ACCIDENT REPORT

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

Report on the investigation of the contact of the oil tanker *Apollo* with the quayside at Northfleet Hope Container Terminal Tilbury, River Thames on 25 July 2013

SERIOUS MARINE CASUALTY REPORT NO 15/2014 JUNE 2014

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

CoC	-	Certificate of Competency
CPP	-	Controllable pitch propeller
DPC	-	Duty Port Controller
FPP	-	Fixed pitch propeller
GL	-	Germanischer Lloyd
ILO	-	International Labour Organization
kn	-	knot, speed in nautical miles per hour[1]
kW	-	kilowatt
m	-	metre
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
OOW	-	Officer of the watch
PLA	-	Port of London Authority
PMSC	-	Port Marine Safety Code
ROT	-	Rate of Turn
SHA	-	Statutory Harbour Authority
SMS	-	Safety Management System
SOG	-	Speed Over the Ground
UK	-	United Kingdom
UTC	-	Universal Co-ordinated Time
VHF	-	Very High Frequency
VTS	-	Vessel Traffic Services

TIMES: ALL TIMES USED IN THIS REPORT ARE UTC + 1 hour, UNLESS OTHERWISE STATED

[1] ISO 80000-3 2006, knot (symbol kn): 1 nautical mile per hour

SYNOPSIS

At 0219 on 25 July 2013, the tanker *Apollo* was rounding Tilburyness, River Thames, in a strong tidal flow when it left its intended track and made contact with the quayside at the Northfleet Hope Container Terminal. The vessel and the quayside both sustained significant damage as a result of the accident.

Apollo was fully loaded with almost 22,000 tonnes of gas oil for discharge at the Vopak Terminal, West Thurrock. The vessel's bridge team consisted of two Port of London Authority pilots, the master, who had returned to the bridge just before the accident, the officer of the watch and a helmsman.

At the time of the accident one of the pilots was undertaking a practical examination and, although he had the conduct of the vessel, he was not authorised to pilot a vessel of *Apollo*'s length and draught.

Apollo was fitted with a controllable pitch propeller, but neither pilot was aware of this before the accident. As *Apollo* rounded Tilburyness the propeller pitch was briefly set to zero, after which the vessel veered off course and made contact with the quayside.

This was the fourth accident involving large vessels at times of strong tidal flow, in the Tilburyness area, since 2007. All resulted in damage to vessels and shore infrastructure.

The vessel's manager has taken action to prevent a recurrence. A recommendation has been made to the Port of London Authority, the UK Marine Pilots Association and the Port Marine Safety Code Steering Group to develop best practice guidelines for the conduct of practical pilotage examinations.

The Port of London Authority has also been recommended to review:

- Its risk assessment for large vessels rounding Tilburyness at times of strong tidal flow.
- Its pilot training programme, to ensure its pilots undertake examinations on vessels of appropriate size.
- The consistency and accuracy of data entered into its vessel traffic management system database.
- The wording of its General Direction 18/2011 relating to *"a member of the crew who is capable of taking charge of the vessel"*.

SECTION 1 - FACTUAL INFORMATION

1.1 PARTICULARS OF *APOLLO* AND ACCIDENT

SHIP PARTICULARS	
Vessel's name	*Apollo*
Flag	Gibraltar
Classification society	Germanischer Lloyd
IMO number	9234628
Type	Oil product/chemical tanker
Registered owner	MT 'Apollo', Schiffahrtsgesellschaft GmbH & Co KG, Bremen, Germany
Manager	Carl Buettner GmbH & Co KG, Bremen
Construction	Steel, built 2003, Rijeka, Croatia
Length overall	167.61m
Draught (at time of accident)	9.3m
Registered length	161.54m
Gross tonnage	16914
Minimum safe manning	14
Authorised cargo	Petroleum products/chemicals
VOYAGE PARTICULARS	
Port of departure	Antwerp
Port of arrival	London
Type of voyage	International
Cargo information	Gas oil, 21730 tonnes
Manning	21
MARINE CASUALTY INFORMATION	
Date and time	25 July 2013, 0220 (UTC+1)
Type of marine casualty or incident	Serious Marine Casualty
Location of incident	Northfleet Hope Container Terminal, River Thames
Place on board	Not applicable
Injuries/fatalities	None
Damage/environmental impact	Material damage to hull plating
Ship operation	On passage
Voyage segment	Arrival
External & internal environment	Darkness, wind: light airs, calm sea, Visibility: good Flood tide
Persons on board	23

1.2 BACKGROUND

The Port of London Authority's (PLA) operating procedure for pilot training detailed the requirements for a pilot's progression from trainee through Classes 4, 3, 2 and 1 to become a Class 1 (Unrestricted) pilot **(Annex A)**.

The training programme required pilots to undertake a minimum number of pilotage acts on vessels of a specific maximum length at each class before becoming eligible for examination to pilot larger vessels in the next class. A pilot's progression to the next class was subject to successful oral and practical examinations.

On 12 July 2013, the PLA Class 3 pilot who had the con of *Apollo* at the time of the accident, successfully passed his oral examination for Class 2 pilot. On 24 July, he was allocated to take the practical examination for Class 2 pilot on *Apollo* during its inward passage. He was accompanied by a Class 1 (Unrestricted) pilot who was authorised to pilot the vessel and trained to undertake the Class 3 pilot's practical examination.

1.3 NARRATIVE

1.3.1 Port pilotage plan

On the afternoon of 24 July 2013 the Class 3 pilot prepared a port pilotage plan for *Apollo*'s passage from the pilot boarding area off North Foreland to its berth at the Vopak terminal, West Thurrock **(Figure 1)**. The pilot was at home and obtained information about the vessel's manoeuvring equipment by internet access to the PLA's "Polaris" database.

At 1830 on 24 July, the Class 3 pilot arrived at the operations room, London Vessel Traffic Services (VTS). He consulted with the duty port controller (DPC), a Class 1 (Unrestricted) pilot, who had also prepared an arrival plan for the vessel. The Class 3 pilot updated his plan with the latest environmental and vessel traffic information and confirmed the accuracy of the tidal height calculations he had made.

The Class 3 pilot met with the Class 1 (Unrestricted) pilot who was to conduct the practical examination; they discussed the vessel's passage and compared their respective port pilotage plans. At 2000 the pilots travelled by taxi to Ramsgate, where they embarked in a pilot boat which took them to board *Apollo* off North Foreland.

1.3.2 Passage

The pilots boarded *Apollo* at 2206 on 24 July and met the master on the bridge. The Class 1 pilot informed the master that the other pilot was undertaking a practical examination and would have the con of the vessel for the inward passage. The Class 1 pilot explained that he would monitor and assess the Class 3 pilot's performance throughout the passage in accordance with the PLA assessment form **(Annex B)**. There was a mutual understanding between both pilots that if the Class 1 pilot had to intervene in the act of pilotage, the examination would be over and the candidate deemed to have failed.

Image courtesy of Google Earth

Figure 1: Thames Estuary to Vopac Terminal

The master/pilot exchange took place between the master and the Class 3 pilot (hereafter referred to as “the pilot”). The pilot explained his port pilotage plan and the intended use of two tugs to assist the vessel berthing. The pilot asked the master about the vessel’s manoeuvring characteristics and was informed that the bow went to starboard when going astern. He then countersigned the vessel’s pilot information card **(Annex C)**.

The pilot also showed the master a recent hydrographic survey of the Princes Channel and explained that the vessel would initially proceed at reduced speed until it had passed through the channel, to ensure there was sufficient under keel clearance at all times.

At about 2240 the master left the bridge and informed the third officer, who was the officer of the watch (OOW), that he wished to be called 10 minutes before the tugs were due to be made fast. The bridge team comprised: the third officer, the helmsman, and the two pilots, until 2300 when the second officer relieved the third officer as OOW. The helmsman was also relieved at this time.

At 0150 on 25 July, *Apollo* entered Gravesend Reach, at a speed over the ground (SOG) of 9.0 knots (kn) and the pilot reported the vessel’s position to London VTS.

The pilot then contacted the tugs *Svitzer Laceby* and *Svitzer Brunel*, advised them of the berthing plan and confirmed that they would be made fast after the vessel had rounded Broadness **(Figure 2)**.

Reproduced from Admiralty Chart BA 1186-1 by permission of the Controller of HMSO and the UK Hydrographic Office

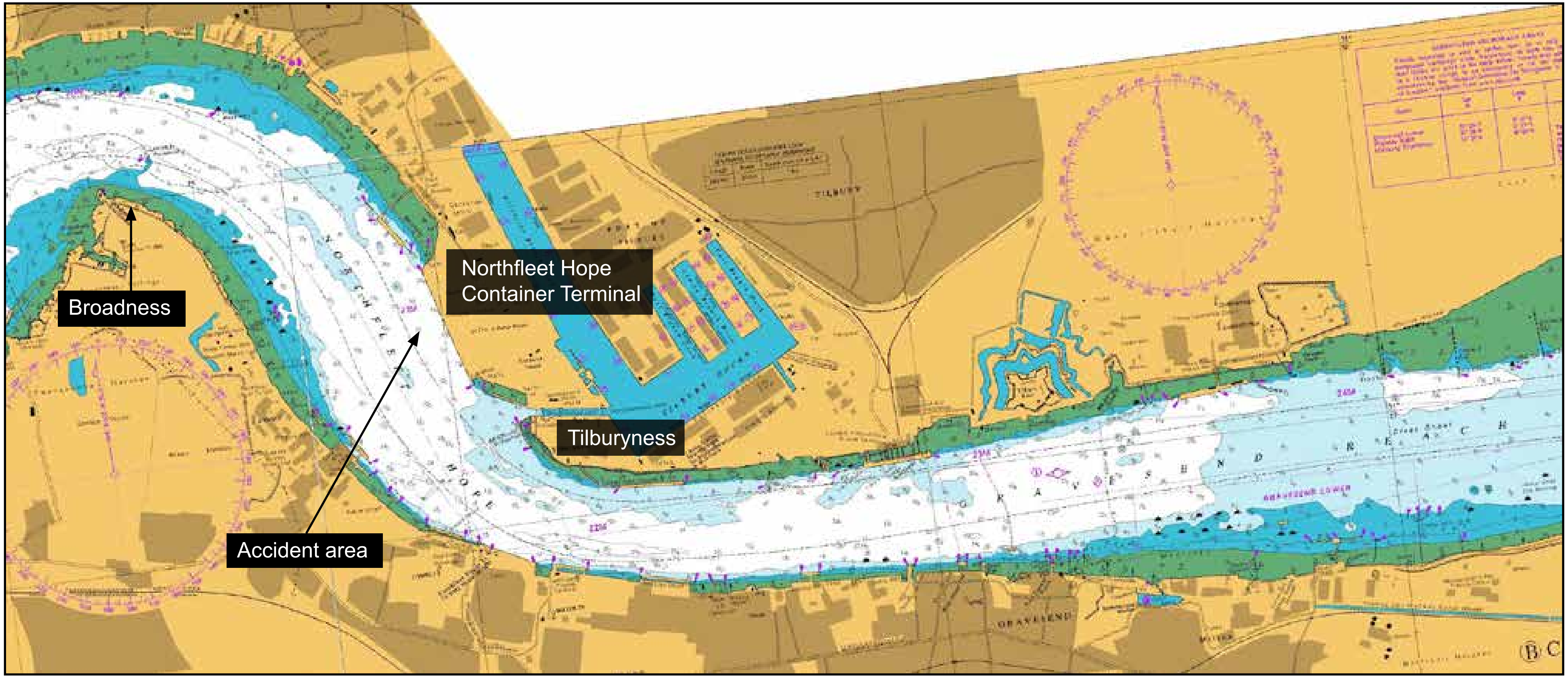

Figure 2: River Thames, Broadness to Gravesend Reach

1.3.3 Approaching and rounding Tilburyness

At 0205 *Apollo* was approaching Gravesend, SOG 10.0kn, when the pilot informed the Class 1 pilot that he intended to make the tugs fast in Northfleet Hope, north of the container terminal[2]. The pilots briefly discussed the presence of a tidal "*down drain*"[3] off the container terminal at certain states of tide.

At 0210 the vessel was off Gravesend, making a SOG of 10.4kn. The pilot told the OOW to call the master because the attending tugs were due to be made fast 10 minutes later. He then ordered the OOW to select Dead Slow Ahead on the engine combinator and told the helmsman to steer a heading of 275°.

As the vessel approached and rounded Tilburyness the following details were obtained from the vessel's Voyage Data Recorder:

Time (local)	Speed (SOG)	Pilot's orders for: Engine and Helm		Rate of Turn	Heading	Report Reference
0213	10.4kn	Dead Slow Ahead	Starboard 15°	0°	275°	**Figure 3a**
0213:30				25° to starboard		
0214	9.9kn	Slow Ahead	Port 10°, then Port 20°	24° to starboard		**Figure 3b**
0215:35	9.2kn	Stop		16° to starboard		**Figure 3c**
0215:55			Hard to Port			
0216:07	8.7kn	Dead Slow Ahead		25° to starboard		
0216:25		Slow Ahead				
0217	7.5kn	Full Ahead		31° to starboard	000°	**Figure 3d**
0218	6.8kn			10° to port		**Figure 3e**
0219		Full Astern				
0219:20	6.0kn					**Contact Figure 3f**

[2] The name Northfleet Hope Container Terminal is used in this report in accordance with the PLA's reference for the facility. It is also known commercially as the London Container Terminal.

[3] *Down drain* is the term used to indicate that the tidal flow off the Northfleet Hope Container Terminal is generally southerly when the tide is flooding and the main tidal flow in the river is northerly.

At 0213 *Apollo* was approaching Tilburyness **(Figure 3a)** when the pilot ordered the helm to starboard 15°; within 30 seconds the vessel's rate of turn[4] (ROT) became 25°/min to starboard.

At 0215:35, the vessel was rounding Tilburyness **(Figure 3c)**, the pilot ordered the engine to be stopped. At 0216:07 the pilot ordered Dead Slow Ahead.

At 0217 the pilot ordered Full Ahead and requested the tug *Svitzer Laceby* to assist the vessel.

1.3.4 Contact

At 0218 the vessel was 100m from the quay at Northfleet Hope Container Terminal **(Figure 3e)** when its bow began to turn to port. The master had just returned to the bridge and repeated the order of Full Ahead, hard-to-port.

The pilot then ordered the tug *Svitzer Brunel* to push on *Apollo*'s bow, but the tug's skipper advised that the tug would have to be turned before it could be positioned to assist the vessel.

At 0218:50 London VTS informed the pilot of a container vessel, which had entered Gravesend Reach and was due to berth at the container terminal, that he should reduce its speed and await further instructions.

At 0219 the pilot ordered Full Astern. Twenty seconds later the vessel's starboard bow made contact with the edge of the quay at the upper berth of the terminal, SOG 6.0kn **(Figure 3f)**.

When the contact occurred the pilot ordered that the port anchor should be let go and the helm placed hard-a-starboard; at 0220 he ordered that the starboard anchor should also be let go.

At 0222 the pilot ordered half astern and instructed *Svitzer Laceby* to make fast to *Apollo*'s stern. The tug was then made fast aft and *Svitzer Brunel* was instructed to make fast to the vessel's bow.

At 0223 *Apollo* stopped in the water with its bow 40m from the stern of a vessel alongside the grain terminal berth ahead **(Figure 3g)**.

1.3.5 Pilot changeover and damage assessment

At 0224 the Class 3 pilot advised the master that he had handed the vessel's con to the Class 1 pilot, and at 0225 the Class 1 pilot instructed that both anchors should be recovered.

At 0234 the forward tug was made fast, both anchors were recovered and the vessel proceeded inwards towards the Vopak terminal. *Apollo*'s crew began to assess the vessel's condition and whether any pollution had occurred.

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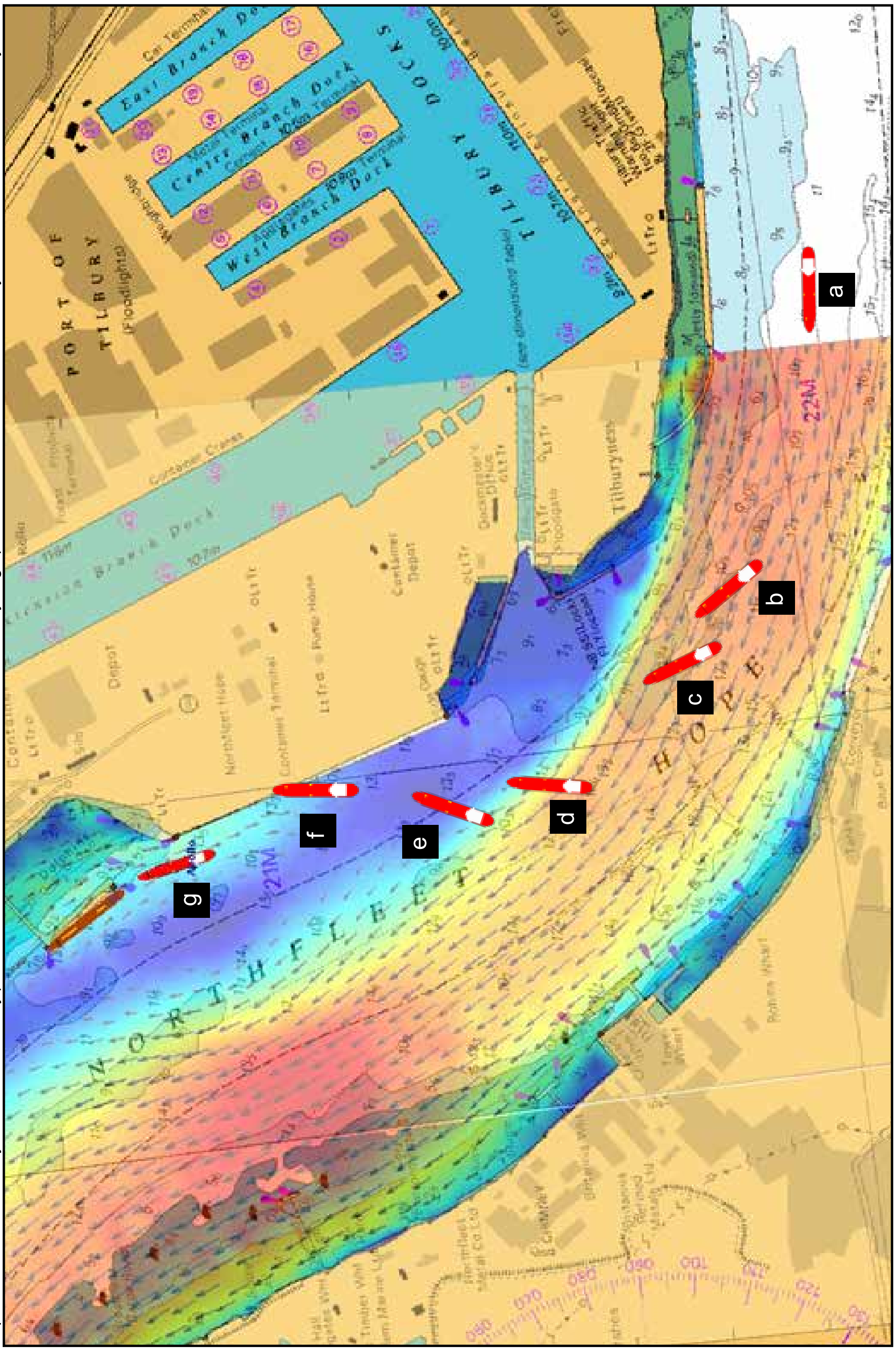
[4] Rate of Turn refers to the rate of change of a vessel's heading when turning to port or starboard and is expressed in degrees per minute (°/min)

Reproduced from Admiralty Chart BA 2151-0 by permission of the Controller of HMSO and the UK Hydrographic Office. Tidal information courtesy of the Port of London Authority



Figures 3 a-g: *Apollo*'s manoeuvre around Tilburyness (showing tidal stream arrows for time of accident)

It was found that the shell plating had been holed in way of number 1 starboard water ballast tank, above the waterline, and that the plating was indented in way of the starboard forepeak tank **(Figure 4)**. The shell plating was also found to have been indented above and below the waterline in the area of the starboard shoulder, aft.

Image courtesy of The Port of London Authority

Figure 4: *Apollo* - damage to shell plating

The crew confirmed that none of the cargo tanks had been damaged, and an inspection of the water around the container terminal by PLA marine staff confirmed that there had been no pollution. Despite the damage to the quayside **(Figure 5)**, the terminal remained operational, and the container vessel following *Apollo* was able to berth as planned.

The Vopak terminal operators were informed of the damage to the vessel and gave approval for it to berth and discharge its cargo. *Apollo* continued its inward passage and berthed at Number 2 jetty, Vopak terminal, at 0339 on 25 July.

Drug and alcohol tests were conducted on all the members of the bridge team, the results of which were all negative.

1.3.6 Condition of Class, repairs

Following discharge of *Apollo*'s cargo of 21,730 tonnes of gas oil, temporary repairs were undertaken which were approved by the vessel's classification society, Germanischer Lloyd (GL). A GL surveyor issued a Condition of Class **(Annex D)**, which allowed the vessel to proceed to Rotterdam on 27 July 2013 for permanent repairs. The vessel resumed trading on 18 August 2013.

Image courtesy of The Port of London Authority

Figure 5: Damage to quay, Northfleet Hope Container Terminal

1.4 ENVIRONMENTAL

Wind: Light (080° x 5kn)

Sea state: Calm

Visibility: Good

1.4.1 Tidal information (Tilbury)

24 July 2013

Low water: 2155 0.1m

25 July 2013

High water: 0330 7.0m

Low water: 0902 0.6m

Tidal range at time of accident = 6.9m

Tidal range (spring tide), Tilbury = 5.9m

1.4.2 Tidal stream, Tilburyness

The PLA's tidal stream diagram for 1 hour before high water **(Figure 6)** predicted a flood[5] tidal rate of about 3kn around Tilburyness (coloured: dark red), and showed the extent of the *down drain* (blue) off the container terminal.

Image courtesy of The Port of London Authority

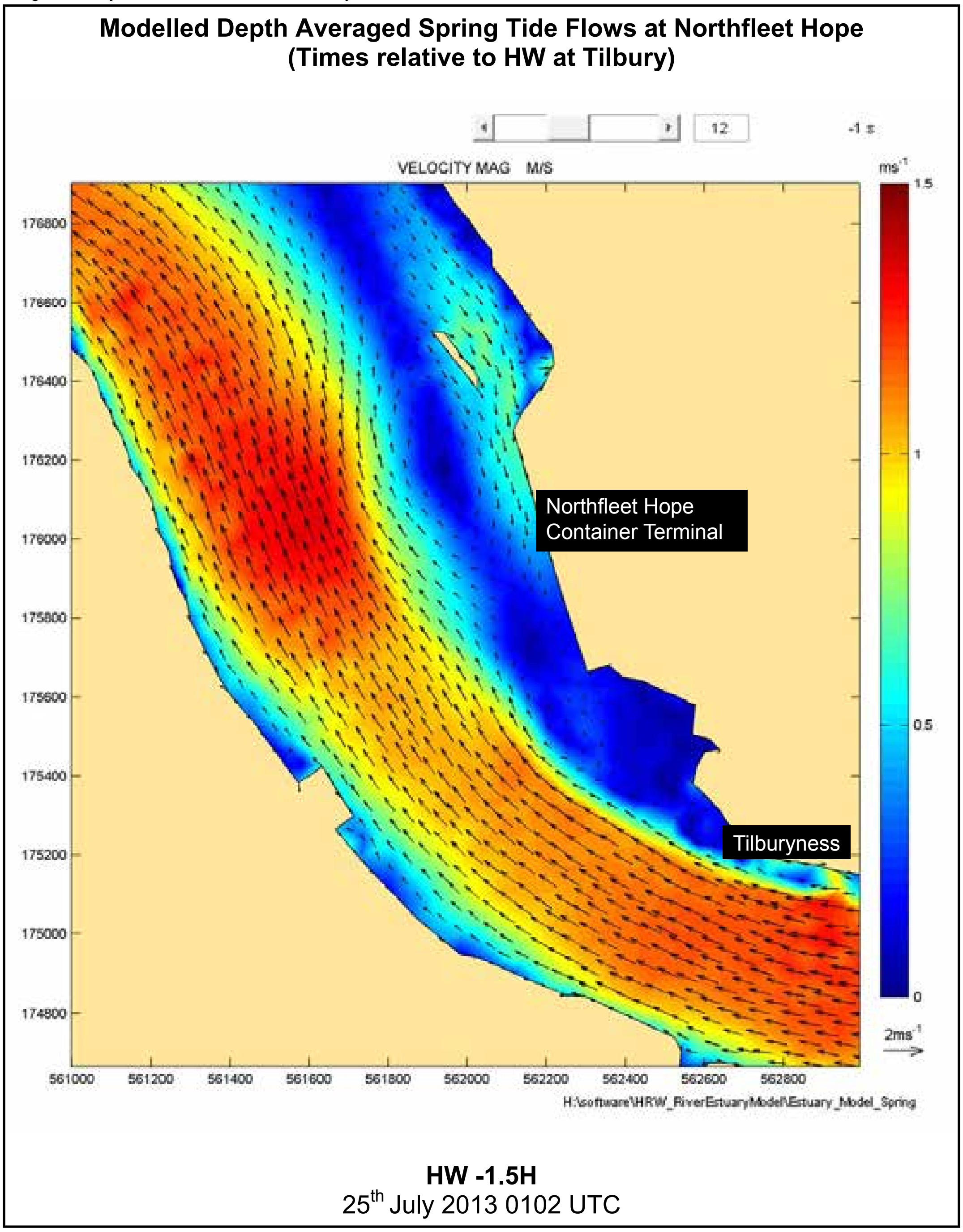


Figure 6: Tidal stream diagram, Tilburyness

[5] Flood tide, refers to the tidal flow between low and high water. The direction of the tidal flow in Figure 6 is represented by arrows; the rate of the tidal stream is represented by the length of the arrow and the colour used. Note: 1m/sec = 1.94kn.

1.5 BRIDGE TEAM

1.5.1 Pilot (Class 3)

The pilot, who had the con of the vessel at the time of the accident, held an STCW[6] II/2 Certificate of Competency (CoC) as master (unlimited). He had joined the PLA as a trainee pilot in February 2011 and was authorised as a Class 4 pilot in August 2011. He became a Class 3 pilot in June 2012 and had completed 125 acts of pilotage at that level before taking the examination to become a Class 2 pilot.

Prior to joining the PLA he had gained extensive shiphandling experience as a master on commercial vessels.

1.5.2 Pilot (Class 1)

The assessor was a Class 1 (Unrestricted) pilot who had joined the PLA in 1995 and became authorised as Class 1 (Unrestricted) in 2000.

1.5.3 Master

The master was a Croatian national who held an STCW II/2 CoC as master (unlimited), and a certificate of equivalent competency issued by the vessel's flag state, Gibraltar.

He had been sailing as master for 14 years and had been employed by the vessel's management company as master of vessels of the same class as *Apollo* for the previous 8 years.

1.5.4 Officer of the watch

The second officer, who was the OOW at the time of the accident, held an STCW II/2 CoC as chief mate. He had been employed by the vessel's management company for 4 years and had been a second officer for 2 years.

1.6 REST PERIODS

The master had taken 11.5 hours' rest on the day before the accident. He had begun work at 0700 following a full night's rest, and had taken 4.5 hours' rest during the day. He had not taken a period of 6 consecutive hours of rest in the 24 hours before the accident.

The remaining crew and both pilots had all taken rest periods in excess of 6 consecutive hours in the 24 hours before the accident.

[6] STCW, International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended (STCW Convention)

1.6.1 International Labour Organization Convention on Seafarers' Hours of Work

The International Labour Organization (ILO) Convention on Seafarers' Hours of Work, ILO 180[7], confirmed the minimum hours of rest which seafarers must receive. For daily rest, 10 hours of rest were required to be taken in any 24 hour period. The rest could be divided into no more than two periods, one of which was required to be at least 6 hours in length.

National competent authorities were able to authorise exceptions to ILO 180 in order to meet overriding operational conditions. In the United Kingdom the Maritime and Coastguard Agency (MCA) issued Marine Guidance Note 448(M)[8] which stated that a "*planned passage under pilotage cannot be considered to be 'overriding operational conditions' which would justify a breach of minimum hours of rest*".

1.7 *APOLLO* – NAVIGATIONAL SAFETY MANAGEMENT SYSTEM

The navigational procedure contained in the vessel's Safety Management System (SMS) for entering port **(Annex E)** required that the bridge manning for clear weather and moderate traffic should consist of two "licensed officers".

The procedure stated that one of the two officers would usually be the master but, under *special circumstances*, the master could delegate to the chief officer.

1.8 PLA GENERAL DIRECTION 18/2011, PERSONS ON THE BRIDGE

The PLA issued General Direction 18/2011 to inform port users of the minimum bridge manning required on the River Thames:

PERSONS ON THE BRIDGE

(1) There shall be, on the bridge of a power-driven vessel underway in the Thames, either the Master of the vessel or a member of the crew who is capable of taking charge of the vessel and, when a pilot is on board, is capable of understanding the pilot's directions.

(2) When a PEC holder has conduct of a vessel within the London Pilotage District, a second person, who is competent to take charge of the vessel, shall be immediately available to take charge in an emergency.

1.9 PLA - PILOT TRAINING PROGRAMME

The PLA pilot training programme provided the structure for the training and experience required for a pilot to progress from recruitment to become a Class 1 (Unrestricted) pilot.

The programme detailed the minimum number of pilotage acts and additional training (including ship simulator, tug trips and safety courses) required at each of the five stages of a pilot's training: Trainee, Class 4, Class 3, Class 2 and Class 1.

[7] ILO 180: as enshrined in Council Directive 1999/63/EC concerning the Agreement on the organisation of working time of seafarers concluded by the European Community Shipowners' Association and the Federation of Transport Workers' Unions in the European Union

[8] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/282116/mgn448.pdf

The programme was structured so that as a pilot progressed through the training he became authorised to pilot vessels of increasing length and draught.

Once a pilot had completed a requisite number of pilotage acts and additional training at a particular Class, he would sit an oral examination. If successful, the pilot would then undertake a practical examination by a specially trained Class 1 pilot, on a suitably sized vessel, for progression to the next Class.

1.9.1 Progression from Class 3 to Class 2 pilot

Class 3 pilots were authorised to pilot vessels of 145m length and 7.5m draught. Class 3 pilots would typically take 9 months to progress to Class 2 during which they had to conduct a minimum of 115 acts of pilotage, 20 of which had to be above Gravesend, as well as further training. The pilots then had to pass oral and practical examinations before advancing to Class 2. Class 2 pilots were authorised to conduct the pilotage of cargo vessels of 160m length and 9.0m draught, except for tankers which were restricted to 8.0m draught for 3 years from the pilot's first authorisation.

At the time of the accident the Class 3 pilot was undertaking a practical examination to become a Class 2 pilot.

1.9.2 Progression from Class 2 to Class 1 (Unrestricted) pilot

A pilot would typically spend 10 months at Class 2 and was required to have completed a minimum of 120 acts of pilotage, 20 of which had to be above Gravesend, before being examined for progression to Class 1.

After authorisation at Class 1, a pilot was restricted for a period of 12 months to the conduct of vessels of 180m length and 9.0m draught above Gravesend. Following further trip requirements and training a pilot could then be examined for progression to Class 1 (Unrestricted).

1.10 VESSEL TRAFFIC MANAGEMENT SYSTEM (POLARIS)

The PLA's Polaris database, which was available to pilots via the internet, contained data about vessels using the port of London as well as environmental and traffic movement information.

Information for individual vessels including name, tonnage, dimensions, IMO number, call sign and manoeuvring aids was entered into the database by PLA staff who could amend and update the data as necessary. Such information was sourced from a commercial vessel data provider.

The manoeuvring aids data entry for *Apollo*'s sister vessel, *Avalon* **(Figure 7a)**, showed that the vessel was equipped with a controllable pitch propeller (CPP) and an 800kW bow thrust.

The manoeuvring aids data entry for *Apollo* **(Figure 7b)** showed the vessel was equipped with an 800kW bow thrust and a semi spade rudder. Information regarding the vessel's manoeuvring speeds and notice required for manoeuvring was also included in the comments section of the entry.

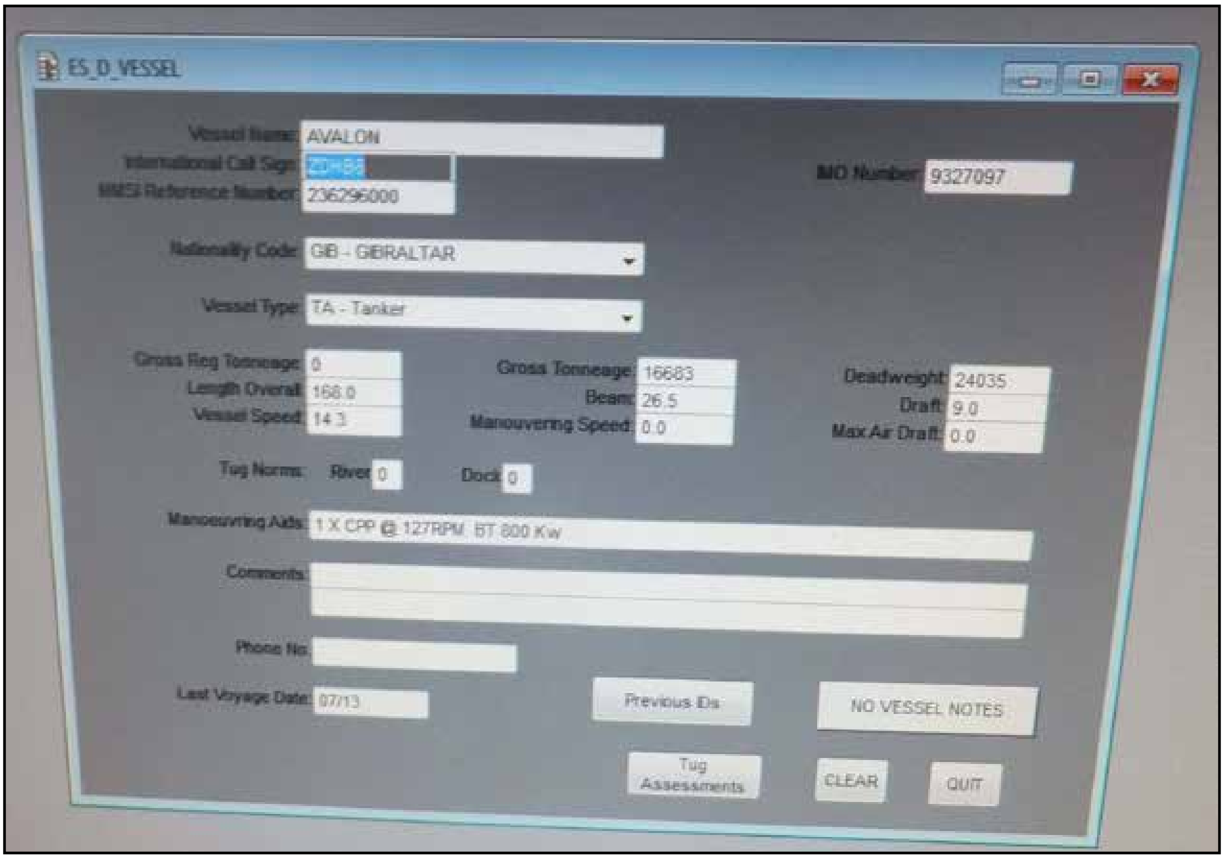


Figure 7a: Extract from Polaris database - *Avalon*'s details

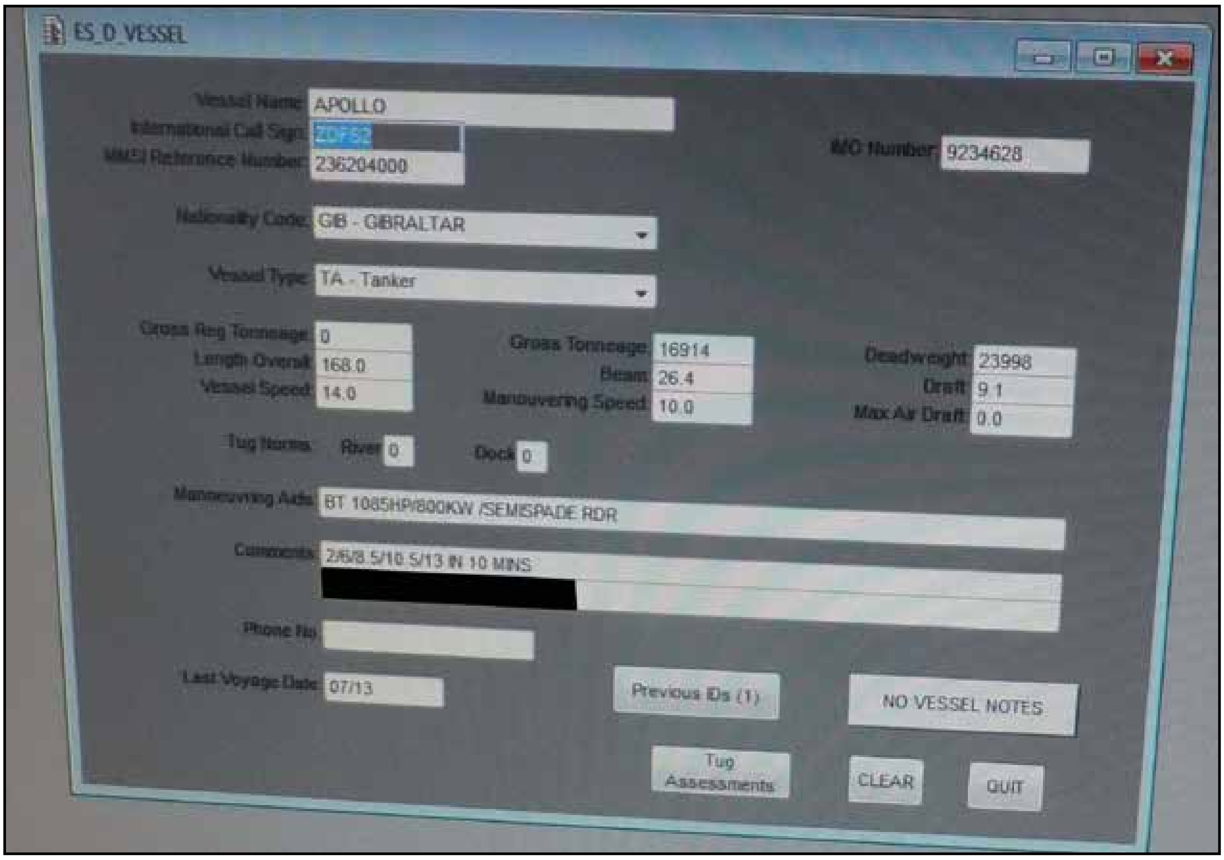


Figure 7b: Extract from Polaris database - *Apollo*'s details

1.11 PLA – NAVIGATIONAL SAFETY MANAGEMENT SYSTEM

The PLA's navigational SMS[9] applied to marine operations and activities within its area of jurisdiction as a Statutory Harbour Authority (SHA). It was based on formal risk assessment of identified hazards to navigation within the port, in accordance with the requirements of the Port Marine Safety Code[10] (PMSC).

The PMSC required SHAs to ensure that all risks were formally assessed and maintained as low as reasonably practicable in accordance with good practice.

All hazards to navigation identified by the PLA were recorded in a database that contained comprehensive details of the hazards and the associated risk control measures employed to mitigate them.

The hazards were ranked in order, based on the outcome of a risk assessment process. This ranking changed with time as the hazards and risk controls continued to be reviewed, reassessed and rescored. At the time of the accident, the PLA had identified and assessed the risks of 114 hazards to navigation throughout its area.

1.11.1 Risk assessment - vessel contact with jetties during transit

At the time of the accident the PLA had ranked the hazard of a vessel making contact with a jetty during its transit of the area between London Bridge and Sea Reach No 1 buoy **(Figure 1)** as the highest hazard to navigation in its port area.

The risk assessment report for this hazard **(Annex F)** listed the possible causes of a contact and the risk control measures in place to mitigate the likelihood of occurrence.

1.12 CONTROLLABLE PITCH PROPELLER

Manoeuvring a vessel fitted with a CPP differs considerably from a manoeuvre on a vessel with a fixed pitch propeller (FPP), which the pilots had assumed was fitted on *Apollo*.

When a vessel fitted with an FPP is moving ahead and its engine is stopped, water still flows through the propeller blades and across the rudder, allowing steerage to be retained as the vessel slows down.

When a vessel fitted with a CPP is moving ahead with the pitch set to zero, the flow of water through the propeller and across the rudder is interrupted **(Figure 8)** and steerage will be adversely affected as the vessel slows down.

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[9] http://www.pla.co.uk/assets/SMS_Manual_-_Issue_14_19_Sep_2012.pdf

[10] The Port Marine Safety Code, issued by the Department for Transport in 2000, established a national standard for every aspect of port marine safety. The code applies to all harbour authorities in the UK that have statutory powers and duties.

Extract from *The Shiphanders Guide*, The Nautical Institute

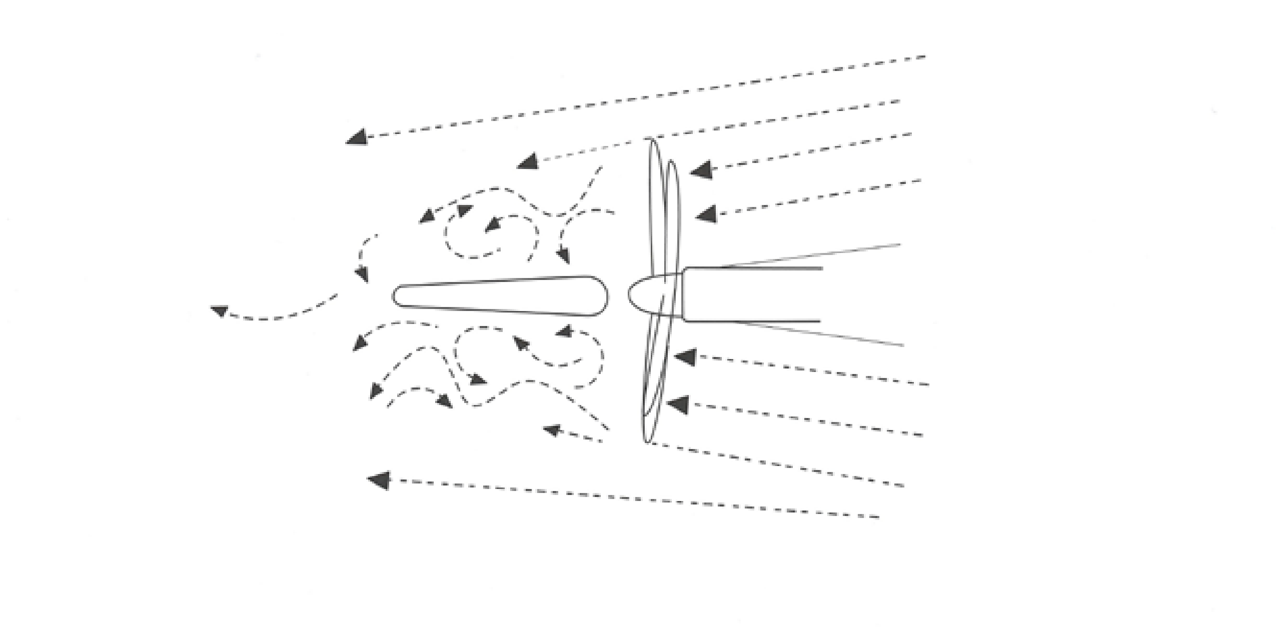


Figure 8: Manoeuvring with a controllable pitch propeller

1.13 PREVIOUS ACCIDENTS: TILBURYNESS, RIVER THAMES

In 2007, a tanker was outbound from Grays Terminal on an ebb tide. As the pilot manoeuvred the vessel around Tilburyness, he lost control of the vessel and it made contact with the quay at Northfleet Terminal. This resulted in damage to the vessel's shell plating. A contributing factor was the vessel's bow entering an area of counter-flow while its stern remained in the main ebb flow, causing the bow to unintentionally sheer to starboard.

In 2009, an outbound container vessel left Northfleet Hope Container Terminal on a flood tide. Shortly afterwards, the pilot lost control as he manoeuvred the vessel around Tilburyness and it made contact with the quay at Bevans Wharf. The vessel sustained superficial damage, but the quay and its supporting structures were severely damaged. The visibility was poor and caused the pilot to lose situational awareness. The vessel's bow had entered the strong flood tidal stream while its stern remained in the down drain, causing the vessel's bow to unintentionally sheer to starboard.

The PLA investigated both of these accidents in which tugs had been used for unberthing but had then been released and were unavailable to the vessels when rounding Tilburyness.

In 2011, the container vessel *CMA CGM Platon* made contact with the quay at Bevans Wharf[11], on the south bank of the river, when outbound from the container terminal. The accident occurred 2 hours before high water, Tilbury. The vessel suffered significant damage to its bow and there was damage to the quay. Fortunately there was no pollution and no one was hurt.

[11] http://www.maib.gov.uk/publications/investigation_reports/2011/platon.cfm

One of the conclusions made in the report was that the master and pilot did not conduct a detailed exchange of information in relation to the complex tidal flows that exist around Tilburyness, and the possibility of retaining the tug.

The report on the MAIB investigation of the accident recommended that the PLA: "*Include in its procedures a requirement for vessels departing Northfleet Hope Container Terminal to retain the use of a tug until they have fully entered the stream when a strong tidal counter-flow is present off the berth.*" This was accepted by the PLA, which issued Notice to Mariners 27 of 2011, to amend the code of practice for ship towage operations on the Thames **(Annex G)**.

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 SUMMARY

Apollo hit the quayside as a result of loss of control caused by the Class 3 pilot ordering what he believed to be an FPP to stop while rounding Tilburyness, to reduce the vessel's speed in anticipation of the need to secure two tugs required for the berthing operation. The effect of putting the CPP system to stop was an uncontrollable increase in the vessel's rate of turn that could not be corrected quickly enough to prevent the accident.

The Class 3 pilot had consulted the PLA's information database when preparing his passage plan and, based on the information he obtained, assumed that the vessel was fitted with a fixed pitch propeller.

Both pilots' focus was not only on the act of pilotage, but also on the conduct of a Class 2 practical examination. *Apollo* had been selected for the examination despite the fact that the examinee could not become qualified to pilot a vessel of *Apollo*'s length and draught for a further 2 years.

The pilots had agreed in advance how the examination would be conducted: the Class 3 pilot would take the con and the Class 1 pilot would monitor his actions and mark the examination assessment form as the act progressed. It was mutually understood that if the Class 1 pilot had to intervene, the examinee would be deemed to have failed the examination.

The master, who had taken insufficient rest in the preceding 24 hours, had left the bridge soon after the pilots had boarded, without nominating the chief officer to take his place. As a consequence, there was no-one on the bridge able to intervene quickly when the order to stop the engine was given.

2.3 PILOT TRAINING PROGRAMME

2.3.1 Selection of vessels for practical examinations

The Class 3 pilot, having successfully completed an oral examination, was allocated *Apollo* on which to undertake his practical examination. However, because *Apollo* was a tanker of over 9m draught, the PLA's rules required a Class 1 (unrestricted) pilot to con the vessel. Therefore the Class 3 pilot could not have become authorised to conduct a vessel of this size for a further 2 years after achieving Class 2 pilot status.

The allocation of *Apollo* for the practical examination was not a sensible test of the pilot's practical competence as it was not representative of the size of vessels he would be expected to con at the Class 2 level.

2.3.2 Preparation for practical examination

The PLA pilot training programme is structured such that a pilot, on successful completion of an oral examination, will then undergo practical assessment on a vessel of the next class. If the training process enabled pilots to gain experience of the larger vessels in the next class, by undertaking trips with a senior pilot in a non-examination environment, they would be better prepared to handle such vessels during the examination.

2.3.3 Conduct of practical examination

The two pilots had discussed the conduct of the practical examination in advance, and it had been agreed that the Class 3 pilot would take the con of the vessel. It was mutually understood that the Class 1 pilot would monitor the other pilot's performance and that if he had to intervene at any time, then the examination would be deemed to be over and unsuccessful.

The method used for the practical examination made it difficult for the Class 1 pilot to know when it might be necessary to intervene as any discussion about the appropriateness of an action could be deemed an intervention, thereby leading to automatic failure of the examination. Further, it effectively resulted in an unauthorised pilot having the conduct of *Apollo.*

An examination in which the examinee provided a running commentary of his intended actions might have proved more effective as it would have allowed the assessing pilot the opportunity to review the trainee's intentions in good time.

2.4 PLA VESSEL TRAFFIC MANAGEMENT SYSTEM (POLARIS)

The Class 3 pilot had consulted the PLA's Polaris database when preparing his port passage plan. There was no reference in *Apollo*'s database entry to record that the vessel was fitted with a CPP, although the database did show that other vessels of the same class did have CPPs. Accordingly, both pilots incorrectly assumed that the vessel was equipped with an FPP.

The pilots were aware of the manoeuvring differences between CPP and FPP. Evidence was obtained to confirm that the order to "*stop the engine*" as the vessel rounded Tilburyness would not have been given had they known that the vessel was equipped with a CPP.

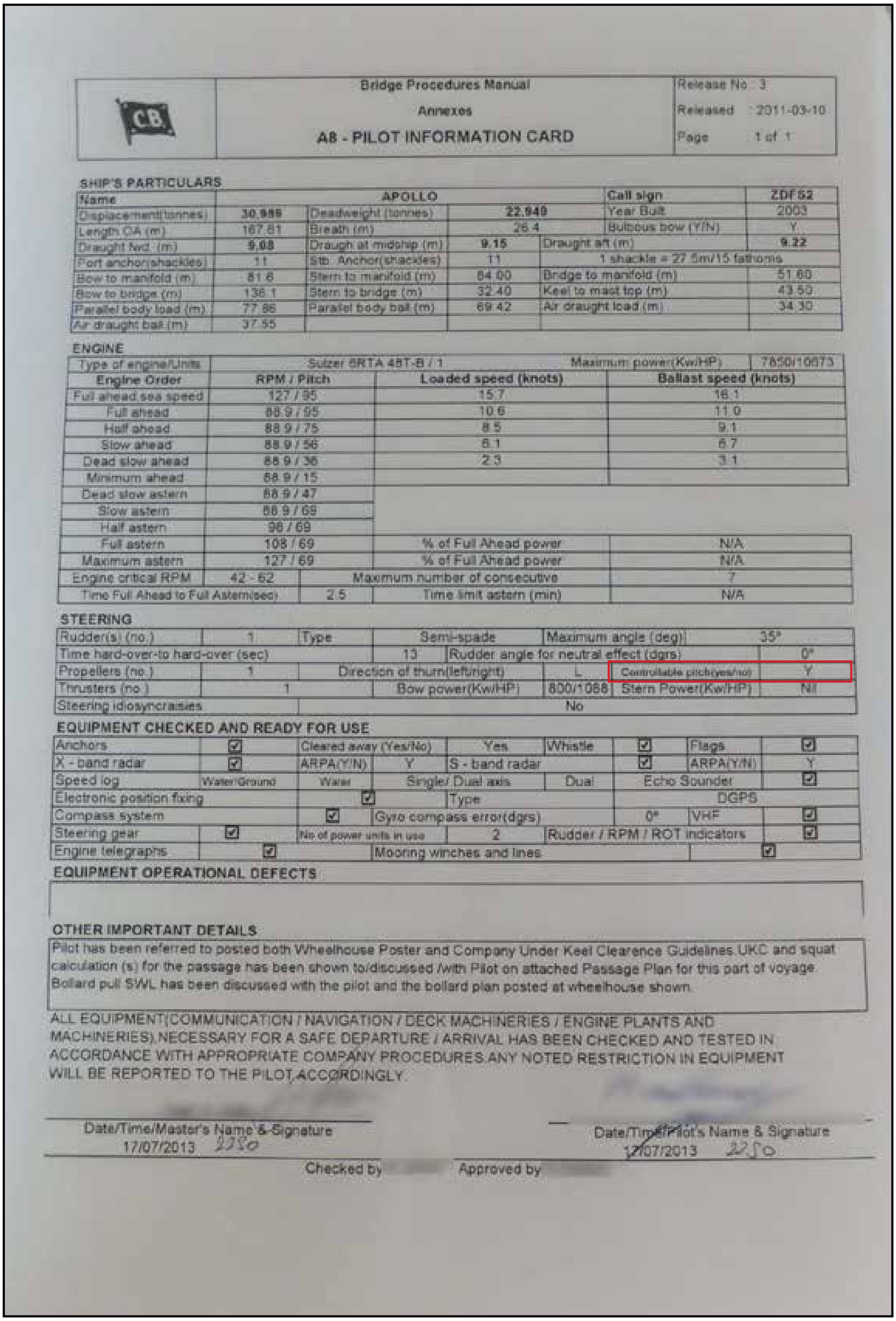
The PLA database is regularly used by its pilots and other marine staff to obtain key information for operational purposes. However, there is no agreed minimum data set and no process for data verification. As such the database cannot currently be relied upon as the primary source of vessel manoeuvring data for pilots.

2.5 MASTER/PILOT EXCHANGE

The master/pilot exchange, which took place between the master and the Class 3 pilot, discussed aspects of the vessel's handling characteristics as well as port related information. However, the fact that the vessel had a CPP was not discussed during the exchange.

The pilot card information indicated that *Apollo* was fitted with a CPP, but a large amount of other information was also displayed on the card. This would have made it difficult to spot that the vessel was fitted with a CPP in the time available.

The reference to its CPP on the vessel's pilot card was not easy to find and the format of the card compares unfavourably with the layout of the specimen master/pilot exchange card annexed to the Bridge Procedures Guide **(Figure 9)**.



CB	Bridge Procedures Manual Annexes A8 - PILOT INFORMATION CARD	Release No : 3 Released : 2011-03-10 Page : 1 of 1

SHIP'S PARTICULARS

Name	APOLLO			Call sign	ZDFS2
Displacement(tonnes)	30,989	Deadweight (tonnes)	22,940	Year Built	2003
Length OA (m)	167.81	Breath (m)	26.4	Bulbous bow (Y/N)	Y
Draught fwd. (m)	9.08	Draugh at midship (m)	9.15	Draught aft (m)	9.22
Port anchor(shackles)	11	Stb. Anchor(shackles)	11	1 shackle = 27.5m/15 fathoms	
Bow to manifold (m)	81.6	Stern to manifold (m)	84.00	Bridge to manifold (m)	51.60
Bow to bridge (m)	136.1	Stern to bridge (m)	32.40	Keel to mast top (m)	43.50
Parallel body load (m)	77.86	Parallel body ball (m)	69.42	Air draught load (m)	34.30
Air draught ball (m)	37.55				

ENGINE

Type of engine/Units	Sulzer 6RTA 48T-B / 1	Maximum power(Kw/HP)	7850/10673
Engine Order	RPM / Pitch	Loaded speed (knots)	Ballast speed (knots)
Full ahead sea speed	127 / 95	15.7	16.1
Full ahead	88.9 / 95	10.6	11.0
Half ahead	88.9 / 75	8.5	9.1
Slow ahead	88.9 / 56	6.1	6.7
Dead slow ahead	88.9 / 36	2.3	3.1
Minimum ahead	88.9 / 15		
Dead slow astern	88.9 / 47		
Slow astern	88.9 / 69		
Half astern	98 / 69		
Full astern	108 / 69	% of Full Ahead power	N/A
Maximum astern	127 / 69	% of Full Ahead power	N/A
Engine critical RPM	42 - 62	Maximum number of consecutive	7
Time Full Ahead to Full Astern(sec)	2.5	Time limit astern (min)	N/A

STEERING

Rudder(s) (no.)	1	Type	Semi-spade	Maximum angle (deg)	35°
Time hard-over-to hard-over (sec)		13		Rudder angle for neutral effect (dgrs)	0°
Propellers (no.)	1	Direction of thurn(left/right)	L	Controllable pitch(yes/no)	Y
Thrusters (no.)	1	Bow power(Kw/HP)	800/1088	Stern Power(Kw/HP)	Nil
Steering idiosyncraisies		No			

EQUIPMENT CHECKED AND READY FOR USE

Anchors	☑	Cleared away (Yes/No)	Yes	Whistle	☑	Flags	☑
X - band radar	☑	ARPA(Y/N)	Y	S - band radar	☑	ARPA(Y/N)	Y
Speed log	Water/Ground	Water	Single/ Dual axis	Dual	Echo Sounder		☑
Electronic position fixing		☑	Type		DGPS		
Compass system		☑	Gyro compass error(dgrs)		0°	VHF	☑
Steering gear	☑	No of power units in use	2	Rudder / RPM / ROT indicators			☑
Engine telegraphs	☑	Mooring winches and lines				☑	

EQUIPMENT OPERATIONAL DEFECTS

OTHER IMPORTANT DETAILS

Pilot has been referred to posted both Wheelhouse Poster and Company Under Keel Clearence Guidelines.UKC and squat calculation (s) for the passage has been shown to/discussed /with Pilot on attached Passage Plan for this part of voyage. Bollard pull SWL has been discussed with the pilot and the bollard plan posted at wheelhouse shown.

ALL EQUIPMENT(COMMUNICATION / NAVIGATION / DECK MACHINERIES / ENGINE PLANTS AND MACHINERIES),NECESSARY FOR A SAFE DEPARTURE / ARRIVAL HAS BEEN CHECKED AND TESTED IN ACCORDANCE WITH APPROPRIATE COMPANY PROCEDURES.ANY NOTED RESTRICTION IN EQUIPMENT WILL BE REPORTED TO THE PILOT ACCORDINGLY.

Date/Time/Master's Name & Signature
17/07/2013 2250

Date/Time/Pilot's Name & Signature
17/07/2013 2250

Checked by Approved by

Figure 9: Pilot cards - *Apollo* and Bridge Procedures Guide

A1 SHIP-TO-SHORE: MASTER/PILOT EXCHANGE

SHIP IDENTITY

Name ____ Call sign ____ Flag ____

Ship's agent ____ Year built ____ IMO No ____

Cargo type ____ Ship type ____ Last port ____

ADDITIONAL COMMUNICATION INFORMATION

Fax ____ Telex ____ Other ____

PILOT BOARDING

Date/ETA ____ (UTC/LT) Freeboard ____

Boarding station (if there is more than one) ____

SHIP PARTICULARS

Draught fwd ____ Draught aft ____ Draught amidships ____ (salt water)

Air draught ____ Length ____ Beam ____

Displacement ____ Dwt ____ Gross ____ Net ____

ANCHORS

Port anchor ____ Stbd anchor ____ (length of cable available)

MANOEUVRING DETAILS AT CURRENT CONDITION

Full speed ____ Half speed ____

Slow speed ____ Min. steering speed ____

Propeller direction of turn: left / right Controllable pitch: yes / no

Number of propellers ____ Number of fwd thrusters ____ Number of aft thrusters ____

MAIN ENGINE DETAILS

Type of engine: motor / turbine / other

Max. number of engine starts ____ Time from full ahead to full astern ____

EQUIPMENT DEFECTS RELEVANT TO SAFE NAVIGATION

____

OTHER IMPORTANT DETAILS e.g. berthing restrictions, manoeuvring peculiarities

____

78 BRIDGE PROCEDURES GUIDE

Figure 9 cont: Pilot cards - *Apollo* and Bridge Procedures Guide

2.6 BRIDGE TEAM COMPOSITION

The master left the bridge after the master/pilot exchange had been completed. The bridge team then comprised the OOW, the helmsman and the two pilots. This did not meet the requirements of the vessel's SMS, which required that the master or, in certain circumstances the chief officer, should be on the bridge when entering or leaving port.

The bridge manning might also not have met the requirements of the PLA's General Direction 18/2011 relating to persons on the bridge, which required that either the master or a "*member of the crew capable of taking charge*" should be on the bridge with the pilot. The meaning of this wording should be clarified to avoid any misinterpretation.

Had the master been on the bridge in the period leading up to the accident, as required by both the vessel's SMS and local regulations, he would have understood the likely consequence of ordering the engine to 'stop' and been able to intervene quickly to avert the accident.

2.7 MANOEUVRE AROUND TILBURYNESS

The vessel's inward passage had proceeded in accordance with the passage plan. However, as the vessel approached Tilburyness the Class 3 pilot decided to connect the tugs earlier than originally planned, which meant he also had to slow *Apollo* earlier than intended.

As the Class 3 pilot fully understood the adverse effects on manoeuvrability of putting a CPP to zero pitch, had he been aware that *Apollo* was fitted with a CPP he would almost certainly have chosen either to reduce the vessel's speed in a safer manner or, if this was not possible, stuck with the original plan.

2.8 PLA RISK ASSESSMENT FOR TILBURYNESS

Since 2007 there have been four notable accidents which caused damage to vessels and shore infrastructure in the Tilburyness area. All occurred at times of strong tidal flow.

The PLA recognised that the hazard to navigation of vessels making contact with jetties while on transit through this area, was significant, and it was ranked as the highest hazard of the 114 identified hazards in its area of jurisdiction. In this accident, control of the vessel was effectively lost when the propeller pitch was placed at zero for just 32 seconds as the vessel made its turn.

This accident demonstrates the high risk to navigation when large vessels transit the Tilburyness area at times of strong tidal flow. It is an area of complex tidal flows, therefore a review should be undertaken to ensure that existing control measures are sufficiently robust to ensure the residual risk to navigation is as low as is reasonably practicable.

2.9 FATIGUE

The master had not taken the required rest period of 6 consecutive hours in the 24 hours before the accident. The remainder of the vessel's officers and crew had taken adequate rest within the same period, as had the pilots.

In MGN 448 the MCA stated that a planned passage under pilotage, in normal circumstances "*cannot be considered to be overriding operational conditions*". Therefore the requirement for the master to take a rest period of 6 consecutive hours should have been prioritised.

The vessel's SMS allowed for the master to hand over responsibility to the chief officer in special circumstances. In view of the fact that the master had not taken the required rest, it would have been appropriate for him to have delegated responsibility for the initial part of the pilotage passage to the chief officer. He would then have been able to take 6 consecutive hours of rest and been available on the bridge for the final part of the passage.

SECTION 3 - CONCLUSIONS

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

1. The allocation of *Apollo* for the practical examination was not a good test of the pilot's practical competence as it was not representative of the vessels he would pilot at the Class 2 level. [2.3.1]

2. The method used for the practical examination made it difficult for the Class 1 pilot to know when it might be necessary to intervene, and also had the effect of an unauthorised pilot having the conduct of *Apollo.* [2.3.3]

3. There was no reference to the vessel's CPP on the PLA database. Without a means of verifying the data in the database, it cannot be considered a reliable source of vessel information for pilots. [2.4]

4. The reference to its CPP on the vessel's pilot card was not easy to find and the format of the card was poor in comparison with the layout of the specimen master/pilot exchange card in the Bridge Procedures Guide. [2.5]

5. Had the master been on the bridge in the period leading up to the accident, as required by the vessel's SMS and local regulations, he might have been able to intervene in time to prevent the accident. [2.6]

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

1. Before a pilot undertakes a practical examination, it would be prudent for him to gain experience of the larger vessels in the next Class by undertaking trips with a senior pilot in a non-examination environment. [2.3.2]

2. The master had not received 6 consecutive hours of rest during the 24 hour period before the accident, but he could have delegated responsibility for the initial part of the pilotage passage to the chief officer. [2.2], [2.9]

3. This accident demonstrates the high risk to navigation when large vessels transit the Tilburyness area at times of strong tidal flow. It is an area of complex tidal flows, therefore a review should be undertaken to ensure that existing control measures are sufficiently robust to ensure the residual risk to navigation is as low as is reasonably practicable. [2.8]

SECTION 4 - ACTION TAKEN

4.1 THE PORT OF LONDON AUTHORITY

The Port of London Authority has:

- Undertaken an internal investigation.
- Reviewed its pilot training and examination programme.
- Reviewed the pilot assessment process and the training for assessor pilots.
- Reviewed its ship simulator performance, with particular emphasis on the accuracy of the modelling of tidal stream information in the Tilburyness area.

4.2 CARL BUETTNER SHIPMANAGEMENT GMBH

Carl Buettner Shipmanagement GmbH has:

- Undertaken an accident investigation and issued a circular to its vessels reporting its findings and lessons learned.
- Reviewed its bridge procedures manual in relation to bridge team manning levels.
- Issued a fleet circular to emphasise the existing procedures for bridge manning and the continuous monitoring of a pilot's actions.
- Issued a fleet circular regarding the complex tidal flows in the Tilburyness area.
- Reviewed its procedure for master/pilot information exchange to reflect the situation when more than one pilot boards to ensure the role, authority and competency of each pilot are clearly understood.
- Revised the layout of the pilot information card to ensure key information is readily apparent.

SECTION 5 - RECOMMENDATIONS

The Port of London Authority is recommended to:

2014/124 Review its procedures for:

- The entry of data into its Polaris database to ensure the information is complete, consistent and accurate.
- The transit of large vessels in the Tilburyness area at times of strong tidal flow and ensure port users are made aware of the complex tidal flows in the area.
- Pilot training, to ensure practical examinations are undertaken on vessels of an appropriate size and are conducted in a manner in which the assessing pilot can intervene if necessary.

2014/125 Clarify the wording of General Direction 18/2011 relating to: *members of the crew capable of taking charge of a vessel*.

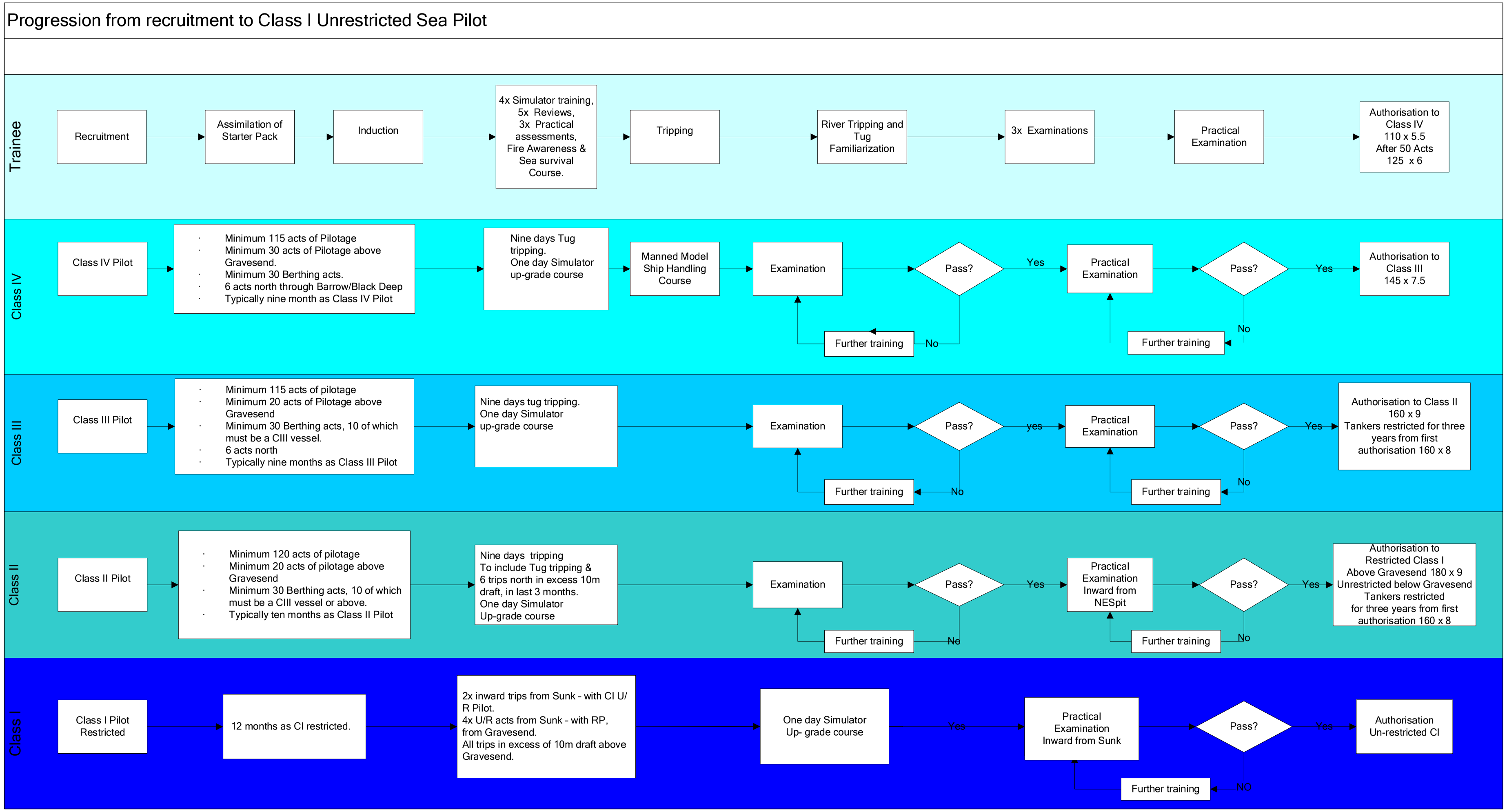
The UK Marine Pilots Association and Port Marine Safety Code Steering Group are recommended to:

2014/126 Develop best practice guidelines for the conduct of practical pilotage examinations.

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

Annex A

PLA pilot training programme



Progression from recruitment to Class I Unrestricted Sea Pilot
Trainee
Recruitment
Assimilation of Starter Pack
Induction
4x Simulator training, 5x Reviews, 3x Practical assessments, Fire Awareness & Sea survival Course.
Tripping
River Tripping and Tug Familiarization
3x Examinations
Practical Examination
Authorisation to Class IV 110 x 5.5 After 50 Acts 125 x 6
Class IV
Class IV Pilot
· Minimum 115 acts of Pilotage
· Minimum 30 acts of Pilotage above Gravesend.
· Minimum 30 Berthing acts.
· 6 acts north through Barrow/Black Deep
· Typically nine month as Class IV Pilot
Nine days Tug tripping. One day Simulator up-grade course
Manned Model Ship Handling Course
Examination
Pass?
Yes
No
Further training
Practical Examination
Pass?
Yes
No
Further training
Authorisation to Class III 145 x 7.5
Class III
Class III Pilot
· Minimum 115 acts of pilotage
· Minimum 20 acts of Pilotage above Gravesend
· Minimum 30 Berthing acts, 10 of which must be a CIII vessel.
· 6 acts north
· Typically nine months as Class III Pilot
Nine days tug tripping. One day Simulator up-grade course
Examination
Pass?
yes
No
Further training
Practical Examination
Pass?
Yes
No
Further training
Authorisation to Class II 160 x 9 Tankers restricted for three years from first authorisation 160 x 8
Class II
Class II Pilot
· Minimum 120 acts of pilotage
· Minimum 20 acts of pilotage above Gravesend
· Minimum 30 Berthing acts, 10 of which must be a CIII vessel or above.
· Typically ten months as Class II Pilot
Nine days tripping To include Tug tripping & 6 trips north in excess 10m draft, in last 3 months. One day Simulator Up-grade course
Examination
Pass?
Yes
No
Further training
Practical Examination Inward from NESpit
Pass?
Yes
No
Further training
Authorisation to Restricted Class I Above Gravesend 180 x 9 Unrestricted below Gravesend Tankers restricted for three years from first authorisation 160 x 8
Class I
Class I Pilot Restricted
12 months as CI restricted.
2x inward trips from Sunk - with CI U/R Pilot. 4x U/R acts from Sunk - with RP, from Gravesend. All trips in excess of 10m draft above Gravesend.
One day Simulator Up- grade course
Yes
Practical Examination Inward from Sunk
Pass?
Yes
NO
Further training
Authorisation Un-restricted CI

PLA Pilotage Practical Examination form

PORT OF LONDON AUTHORITY

Practical Examination

Pilot Class 4 - 1 Progression

Pilot ....

Examiner ....

Class .... Date ....

Pass .... ☐ Fail................ ☐

Ship .... L.O.A .... Draft ....

From .... To .... Day / Night.

THE EXAMINATION TO BE CARRIED OUT ON AN APPROPRIATE CLASS SHIP, INWARDS TO BERTH.

1. Passage Planning

A pilot is expected to take on board a vessel a prepared Port Pilotage Plan (PPP). Utilising either the PLA basic PPP or the pilot's personal preferred format to which must added up to date and relevant information, before the pilot boards a vessel. The acquisition of data may include consultation with the DPC and or submission of the passage plan for verification as required by the DPC for deep drafted vessels.

Once on board further factors, such as manoeuvring characteristics, may require the PPP to be amended.

In regard to information about the vessel to be boarded, a pilot should ascertain beforehand as much as possible about that vessel, from various appropriate sources including POLARIS.

The ship's master is required by General Direction 2006 / 8 to present his own passage plan for the passage. This should be compared with the pilot's PPP so that a comprehensive passage plan is clearly understood and agreed by the master and the pilot.

As the act of pilotage progresses, the passage plan may need to be reviewed and adjusted by the pilot, this process must be inclusive of the master and the bridge team.

Element	Delete as appropriate	
Acquiring Relevant Data.	Considered Competent	Requires Further Training
Preparation of the Passage Plan including abort contingencies.	Considered Competent	Requires Further Training
Execution, monitoring and modification of the plan.	Considered Competent	Requires Further Training
Examiner's Comments:		

2. Assessing onboard Standards and deficiency reporting.

It is essential once on board, for the pilot to ascertain details of any equipment deficiencies and to gain an impression of the operating standards on board the vessel. If deficiencies or poor standards are apparent, the pilot will be alerted to the possibility of experiencing potential problems. The port pilotage plan may as a result, need to be revised and in the worst cases, consideration given to aborting the pilotage passage.

The pilot needs to be aware of his statutory and PLA regulatory requirements regarding deficiency reporting.

Element	Delete as appropriate	
Evaluating conduct of the vessel prior to boarding.	Considered Competent	Requires Further Training
Evaluating vessel's condition.	Considered Competent	Requires Further Training
Reporting of deficiencies.	Considered Competent	Requires Further Training
Examiner's Comments:		

3. Master / Pilot relationship & Bridge Team Integration

In order to ensure a safe and efficient passage, it is essential that there is close co-operation between the pilot and the bridge personnel. This will necessitate an early exchange of information. It is vitally important that an interactive master/pilot relationship is clearly established.

A further aspect for ensuring a successful passage, involves an on-going assessment of the capabilities of other bridge personnel. The conduct of the master, the language in use and the general attitude and competence of bridge personnel, all contribute to this assessment.

The pilot will need to integrate fully, with other personnel on the bridge, and into any bridge team, taking into account any limitations and deficiencies observed along with respect for any national cultural peculiarities of the bridge team personnel.

Element	Delete as appropriate	
Master / Pilot Exchange	Considered Competent	Requires Further Training
Assessment of any Bridge Team limitations.	Considered Competent	Requires Further Training
Bridge Team Integration.	Considered Competent	Requires Further Training
Examiner's Comments:		

4. Communications and Reporting requirements

Good liaison between the pilot and those persons which comprise the rest of the port team, such as

VTS, the Duty Port Controller, The pilot office, the harbour master, Tilbury lock master, tugs, Coryton dock office, Berthing Pilot, mooring parties, other relevant operatives as well as other vessels is important.

It is of course fundamental to establish and maintain good, clear and concise communications. Usually by VHF radio but also by other practicable means paying due regard to the misuse of mobile phones where appropriate.

Compliance with the various port reporting procedures is also essential.

The requirements of the rest of the port team are important and should be considered at all times.

Element	Delete as appropriate	
VHF radio communications including reporting.	Considered Competent	Requires Further Training
Use of alternative means of communication.	Considered Competent	Requires Further Training
Cooperation with other port officers and users.	Considered Competent	Requires Further Training
Examiner's Comments:		

5. Transiting the pilotage district.

During the passage the pilot needs to constantly monitor the vessel's position taking into account the influence of external environmental forces, such as wind, tide, currents and the effect shallow water. Any of these may result in a vessel's ground track being substantially different from its water track.

To ensure that safety margins are maintained, the execution of an agreed passage plan will need to be verified against previous calculations and following consultation with bridge personnel, amended as required.

Clearly, navigation of a vessel in confined waters requires different skills to those adapted for open waters and offshore areas. This will of course involve a variety of position fixing and monitoring techniques using all available and appropriate means.

Element	Delete as appropriate	
Determining the vessel's position.	Considered Competent	Requires Further Training
Monitoring the vessel's progress.	Considered Competent	Requires Further Training
Examiner's Comments:		

6. Vessel Manoeuvring.

The competent pilot needs to understand and deal with the many aspects of manoeuvering a vessel within the pilotage district, including the effects of shallow water, the use of tugs and the skills appertaining to berthing and unberthing.

Element	Delete as appropriate	
Manoeuvring in different locations and conditions including pilot transfers.	Considered Competent	Requires Further Training
Working with tugs.	Considered Competent	Requires Further Training
Examiner's Comments:		

7. Considering of & Dealing with the unexpected.

A competent pilot must possess the aptitude to respond effectively and quickly to any potential problem and emergency. This will require an ability to stay calm and make effective, rapid decisions, conveying them clearly and concisely to personnel on board the ship and personnel within the port team e.g. VTS.

The pilot should also bear in mind, that a minor malfunction might be just one factor, in a number of small contributing factors that are developing into an error chain, which may ultimately lead to a major incident or emergency.

Consideration of abort procedures and options, not necessarily pertaining to own vessel, i.e. in the event of a port emergency is essential.

It is not possible to assess an individual's reaction to the many different types of emergencies that could possibly arise, many of which may be of a very minor nature. However, comprehension and appreciation of the paramount importance of the safety of life, that of the piloted vessel, other vessels, and the environment is essential.

Element	Delete as appropriate	
Managing shipboard malfunctions and problems. e.g. Engine and or Steering failures.	Considered Competent	Requires Further Training
Dealing with emergencies onboard and within the port including abort options.	Considered Competent	Requires Further Training
Consideration of tug failure and non-availability contingency.	Considered Competent	Requires Further Training
Examiner's Comments:		

8. Professional conduct and development.

Previous items have concentrated on specific competences relating directly to pilotage.

This item relates to the importance of maintaining professionalism and the need to update skills, so that performance is continually being improved.

A pilot must be in a fit state to carry out his duties effectively, at all times paying particular regard to the often overlooked effects of fatigue, the effects of prescribed medication and of course alcohol.

Element	Delete as appropriate	
Maintenance of professional standards.	Considered Competent	Requires Further Training
Improvement of professional performance.	Considered Competent	Requires Further Training
Understanding the effects of fatigue and other factors.	Considered Competent	Requires Further Training
Examiner's comments		

Examiner's general comments (if any)

Report Signed by Examiner

Pilot's comments (if any)

Report Sighted by Pilot on completion (signed)

COMPLETED FORM TO BE RETURNED TO : PILOTAGE RESOURCES MANAGER

Apollo's Pilot Information Card

SHIP'S PARTICULARS

Name	APOLLO			Call sign	ZDFS2
Displacement(tonnes)	**30,989**	Deadweight (tonnes)	**22,949**	Year Built	2003
Length OA (m)	167.61 CM	Breath (m)	26.4 CM	Bulbous bow (Y/N)	Y CM
Draught fwd. (m)	~~**9,08**~~ 9,26	Draugh at midship (m)	~~**9,15**~~ 9.28	Draught aft (m)	~~**9.22**~~ 9.30
Port anchor(shackles)	11	Stb. Anchor(shackles)	11	1 shackle = 27.5m/15 fathoms	
Bow to manifold (m)	81.6	Stern to manifold (m)	84.00	Bridge to manifold (m)	51.60
Bow to bridge (m)	138.1	Stern to bridge (m)	32.40	Keel to mast top (m)	43.50
Parallel body load.(m)	77.86	Parallel body ball.(m)	69.42	Air draught load.(m)	34.30
Air draught ball.(m)	37.55				

ENGINE

Type of engine/Units	Sulzer 6RTA 48T-B / 1	Maximum power(Kw/HP)	7850/10673
Engine Order	**RPM / Pitch**	**Loaded speed (knots)**	**Ballast speed (knots)**
Full ahead,sea speed	127 / 95	15.7	16.1
Full ahead	88.9 / 95	10.6	11.0
Half ahead	88.9 / 75	8.5	9.1
Slow ahead	88.9 / 56	6.1	6.7
Dead slow ahead	88.9 / 36	2.3	3.1
Minimum ahead	88.9 / 15		
Dead slow astern	88.9 / 47		
Slow astern	88.9 / 69		
Half astern	98 / 69		
Full astern	108 / 69	% of Full Ahead power	N/A
Maximum astern	127 / 69	% of Full Ahead power	N/A
Engine critical RPM	42 - 62	Maximum number of consecutive	7
Time Full Ahead to Full Astern(sec)	2.5	Time limit astern (min)	N/A

STEERING

Rudder(s) (no.)	1	Type	Semi-spade	Maximum angle (deg)	35°
Time hard-over-to hard-over (sec)		13	Rudder angle for neutral effect (dgrs)		0°
Propellers (no.)	1	Direction of thurn(left/right)	L	Controllable pitch(yes/no)	Y
Thrusters (no.)	1	Bow power(Kw/HP)	800/1088	Stern Power(Kw/HP)	Nil
Steering idiosyncraisies	No				

EQUIPMENT CHECKED AND READY FOR USE

Anchors	☒	Cleared away (Yes/No)	Yes	Whistle	☒	Flags	☒
- band radar	☒	ARPA(Y/N)	Y	S - band radar	☒	ARPA(Y/N)	Y
Speed log	Water/Ground	Water	Single/ Dual axis	Dual	Echo Sounder		☒
Electronic position fixing		☒	Type		DGPS		
Compass system		☒	Gyro compass error(dgrs)		0°	VHF	☒
Steering gear	☒	No of power units in use	2	Rudder / RPM / ROT indicators			☒
Engine telegraphs	☒	Mooring winches and lines					☒

EQUIPMENT OPERATIONAL DEFECTS

OTHER IMPORTANT DETAILS

Pilot has been referred to posted both Wheelhouse Poster and Company Under Keel Clearence Guidelines.UKC and squat calculation (s) for the passage has been shown to/discussed /with Pilot on attached Passage Plan for this part of voyage. Bollard pull SWL has been discussed with the pilot and the bollard plan posted at wheelhouse shown.

ALL EQUIPMENT(COMMUNICATION / NAVIGATION / DECK MACHINERIES / ENGINE PLANTS AND MACHINERIES),NECESSARY FOR A SAFE DEPARTURE / ARRIVAL HAS BEEN CHECKED AND TESTED IN ACCORDANCE WITH APPROPRIATE COMPANY PROCEDURES.ANY NOTED RESTRICTION IN EQUIPMENT WILL BE REPORTED TO THE PILOT ACCORDINGLY.

[redacted]

Date/Time/Master's Name & Signature
24/07/2013 2315

2200
24/07/13 [redacted]

Date/Time/Pilot's Name & Signature
24/07/2013 2315

Checked by [redacted] Approved by [redacted]

Condition of Class

Survey Statement

Attachment to the Certificate of Class

GL

Name of Ship:	APOLLO	Register No:	0094943	
Port of Registry:	Gibraltar	IMO Number:	9234628	
Flag of Registry:	Gibraltar	Class Period:	2013-06-01	# 3
Place of Survey:	West Thurrock	Survey Date:	2013-07-26	/ 2013-07-26

The surveys listed below have been carried out. This Survey Statement is integral part of the Certificate of Class for class related items.

Surveys Performed	Status	New Records
Class related findings		
S 006 Condition of Class, Hull	postponed	2013-07-26 confirmed until 2013-08-02

West Thurrock, 2013-07-26 The temporary repairs have been carried out by using the concrete box and found satisfactory.
The vessel is allowed to sail to Damen Yard Schiedamm Rotterdam, Netherland for permanent repair. The Letter of No Objection has been issued by the administration and valid until 2013-08-02; As instructed the interim conditionally SAFCON has been issued.

Issued Certificates

Safety Construction	Conditionally Interim	valid until 2013-08-02

Confirmation of class, if endorsed or Statutory Status, if dealt with, is confined to surveys conducted and documented by this Statement according to the Rules for Classification and Construction of Germanischer Lloyd in the last edition.

Class Status Confirmed until 2013-08-02

Statutory Status Statutory matters without objections

[redacted] [redacted]

(Master) Surveyor(s) to Germanischer Lloyd

[redacted] ( )

West Thurrock 2013-07-26

Place *Date*

Apollo's navigation procedures

GENERAL CONDITIONS	**STEAMING WATCH**	
OPEN WATERS		
Clear weather, little or moderate traffic	I	(see note 1)
Clear weather, high density traffic	II	
Reduced visibility, little or moderate traffic	II	
Reduced visibility, high density traffic	II or III	
RESTRICTED WATERS (limited manoeuvring room)		
Clear weather, little or moderate traffic	I or II	
Clear weather, high density traffic	II or III	
Reduced visibility, little or moderate traffic	II or III	
Reduced visibility, high density traffic	III	
ENTERING OR LEAVING PORT		
Clear weather, little or moderate traffic	II	
Clear weather, high density traffic	II or III	
Reduced visibility, little or moderate traffic	II or III	
Reduced visibility, high density traffic	III	
AT ANY TIME		
When high navigation and collision avoidance workloads combine	III	

3.1.2 Bridge Steaming Watches - Manning

The bridge steaming watches are manned as follows:

Steaming Watch I: This watch has one licensed officers(2) and one rating(3) on the bridge
Steaming Watch II: This watch has two licensed officers(2) and two ratings(3) on the bridge
Steaming Watch III: This watch has three licensed officers(2) and two ratings(3) on the bridge

Notes:

(1) Under certain conditions, the officer in charge may be the sole look out of steaming watch I (see Chapter 2.2 for details)

(2) Licensed Officer includes the Master

(3) "Rating(s)" means ratings who are certified to form part of a navigational watch (STCW A-II/4)

In any of the foregoing watch conditions it is the responsibility of the officer in charge of the watch to ensure that sufficient that in addition qualified ratings (deck ratings forming part of a navigational watch as per STCW95) are assigned to the watch to handle all requirements safely.

PLA Risk Assessment for vessels in transit

Port-wide Risk Assessment Hazard Detail Report

Contact - Jetties, Berths, Piers during Transit

Hazard Details

Reference	55
Accident Category	Contact
Next Review	1 Nov 2014
Last Review	13 Jun 2013

Vessels Involved

Primary	All Vessels
Secondary	All Vessels

Areas Affected

Crayfordness to London Bridge
Gravesend to Crayfordness
Sea Reach No 1 to Gravesend

Hazard Description

Hazard Detail	Vessel on passage in contact with Jetties, berths and piers in river or vessels alongside. Does not include vessels manoeuvring for these berths.
Possible Causes	Misjudgement, Fatigue, Inattention, Failure to follow procedures, especially position monitoring and passage planning. Failure to keep a proper lookout. Adverse weather, poor visibility, Mechanical / steering failure, Vessel characteristics (restricted visibility from the bridge, high freeboard, cpp limitations/characteristics, manoeuvring characteristics, etc) Limitations and expectations of tug assistance during extended ship towage operations eg passenger ship stern first from West India Dock turning area. Passing vessel put out by vessel manoeurvring on/off a berth. Navigation lights not maintained on some jetties. Collision avoidance manoeuvre. Inappropriate and/or insufficent allowance for tidal conditions. Bank effect/shallow water effect. Vessel manoeuvring onto adjacent berth. Master/helmsman incapacitated. Poor navigational skills in restricted visibility. Vessel navigating which is encumbered in some way and is unable to proceed normally or respond to external influences. Proximity of the channel (increases the risk from steering failure / misjudgment on passing ships). A Health and Safety accident on board could result in or contribute to causing a navigational incident. Scatter from background shore lights.
Remarks	Berths in Northfleet Hope - This area is particularly busy around high water as vessels manoeuvre to enter Tilbury Lock. Some berths eg Northfleet Terminal are relatively close to the navigational channel and extra caution is required. Links to hazard reference 37 (Contact - Berths on the southside at Tilburyness) which specifically addresses a scenario at Tilburyness. Hazard reviewed in special hazard review panel following APOLLO incident Mar-2013-209 (Dec 13).

Risk Assessment

Overall Risk

Inherent Risk	7.37
Residual Risk	7.37
Ranked	1 out of 114

	Frequency	Environment	People	Property	Stakeholders
Most Likely	5	2	2	3	3
Inherent Risk	5	5.9	5.9	8.3	8.3
Residual Risk	5	5.9	5.9	8.3	8.3

Slight/moderate localised damage to ships plating and frames. Possibility of perforation of ships side plating with resulting water ingress and/or cargo loss/ minor pollution. Damage to structure/vessel contacted. Possible minor injuries.

	Frequency	Environment	People	Property	Stakeholders
Worst Credible	3	5	5	5	5
Inherent Risk	3	7	7	7	7
Residual Risk	3	7	7	7	7

Major damage to the structure and the vessel, pollution, fire and multiple injuries/fatalities on vessel and /or berth. Berths close to major bends in the river are more susceptible to damage. The berth could be unusable for some time, with resulting financial and reputational impacts.

Risk Controls

Title	Owner	Type	Fr. Eff	Co. Eff	Review Due
Vessel Operator Drugs & Alcoho	Vessel Operator	External Procedures	0%	0%	11 Feb 2102
Passage Planning	Vessel Operator	National/Int Legislatio	0%	0%	18 Dec 2099
VTS Staff Training/Expertise	VTS Manager	Training / Education	0%	0%	17 Mar 2102
GLA Annual Inspection	External Body	National/Int Legislatio	0%	0%	18 Dec 2099
General Directions	Port of London Author	PLA Legislation	0%	0%	18 Dec 2013
Pilotage Directions	Port of London Author	PLA Legislation	0%	0%	18 Dec 2013
Pilot Training/Experience	Director of Marine Ope	Training / Education	0%	0%	10 Feb 2102
PEC Training	Director of Marine Ope	Training / Education	0%	0%	21 Nov 2102
Harbour Service Manual	Harbour Master	PLA Proc/Plans/Mans	0%	0%	28 Jan 2102
River Works Licence	Port of London Author	PLA Hardware	0%	0%	10 Feb 2102
VTS Procedures	VTS Manager	PLA Proc/Plans/Mans	0%	0%	11 Feb 2102
VTS Manual	VTS Manager	PLA Proc/Plans/Mans	0%	0%	18 Dec 2101
VTS Qualification/Authorisatio	VTS Manager	Training / Education	0%	0%	21 Aug 2101
Oil Spill Contingency Plan	Harbour Master (SMS)	PLA Proc/Plans/Mans	0%	0%	28 Feb 2111
ISM Code	External Body	National/Int Legislatio	0%	0%	31 Jan 2102
Emergency Plans/Procedures	Port of London Author	PLA Proc/Plans/Mans	0%	0%	24 Apr 2101
PLA/BML - Local Knowledge E	Port of London Author	Training / Education	0%	0%	3 Jul 2101
Permanent Notice to Mariners	Port of London Author	Lia/Advice River Users	0%	0%	18 Jul 2101
Escort Tug	Harbour Master	PLA Hardware	0%	0%	28 Jan 2102
Machinery Redundancy (Back-u	Vessel Operator	Ext Hardware	0%	0%	31 Jan 2102
Special Risk Assessment	Port of London Author	PLA Hardware	0%	0%	11 Feb 2102
Vessel Trim	Vessel Operator	External Procedures	0%	0%	11 Feb 2102
Education of River Users	Port of London Author	Training / Education	0%	0%	18 Dec 2099
Domestic Safety Management C	External Body	National/Int Legislatio	0%	0%	20 Nov 2101
Ship Towage Code of Practice	Undefined	Codes of Prac/Guides	0%	0%	18 Dec 2099
Tug Operator Procedures	External Body	External Procedures	0%	0%	16 Mar 2100
National Inland Waterway Com	Maritime and Coastgua	Training / Education	0%	0%	6 Nov 2102
PEC Examination/Experience	Vessel Operator	Training / Education	0%	0%	10 Feb 2102
STCW Competency Standards	Port of London Author	Training / Education	0%	0%	21 Nov 2102
Craft & Boat Registration & Reg	Port of London Author	PLA Legislation	0%	0%	18 Dec 2099
Passenger Vessel Code of Practi	Port of London Author	Codes of Prac/Guides	0%	0%	14 May 2108
Thames AIS	VTS Manager	PLA Legislation	0%	0%	17 May 2106
Thames Byelaws	Port of London Author	PLA Legislation	0%	0%	21 Sep 2111
VTS Navigational Broadcast	VTS Manager	Lia/Advice River Users	0%	0%	11 Feb 2102

PLA Notice to Mariners No 27 of 2011

Copy.

Port of London - River Thames

PORT OF LONDON AUTHORITY

NOTICE TO MARINERS No.27 of 2011

CODE OF PRACTICE FOR SHIP TOWAGE OPERATIONS ON THE THAMES 2010

AMENDMENT NOTICE

This Notice replaces Notice to Mariners No. 18 of 2011, which is hereby cancelled.

Please note the revised wording in the second paragraph of Section 9.5

SECTION 9 – LOCAL TOWAGE OPERATIONS

SECTION 9.5

9.5 Northfleet Hope Container Terminal – Tilburyness
The strong tidal flows around Tilburyness have resulted in a number of incidents where ships departing the container terminal have failed to successfully negotiate the bend. Some of these incidents have resulted in vessels making contact with berths on the south side of the River. The effect is particularly pronounced when vessels are departing on the flood tide.

When a vessel, berthed head down, is departing on a flood tide from the container terminal using tugs, and a strong tidal counter flow is present off the berth, it is strongly recommended that the tugs are retained until the vessel has fully entered the stream.

SECTION 9.1

Please Note:
Any references to Shellhaven in **Section 9.1 Coryton, Shellhaven and other river berths** and elsewhere in the Code should now refer to **S Jetty** (at the eastern end of the London Gateway Port development).

Please ensure you attach this amendment in your copy of Code of Practice for Ship Towage Operations on the Thames 2010.

15 December 2011

Port of London Authority
London River House
Royal Pier Road
Gravesend, Kent, DA12 2BG

[redacted]
CHIEF HARBOUR MASTER

EXPIRY DATE: N/A
TO RECEIVE FUTURE NOTICES TO MARINERS BY **E-MAIL**, PLEASE REGISTER VIA OUR WEBSITE www.pla.co.uk

Telephone calls, VHF radio traffic, CCTV and radar traffic images may be recorded in the VTS Centres at Gravesend and Woolwich.

PORT OF LONDON AUTHORITY

Marine Accident Report

INVESTORS IN PEOPLE