting time', and that once he left *Amber* there would be a delay before a replacement pilot could be made available. It is therefore unsurprising that he agreed to *Amber*'s departure.

However, while pressing to take full advantage of the increase in visibility, no steps were taken to put in place measures to help mitigate any subsequent reduction in visibility. When the VTS operator gave permission for *Amber* to proceed, the visibility had reduced to about 0.2nm, although it was less in patches, and VTS had just issued a river broadcast warning mariners that there was dense fog throughout the area.

In the event, the VTS operator provided a navigation assistance service by monitoring *Amber*'s departure, and did warn the pilot on VHF when he saw the vessel closing the southern side of the Reach. However, it is possible that the DPC might have been able to provide a much enhanced level of support to the pilot and bridge team had he been at his post during the manoeuvre.

The VTS operator did not take sufficient steps to mitigate the possibility that the visibility would be poor. The DPC should have been in the control room to aid specific onboard decision-making in such difficult meteorological conditions.

2.6 MANOEUVRE

2.6.1 Bridge team roles and responsibilities

No member of *Amber*'s bridge team was assigned the role of monitoring the vessel's radar, the vessel's heading and speed, or the vessel's position in the Reach. Without such information there was a collective loss of situational awareness. Thus, there was no challenge from other members of the bridge team when the pilot instructed the tug to increase power to 50%, even though *Amber* was already making 4 knots astern and approaching the southern edge of the fairway.

The pilot was not alerted to the vessel's predicament by the master or OOW, who had both taken inappropriate roles at the helm and engine telegraph respectively, and were therefore unaware of the vessel's position.

The VTS operator's VHF warning to the vessel as she left the fairway was made in a timely manner and should have enabled the bridge team to recover the situation. However, the collective loss of situational awareness within the bridge team was such that no effective corrective action was taken to prevent the accident.

2.6.2 Radar display

The pilot's attempt to establish the vessel's position and speed using the radar was unsuccessful as he was not familiar with the set. In addition, the radar display would have been cluttered by the trails of all targets, which would have moved relative to the vessel because there was no speed input to the set.

The radar was set to the 1.5nm range, but the vessel was within 300 metres of the south shore when she was swinging to starboard. In an increasingly tense situation, it would have been difficult to readily identify the vessel's position with a quick glance at the radar, given the large amount of clutter from targets on the land which would have been present.

2.6.3 *Svitzer Cecilia* -v- *Amber*'s engine power

Analysis of both the positioning of *Svitzer Cecilia* and the various power settings requested of the tug throughout the manoeuvre show that the tug had more effect on *Amber*'s movements than *Amber*'s engine, which was not used at full power until after the vessel had left the fairway.

As *Amber* moved stern first away from the berth and into the fairway, the effect of the ebb tide on the vessel's port quarter, which strengthened in effect as *Amber*'s stern entered the stronger stream, acted to reduce the vessel's ability to turn to starboard in the fairway. As *Amber* moved south of the fairway, the engine was ordered to full ahead, the helm was put hard over to starboard, and *Svitzer Cecilia* was ordered to pull at 50% power on the vessel's port quarter. This resulted in *Amber* turning rapidly to starboard, and gathering headway, towards the south bank.

As *Amber* left the fairway, the pilot attempted to turn the vessel downriver by ordering 'hard-to-port', but *Svitzer Cecilia*'s position on the port quarter, even with no weight on the tow line, was sufficient to cause *Amber* to continue swinging to starboard. This led the pilot to assume that *Amber*'s engine was not responding.

The implications of *Amber*'s engine power being quite similar to *Svitzer Cecilia*'s had not been fully realised by the pilot. Consequently, his use of the tug, in circumstances where he had no visual references, resulted in a disproportionate force being applied that turned *Amber* some 90^{o} more than intended so that the vessel drove out of the channel and grounded before he could assess and recover the situation.

2.6.4 Bridge team communications

There was a series of occasions when poor communications between the members of *Amber*'s bridge team and between the pilot and the tug's master resulted in negative consequences. In the first instance, the pilot's report to VTS that *Amber*'s engine was not responding prompted the master to increase engine speed to full sea speed, without first informing the pilot.

Secondly, it would have been appropriate for the pilot to have been keeping *Svitzer Cecilia*'s master aware of his concerns and intentions, as required by the Svitzer operations manual, section 2.13 **(Annex D)**. This would then have allowed the tug's master to ensure that, once he was positioned on *Amber*'s port quarter, he did not allow weight on the tow line to prevent *Amber* from turning to port. Further, the tug's master would certainly have been concerned had he been informed that the pilot had increased *Amber*'s engine to full power and might then have queried the pilot's intentions.

Finally, such was the confusion on the bridge that, even when the officer at the forward mooring party reported there were barges very close ahead, the vessel was allowed to continue at full sea speed towards them.

The poor communications that characterised this accident can be attributed to the initial failure at the briefing stage to assign appropriate roles and responsibilities within the bridge team to manage a port departure in restricted visibility. This led to poor situational awareness that resulted in team members acting in isolation as they thought best, but without fully communicating their actions to the other team members or the assisting tug.

2.7 CONTACT AND GROUNDING

After *Amber* had made contact with the moored barges, *Svitzer Cecilia*'s master advised the pilot to stop *Amber*'s engine, which he did.

Within a few minutes of the grounding, the pilot ordered *Svitzer Cecilia* to pull astern at 75% power, and *Amber*'s engine was put astern. This immediate attempt to refloat was made before any damage assessment had been carried out and despite the tug master informing the pilot that the tide was falling and they were unlikely to refloat the vessel.

In common with several grounding accidents the MAIB has recently investigated[5] the bridge team's immediate reaction was to attempt to refloat the vessel without first undertaking a damage assessment. Had the advice given in the vessel's emergency checklist for grounding been followed, the engine would have been stopped and soundings taken of tanks and spaces prior to any attempt being made to refloat the vessel.

The immediate attempt to refloat *Amber* was ill considered and contrary to both PLA instructions and the company's SMS. In this case, the attempt to refloat continued for some time and a second tug was connected to provide further assistance. Ironically, it is probable that the considerable wash generated by the tugs while attempting to pull *Amber* clear, caused the barges to make further contact with the vessel's hull, resulting in further damage.

2.8 *SVITZER CECILIA* - BRIDGE OPERATIONS

During the manoeuvre*, Svitzer Cecilia*'s master was at the controls, with responsibility for also monitoring the radar and chart plotter, and the mate was on the bridge with responsibility for monitoring the VHF radio and the towing winch controls. This was the normal operating routine for the tug, and would be reasonable in clear weather when it is relatively easy to see the aspect of the towed vessel from the conning position. However, in restricted visibility, when it is essential that the master keeps a close eye on the towed vessel, it may be difficult for him to monitor the radar and chart plotter, and so retain situational awareness.

[5] MAIB reports: *Karin Schepers* 10/2012, *K-Wave* 18/2011, *Maersk Kendal* 2/2010

On the appropriate range scales, it might have been clear on the tug's chart plotter and radar that *Amber* and *Svitzer Cecilia* had moved south of the main fairway and, subsequently, the AIS would have shown that *Amber* was heading towards the south shore. Had the tug's master been aware of this he would almost certainly have queried the pilot's intentions, and this in turn might have alerted the pilot to *Amber*'s situation.

While a proper radar watch should have been maintained on *Amber* in such restricted visibility, similar monitoring of the navigation situation on *Svitzer Cecilia* might have identified that the departure was not going as planned. The roles and responsibilities of tugs' bridge teams, when operating in restricted visibility, should be reviewed to ensure that situational awareness can be maintained at all times.

2.9 RADAR/ARPA

Amber arrived in the Thames estuary without an operational 3GHz radar and consequently also without an operational ARPA. This deficiency was recorded on the PLA's internal pilotage records but was not reported to the MCA, contrary to the Merchant Shipping (Port State Control) regulations. Had *Amber*'s defective radar defect been reported to the MCA, this would have triggered a Port State Control inspection of the vessel that would have resulted in the vessel being detained in port until the radar was repaired.

That *Amber* had been operating for several weeks without a functioning ARPA, contrary to SOLAS requirements, also indicates that the vessel's defect reporting procedures, as specified in its Safety Management System (SMS), were not being complied with.

The consequences of both the port and the vessel failing to report defects, as required by their respective procedures, resulted in *Amber* sailing without an operational ARPA radar.

2.10 TILBURY POWER STATION

The requirement to maintain a constant fuel supply to the power station was well known to VTS staff, who were regularly reminded of the fact by shipping agents when arranging vessel movements to the facility.

In fact, the temporary loss of the power station's output to the National Grid could have been compensated from other sources. The imperative to maintain the supply was therefore not as great as the PLA's marine staff had been led to believe.

In such situations commercial expediency must not be permitted to override measures which are in place to ensure operational safety. The natural enthusiasm of staff to 'get the job done' should be tempered with a proper consideration for the risks involved.

SECTION 3 - CONCLUSIONS

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

1. The pilot and OOW were on *Amber*'s bridge for almost 3 hours before the decision to sail was made. During the time, the opportunity to test the bridge equipment and for the pilot to become familiar with its use was not taken. [2.4.1]

2. The Bridge Procedures Guide states that watchkeeping officers should be completely familiar with all navigational equipment on board. In this instance, none of the watchkeeping officers that were on the bridge for *Amber*'s departure in restricted visibility were sufficiently familiar with the operation of safety critical bridge equipment. [2.4.2]

3. Had either the PLA's master/pilot information and passage planning exchange form, or the owner's master/pilot information exchange checklist included the need to check on roles and responsibilities, as recommended by the BPG, it is probable that an officer would have been allocated to maintain a radar watch during the vessel's departure. [2.4.3]

4. The VTS operator did not take sufficient steps to mitigate the possibility that the visibility would be poor. The DPC should have been in the control room to aid specific onboard decision-making in such difficult meteorological conditions. [2.5]

5. The poor communications that characterised this accident can be attributed to the initial failure at the briefing stage to assign appropriate roles and responsibilities within the bridge team to manage a port departure in restricted visibility. This in turn resulted in poor situational awareness that resulted in team members acting in isolation as they thought best, but without fully communicating their actions to the other team members or the assisting tug. [2.6.4]

6. While a proper radar watch should have been maintained on *Amber* in such restricted visibility, similar monitoring of the navigation situation on *Svitzer Cecilia* might have identified the departure was not going as planned. [2.8]

7. The consequences of both the port and the vessel failing to report defects, as required by their respective procedures, resulted in *Amber* sailing without an operational ARPA radar. [2.9]

8. In such situations commercial expediency must not be permitted to override measures which are in place to ensure operational safety. The natural enthusiasm of staff to 'get the job done' should be tempered with a proper consideration for the risks involved. [2.10]

3.2 OTHER SAFETY ISSUES DIRECTLY CONTRIBUTING TO THE ACCIDENT

1. The VTS Operator's VHF call to the vessel as she left the fairway was made in a timely manner and should have enabled the bridge team to recover the situation. However, the collective loss of situational awareness within the bridge team was such that no effective corrective action was taken to prevent the accident. [2.6.1]

2. The implications of *Amber*'s engine power being quite similar to *Svitzer Cecilia*'s had not been fully realised by the pilot. Consequently, his use of the tug, in circumstances where he had no visual references, resulted in a disproportionate effect being applied that turned *Amber* some 90º more than intended so that the vessel drove out of the channel and grounded before he could assess and recover the situation. [2.6.3]

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

1. The immediate attempt to refloat *Amber* was ill considered and contrary to both PLA instructions and the company's SMS. In this case, the attempt to refloat continued for some time and a second tug was connected to provide further assistance. Ironically, it is probable that the considerable wash generated by the tugs while attempting to pull *Amber* clear, caused the barges to make further contact with the vessel's hull, resulting in further damage. [2.7]

SECTION 4 - ACTION TAKEN

4.1 THE PORT OF LONDON AUTHORITY

The Port of London Authority has:

- Issued advice to its pilots regarding the need to take care when setting up a radar with which they may be unfamiliar or if they consider there may be a lack of onboard knowledge regarding its set up.

- Ensured that all pilots now undertake restricted visibility berthing and unberthing exercises during their simulator training sessions.

- Issued instructions to ensure the reports required under the Merchant Shipping (Port State Control) regulations are made to the MCA in a timely manner.

4.2 SC COSENA S.R.L

SC Cosena S.R.L has:

- Undertaken an accident investigation and issued a circular to vessels in its fleet with a report of its findings and lessons learned.

SECTION 5 - RECOMMENDATIONS

SC COSENA SRL is recommended to take action, as appropriate, to:

2013/227 Ensure that its vessels comply fully with SOLAS requirements in respect of the carriage of operational 3GHz radar and ARPA.

2013/228 Review its Safety Management System instructions relating to the performance of its vessels' bridge teams to ensure:

- Bridge equipment is tested in good time prior to departure from port.
- Bridge teams are familiar with all navigational and communications equipment on board, and understand the need to ensure that radars are set at optimum range scales and performance monitoring is used.
- The master/pilot information exchange checklist includes a requirement to clarify the roles and responsibilities of the master, pilot and other members of the bridge team.
- Bridge team members understand the need to communicate effectively in order to retain good situational awareness at all times.
- Bridge teams understand the importance of following checklists in emergency situations.

The Port of London Authority is recommended to:

2013/229 Include in its pilot/master exchange form:

- Reference to the requirement to clarify the roles and responsibilities of the bridge team.
- Reference to the relative engine output power of the assisting tugs with that of the vessel being assisted.

2013/230 Review its instructions to port controllers and VTS staff, aimed to ensure that:

- With respect to decisions taken regarding the movement of ships within the port, commercial considerations are not permitted to compromise safety.
- When vessels' movements are to take place in restricted visibility, appropriate risk mitigation measures are put in place, including making available a duty port controller to provide navigational assistance and setting clear minimum parameters that must be met. Such parameters could include: the number of pilots required and the requirement for all vessels to have a full suite of fully functioning radars and navigational equipment.

- A damage assessment is carried out on a grounded vessel before an attempt is made to refloat the vessel.

Svitzer Marine Limited is recommended to:

2013/231 Review and, where appropriate, revise the roles and responsibilities of bridge teams when its vessels are towing in restricted visibility.

The **International Chamber of Shipping** is recommended to:

2013/232 Include in the review of the Bridge Procedures Guide a reference to:

- The need for bridge teams to be sufficiently resourced to provide assistance to embarked pilots through the operation of the vessel's navigational equipment when required.

- The need to compare the engine power of a vessel with that of the assisting tug(s), and for this to be discussed during the pilot/master exchange.

Marine Accident Investigation Branch
October 2013

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

Marine Accident Report