



HM Government of Gibraltar

Office of the Marine Accident
Investigation Compliance Office

Report on the investigation of the collision of

OS 35 and ADAM LNG

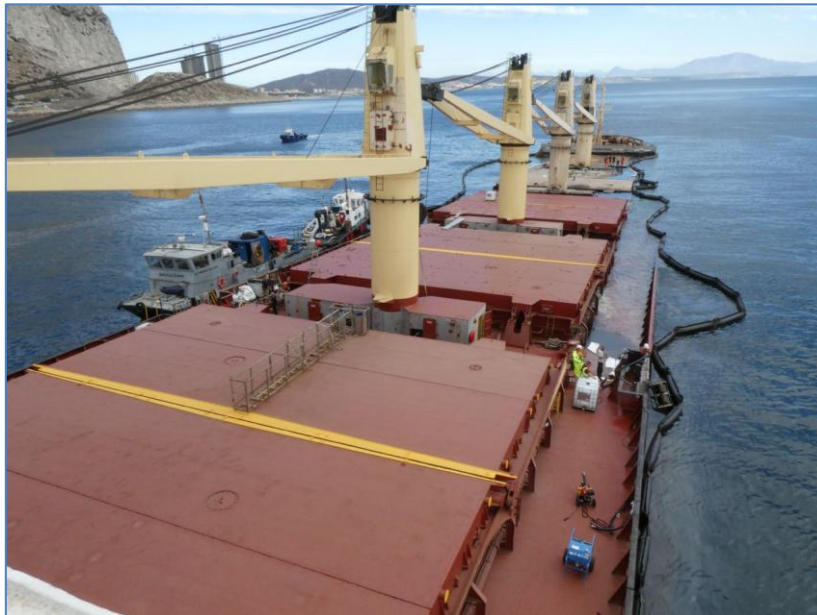
And the subsequent grounding of

OS 35

on

29 AUGUST 2022

This report is subject to the Gibraltar Merchant Shipping (Accident Reporting & Investigation) Regulations 2012.



Office of the Marine Accident Investigation Compliance Officer
Ministry for Business, Tourism and The Port
HM Government of Gibraltar
Suite 971, Europort
Gibraltar
GX11 1AA

**The Gibraltar Merchant Shipping
(Accident Reporting and Investigation)
Regulations 2012**

NOTE

Investigations under the Gibraltar Merchant Shipping (Accident Reporting and Investigation) Regulation 2012 ('the Regulations') shall not be concerned with apportioning blame nor with determining civil or criminal liabilities.

The purpose of safety investigation into marine accidents is to reduce the risk of future casualties and incidents and reduce their serious consequences including loss of life, loss of ships and pollution of the marine environment.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AB	Able-Bodied Seaman
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
BGTW	British Gibraltar Territorial Waters
Cable	One tenth of a nautical mile (185.2m)
CCTV	Closed-Circuit Television
CoC	Certificates of Competency
COG	Course Over Ground
ETA	Estimated Time of Arrival
CPA	Closest Point of Approach
GPA	Gibraltar Port Authority
GPS	Global Positioning System
IMO	International Maritime Organisation
ISM	International Safety Management System
kW	Kilowatt
LT	Local Time
LNG	Liquified Natural Gas
m	metre
NM	Nautical Miles
OOW	Officer Of the Watch
PSC	Port State Control
RGP	Royal Gibraltar Police
SMS	Safety Management System
SOF	Statement of Fact
SOLAS	International Convention for the Safety Of Life At Sea
UK	United Kingdom
UTC	Universal Coordinated Time
VDR	Voyage Data Recorder
VTS	Vessel Traffic Management and Information System
VTSO	Vessel Traffic Management and Information System Officer

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SYNOPSIS

'OS 35', loaded with a cargo of steel rebar, weighed anchor in Gibraltar Bay on completion of bunkering. 'OS 35' then manoeuvred with astern propulsion, with the bow swinging to starboard and the speed astern increasing to 3 knots.

The master concerned that 'OS 35' was drifting - due to the effects of tidal flow and wind - towards the anchored 'ADAM LNG', then set the engine to full ahead and the rudder hard to port.

The starboard swing and speed of 'OS 35' reduced and the vessel then set the vessel towards 'ADAM LNG'. The starboard side hull of 'OS 35' collided with the bulbous bow of 'ADAM LNG'.

The hull of 'OS 35' was breached in holds 2 and 3, with water quickly flooding into the two holds, and then hold 1. 'ADAM LNG' sustained minor steel damage to its bulbous bow.

The Port of Gibraltar VTS directed 'OS 35' to proceed to the East of Gibraltar and to ground the vessel close to shore in order to prevent it sinking in deeper water and remain in British Gibraltar Territorial Waters.

'OS 35' grounded with the anchor lowered, and was then assisted with salvage support, which was available in the port.

The investigation found that the master and bridge team did not monitor the manoeuvre effectively and made an error in their understanding of the effects of the tidal flow and wind. The Gibraltar Port Authority (GPA) Vessel Traffic Services (VTS) monitored the manoeuvre; however, their interventions did not alter the actions of the master or prevent the collision.

Recommendations have been made with the aim of preventing a recurrence of the accident. The operator of 'OS 35' is recommended to review bridge team training and procedures prior to arrival and departure without a pilot onboard.

Gibraltar Pilots are advised to provide clear information to masters on the availability of a pilot for departure from the Western Anchorage.

The GPA is recommended to require VTS to provide clear advice to vessels prior to giving permission to depart from the Western Anchorage. The GPA is recommended to consider introducing compulsory pilotage for vessels departing from the Western Anchorage.

SECTION 1 – FACTUAL INFORMATION

1.1 Background Information

All times are Local Time (LT) in Gibraltar, that is UTC +2 hours, unless stated otherwise.

1.2 Ship Particulars – ‘OS 35’

A photograph of ‘OS 35’ in Catalan Bay, Gibraltar, following the collision and grounding, is shown at Figure 1 below.



Figure 1 ‘OS 35’ Post collision and subsequent grounding

Particulars of ‘OS 35’

Type:	Geared Bulk Carrier
Flag:	Tuvalu
Port of Registry:	Funafuti
IMO Number:	9172399
Owner:	Old Stone Cargo Ltd., Belize
Operator:	Old Stone Management Ltd., Tripoli, Lebanon
Classification Society:	Korean Register
Construction:	Steel
Gross Tonnage:	20,947
Length Overall:	178.04 metres

Engine Type/ Power: Mitsubishi 6UEC52LA / 7060kW @ 133RPM
Propulsion: Fixed Pitch – 4 blades
Rudder: Semi Balanced Stream Line Reaction Type
Date of Delivery: 1999
Cargo: Steel Rebar (reinforcement bars used in construction)

1.2.1 Voyage Particulars

'OS 35' was on passage from Sohar, Oman to Ghent and Rotterdam in the Netherlands with a cargo of steel rebar. Rebar is steel reinforcement bars, mainly used in construction.

The vessel was manned with 24 Syrian crew in compliance with the safe manning certificate.

1.3 Ship Particulars 'ADAM LNG'

'ADAM LNG', after the collision, is shown at Figure 2 below.



Figure 2 'ADAM LNG' – alongside after the collision

Particulars of 'ADAM LNG'

Type:	LNG Carrier – Membrane Type
Flag:	Marshall Islands
Port of Registry:	Majuro
IMO Number:	9501186
Owner:	Adam Maritime Transportation Company Limited
Operator:	Oman Shipmanagement Company S.A.O.C.
Classification Society:	Class NK
Construction:	Steel
Gross Tonnage:	105,975
Length Overall:	288.89 metres
Engine Type/ Power:	Wartsilla12V50DF x 2, 6L50DF x 2. 35,100kW
Propulsion:	Single Right Hand Fixed Propeller
Date of Delivery:	2014
Cargo:	Nil

1.3.1 Voyage Particulars

'ADAM LNG' was calling at Gibraltar for fuel oil bunkers on a passage in ballast from Malta to Nigeria, where the vessel was to load Liquefied Natural Gas (LNG).

Adam LNG' was manned with 29 Indian and Omani crewmen, in compliance with the vessel's Safe Manning Certificate.

1.4 Marine casualty or incident information

Class of Incident: IMO Very Serious Marine Casualty - Total loss of Vessel ('OS 35').

Date and time of the collision incident: 22:11 LT on 29 August 2022.

Position and location of the marine casualty or incident: Western Anchorage, Gibraltar Bay in position 36° 06.4' N 005° 21.6' W.

'OS 35' was subsequently grounded off Catalan Bay, Gibraltar, in Position 36° 08.1' N 005° 20.0' W.

There was minor pollution in Catalan Bay, Gibraltar, following the grounding.

1.4.1 Damage to 'OS 35'

The starboard side of 'OS 35' was holed below the waterline in No 2 and No.3 cargo holds, with No. 1 hold subsequently flooding. Following the grounding the hull of 'OS 35' sustained further damage to the hull. A wreck removal order was subsequently issued by the Gibraltar Administration, with the wreck required to be removed by 31 May 2023.

1.4.2 Damage to 'ADAM LNG'

The bulbous bow of 'ADAM LNG' sustained minor damage as shown at Figure 3 below. The damaged steel was repaired with the vessel alongside.

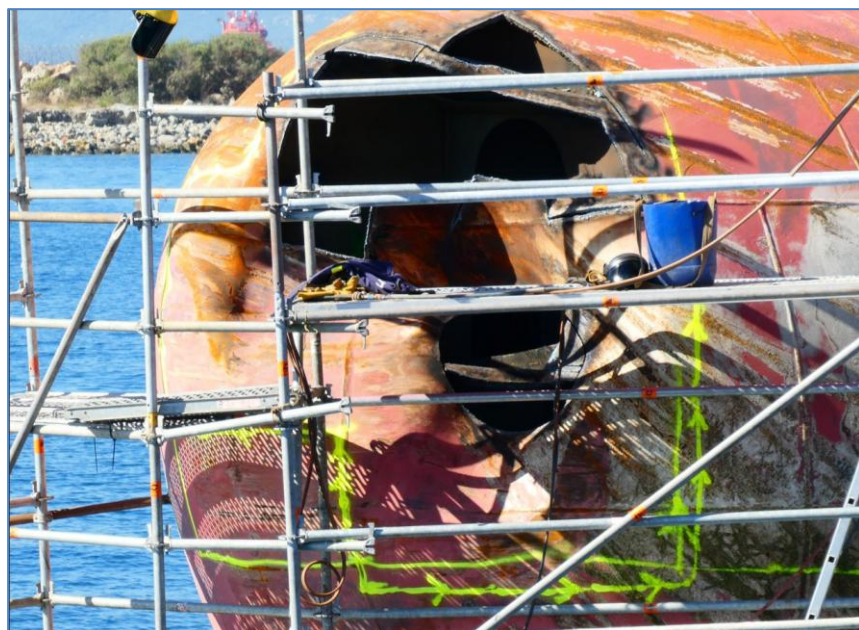


Figure 3 Damage to the bow of 'ADAM LNG' under repair

1.5 Environmental Conditions.

The 'OS 35' deck logbook recorded the weather as being a north-east Beaufort Force 1 wind, with good visibility, and clear skies.

The VTS CCTV image taken immediately prior to the collision shows, at Figure 4 below, that the winds were light, and from the anchor cable of 'ADAM LNG' - being almost "up and down" throughout the recording - that the tidal flow was weak. Anchored vessels in the Western Anchorage were heading in a generally northerly direction which indicates that the general direction of the tidal flow at the time was southerly.



Figure 4 VTS CCTV image showing the wind conditions and 'ADAM LNG's anchor cable prior to the collision

'ADAM LNG's radar screenshot, provided from the fitted Doppler log, showed a current of 0.2 knots from the west, with a recorded wind speed of 12 knots from the east-north-east.

1.6 Rapid Replay Reconstruction

A Solis Marine Rapid Replay reconstruction was produced to show the positions and tracks of 'OS 35', 'ADAM LNG', and the other vessels transmitting Automatic Identification System (AIS) data located in the Western Anchorage at the time of the incident. The reconstruction used commercially available AIS data. Rapid Replay images are shown in UTC, two hours behind the local time in Gibraltar.

An overview of the Rapid Replay reconstruction of the tracks of 'OS 35' and 'ADAM LNG' is shown at Figure 5 below.

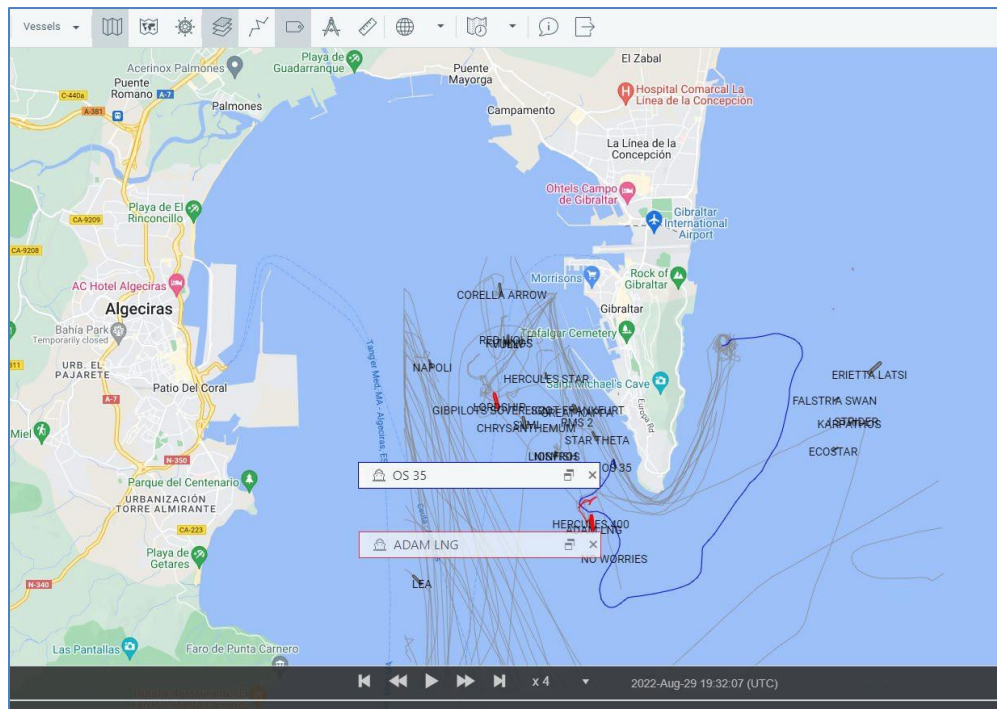


Figure 5 Rapid Replay overview of the available AIS data for the incident

1.7 Bridge Equipment

1.7.1 'OS 35'

'OS 35' was fitted with a Transas Electronic Chart and Information System (ECDIS) and two Furuno Automatic Radar Plotting Aids (ARPA) radars. All the bridge equipment was reported to be functioning correctly.

1.7.2 'ADAM LNG'

'ADAM LNG' was monitoring the position of 'OS 35' by ECDIS and ARPA radars on the Integrated Bridge System. All the bridge equipment was reported to be functioning correctly.

1.8 Human factors:

1.8.1 'OS 35'

Bridge manning:

The Certificates of Competency (CoC) for each of the officers involved was found to be correct and in compliance with the vessel's Minimum Safe Manning Certification.

The recorded hours of rest, recovered from 'OS 35', indicate that all crew were compliant with the IMO requirements for rest periods.

At the time of the incident the bridge of ‘OS 35’ was manned with the Master, Second Officer, and the Cadet, who was the helmsman. The Chief Officer oversaw the anchoring operation.

No Drug and Alcohol testing was carried out, either by the ‘OS 35’ crew or the Royal Gibraltar Police (RGP) following the initial collision or grounding.

1.8.2 ‘ADAM LNG’

The bridge of ‘ADAM LNG’ was manned by the Third Officer and the Cadet. The watch Able-Bodied Seaman (AB) was on deck rounds and in VHF radio communication with the bridge.

The recorded hours of rest, recovered from ‘ADAM LNG’, indicate that all crew were compliant with the IMO requirements for rest periods.

1.9 Bridge Procedures

1.9.1 ‘OS 35’

The Oldstone Management Limited Operations and Safety Manual Section 1: Procedures To Prepare for Sea provided the “*procedure for ensuring the preparation of a voyage plan*”.

The procedure required that the “berth to berth” plan included the consideration of:

- *Predicted weather, currents and tides*
- *Expected vessel traffic*
- *Internal and External communication procedures*

The section of the ‘OS 35’ Voyage Plan for arrival into and departure from Gibraltar is shown below at Figure 6.

136.		36° 25.796 N 002° 11.353 W	257.2°	12.0 KN	9.55 NM	1000 M	4551.32 NM	GPS RADAR	NP208 VOL8	UNDER MASTER AND PILOT INSTRUCTION
137.		36° 15.484 N 003° 46.525 W	262.4°	12.0 KN	77.58 NM	790 M	4628.90 NM	GPS RADAR	NP208 VOL8	UNDER MASTER AND PILOT INSTRUCTION
138.		36° 05.391 N 005° 19.923 W	262.4°	12.0 KN	76.27 NM	450 M	4705.17 NM	GPS RADAR	NP208 VOL8	UNDER MASTER AND PILOT INSTRUCTION
139.	PST GIBRAL	36° 05.900 N 005° 22.158 W	285.7°	12.0 KN	1.85 NM	300 M	4707.01 NM	GPS RADAR	NP208 VOL8	UNDER MASTER AND PILOT INSTRUCTION
140.	GIBRAL ANCHOR	36° 06.823 N 005° 21.325 W	016.8°	12.0 KN	1.30 NM	45 M	4708.32 NM	GPS RADAR	NP208 VOL8	UNDER MASTER AND PILOT INSTRUCTION
141.		36° 02.261 N 005° 23.418 W	183.2°	12.0 KN	5.63 NM	482 M	4717.02 NM	GPS RADAR	NP208 VOL8	UNDER MASTER AND PILOT INSTRUCTION
142.		35° 59.777 N 005° 28.149 W	237.1°	12.0 KN	4.61 NM	369 M	4721.57 NM	GPS RADAR	NP208 VOL8	UNDER MASTER AND PILOT INSTRUCTION

Figure 6 ‘OS 35’ Gibraltar section of the Voyage Plan

The specific considerations of arrival and departure Gibraltar, other than listing the relevant nautical publications are not stated in the Voyage Plan.

The procedure also stated that “*the planned route shall be clearly displayed on appropriate charts and shall be continuously available to the officer in charge of the watch, who shall verify each course to be followed prior to using it during the voyage*”.

The passage plan identified a waypoint in the centre of Gibraltar Bay which was plotted on the back-up paper chart shown at Figure 7 below. The route is also not shown on the ECDIS playback recording.

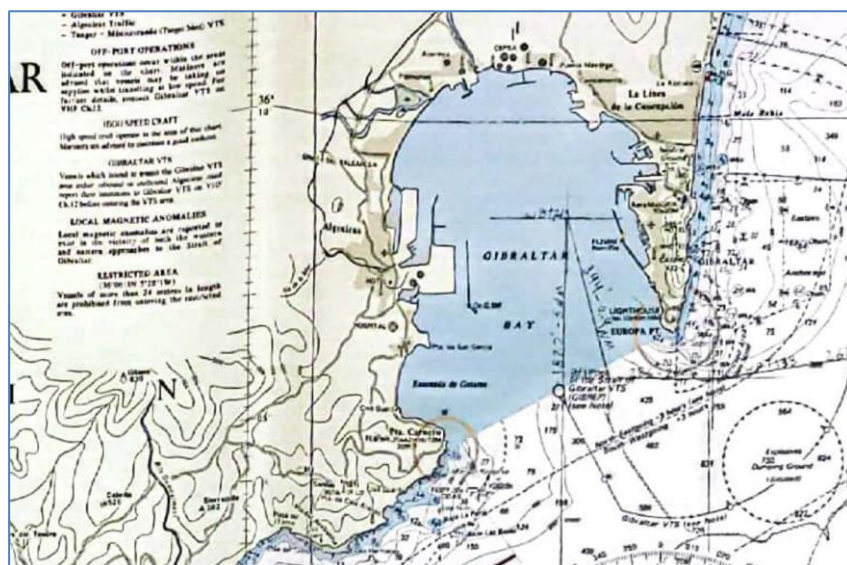


Figure 7 Chart extract of the chart recovered from 'OS 35'

The departure from the 'OS 35' anchorage position was not plotted and the existing prior passage plan was not amended for the actual anchor position.

There was no requirement to discuss the manoeuvre for departing the anchorage prior to the anchor being aweigh.

Had a pilot been embarked, it was required by the Safety Management System (SMS) that the pilot card would have been completed and that a discussion between pilot and master would have taken place prior to the anchor being raised that discussed the proposed manoeuvre. It is usual for the pilot's recommended manoeuvre to be accepted by the master.

1.9.2 'ADAM LNG'

The procedures on board 'ADAM LNG' required that the vessel anchored closest to them was monitored and recorded.

The officer of the watch (OOW) was alerted by the cadet on watch that 'OS 35', when underway, was no longer the closest anchored vessel. This procedure effectively identified that 'OS 35' was departing from the anchorage and that it should be monitored until clear.

1.10 Port State Control Records

A Port State Control (PSC) inspection of 'OS 35' was carried out on 10 January 2022 in Vietnam. The inspection reported two deficiencies relating to SOPEP documentation and "oil accumulation in engine room". There were no records of PSC detention for 'OS 35' prior to the accident.

A further PSC inspection was carried out by Gibraltar PSC Officers following the grounding when the vessel was detained. There were no deficiencies noted relating to crew certification or work hours.

A PSC inspection of 'ADAM LNG' was carried out a few days before the accident, in Malta on 26 August 2022, when no deficiencies were noted. There were no recent records of PSC detentions for 'ADAM LNG'.

1.11 Shore authority involvement and emergency response

Gibraltar Port VTS responded to the incident, acting prior to either vessel advising that a collision had occurred. The duty VTS team escalated the incident in accordance with the Port Procedures. VTS provided instructions to the flooding 'OS35' until the vessel was grounded in Catalan Bay. VTS also sent a pilot to board 'OS 35' to provide feedback from the vessel, and instructed tugs to attend.

Gibraltar Port VTS also verified, shortly after the collision, that 'ADAM LNG' had sustained minor damage.

1.11 Voyage Data Recorder

Both 'OS 35' and 'ADAM LNG's Voyage Data Recorders (VDR) had valid Annual Performance Test (APT) certificates that showed that the VDRs were working as required and in compliance with the required standards of SOLAS Ch. V and IMO Res. A.861 (20) Recommendation on performance standards for shipborne Voyage Data Recorders (VDR) and IEC 61996 Shipborne Voyage Data Recorder (VDR) Performance requirements – Methods of testing and required test result.

'OS 35' was fitted with an NSR-9000S SVDR Voyage Data Recorder (VDR) with an Annual Performance Test carried out on 6 October 2021.

Attempts were made to download the data by the master and a local technician. The VDR technician: *'Found no Log data of 29-8- 2022 or 30-08-2022... It is possible that the VDR has been switched off. VDR was checked and it is working and recording data.'*

The complete VDR unit, including capsule and control panel, was sent to the UK's Marine Accident Investigation Branch (MAIB) for forensic analysis; however, no data for the time of the incident was recovered from the VDR unit.

'ADAM LNG' was fitted with a HiVDR manufactured by Hyundai Heavy Industries Co. Ltd. in Korea. An Annual Performance test was carried out on VDR data on 20 July 2022, when the VDR was found to be in compliance with the required performance standards. The VDR data was downloaded following the incident. While the radar images and bridge audio was

accessed, the National Marine Electronics Association (NMEA) data was not found to have recorded. The NMEA data records the vessel's position, heading, course and speed (both through the water and over the ground), engine orders and responses, rudder angles, bow thruster operation, along with other data.

The attending service engineer found that the hub port was defective and had not displayed and that, since the last VDR APT, that the NMEA files were not recorded and were therefore not be available for the material period in question.

The loss of NMEA data from 'ADAM LNG' meant that the second-by-second positions of 'ADAM LNG' could not be used in the reconstruction and relied on the 3-minute AIS transmitted positions that were received externally.

The total loss of VDR data from 'OS 35' severely limited the investigation of the actions of 'OS 35'. The audio recordings from the bridge, all NMEA data, and the screenshot images from the radar were unavailable. Therefore, the actions of the master and officers on the bridge of 'OS 35; cannot be effectively reviewed.

1.13 Pilotage

There are seven Gibraltar Pilots, supplied with three high-speed pilot boats. Gibraltar Pilots are a self-administrating company, regulated by HM Government of Gibraltar. The Gibraltar Pilots website provides the following information for vessels arriving at the anchorage.

Services - Arrival Information

- *Pilotage is compulsory for all commercial vessels entering the port, the anchorage or when steaming in the Bay within Port Limits.*
- *Vessels should give 2 hours' notice prior to arrival on VHF Channel 12.*
- *Vessels should call again when 5 miles from the Pilot Boarding Area.*
- *A listening watch must be kept on VHF Channel 12 at all times.*
- *Tugs for berthing and unberthing will be ordered by the pilot.*
- *The Masters of Passenger Vessels however will be responsible for ordering tugs.*
- *Vessels leaving a berth should give 30 minutes notice prior to departure.*
- *Pilotage is not compulsory for vessels leaving the anchorage.*

The total number of pilotage acts by Gibraltar Pilots, by all seven pilots, for the year 2021 was 8,698. This figure includes berthing, un-berthing, and arrival at anchor.

Most vessels do not take a pilot on departure as it is not compulsory; however, a small number of operators do require that a pilot is taken on

departure. It is understood that the cost of a pilotage from the anchorage would be charged at the same rate as an arrival. This would incur an additional charge as it is another pilotage trip.

The Gibraltar Pilots website does not provide information on the procedure for ordering a pilot for departing the anchorage, although this service is available.

1.14 The Western Anchorage

Anchorage areas are available to the West and East of Gibraltar. The Western Anchorage is primarily used for vessels bunkering fuel oil.

The Western Anchorages are shown at Figure 8 below.



Figure 8 Designated Gibraltar Western Anchorages

'OS 35' was anchored at the Camp Bay Inner anchorage, and 'ADAM LNG' was anchored at the Europa Anchorage.

The two anchorages to the north of 'OS 35' were in use by anchored vessels at the time of the collision, while the Camp Bay Out anchorage, to the West of 'OS 35' was vacant.

1.15 Vessel Traffic Services (VTS)

Port of Gibraltar Vessel Traffic Services (VTS) is part of the Gibraltar Port Authority.

The VTS control room is continuously manned with three personnel, two VTS Officers (VTSO) and a VTS Supervisor, who is responsible for the shift. All

VTS Staff are trained to CO103/1 level and VTS Supervisors are trained to the CO103/2 standards.

VTS Management is made up of a Deputy VTS Manager and a VTS Manager.

All operational issues are escalated to one of the two Senior Port Officers, with any further escalation to the Deputy Captain and eventually Captain of the Port if, required.

The VTS control room equipment consists of a Kongsberg C-Scope with two AIS Base Stations and three Radar systems all integrated into a single display with all traffic information available at each VTS workstation.

While not a written procedure, it is standard practice for VTSOs to advise vessels, when they inform VTS that they are underway, to proceed to the west in Gibraltar Bay before heading south to the Gibraltar Strait. On this occasion, perhaps as 'OS 35' was late in reporting to VTS that they were underway and already making way astern to the west, this advice was not given to the master of 'OS 35'.

1.16 NARRATIVE

At 15:15 on 29 August 2022 'OS 35', loaded with steel cargo, embarked a Gibraltar Pilot on the approach to the Gibraltar Western Anchorage to take bunkers. On the final approach to the anchorage the pilot advised that the engine be briefly placed at Full Astern power to take the way off the loaded vessel.

At 15:37 'OS 35' dropped anchor in the "Camp Bay In" anchorage in Gibraltar's western anchorage and then loaded 225 MT of Marine Gas Oil bunkers from a barge.

At 17:30 'ADAM LNG' anchored to her starboard anchor with 9 shackles of anchor cable at the Europa anchorage and then commenced bunkering. The main engine was placed on 'short notice' of 15 minutes for the engine to be available for manoeuvring. The position of the two vessels is shown at Figure 9.

The bunker barge departed 'OS 35' after the bunkering operation was completed at 20:31. 'OS 35's engines were on standby from 21:15 and the anchor made ready for heaving.

At 21:30 'OS 35' contacted VTS to request permission to depart the anchorage, which VTS approved.

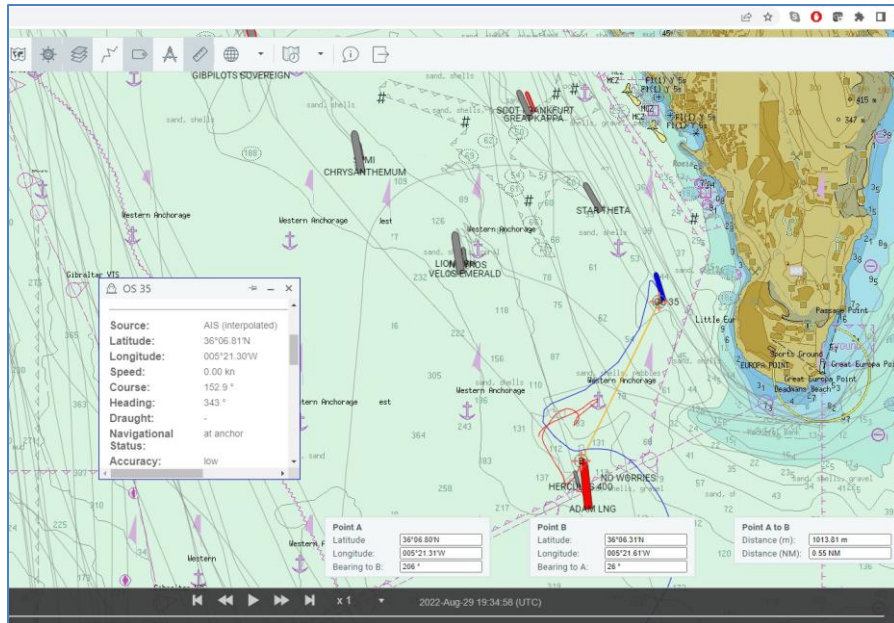


Figure 9 Positions of 'OS 35' and 'ADAM LNG' at anchor

At 21:36 the bunker barge departed from 'ADAM LNG' and, at 22:00, one hours' notice of departure was given to the engine room.

'OS 35's anchor was raised at 21:47 when the master ordered the main engine Dead Slow Astern. The astern propulsion was increased to Slow Astern, and then Half Astern at 21:52 as shown at Figure 10. 'OS 35's Speed over the Ground (SOG) astern increased to 2.6 Knots with the ship's heading turning to starboard.

The effect of transverse thrust on the right-handed propeller ensured that the bow swung strongly to starboard as the speed astern increased.

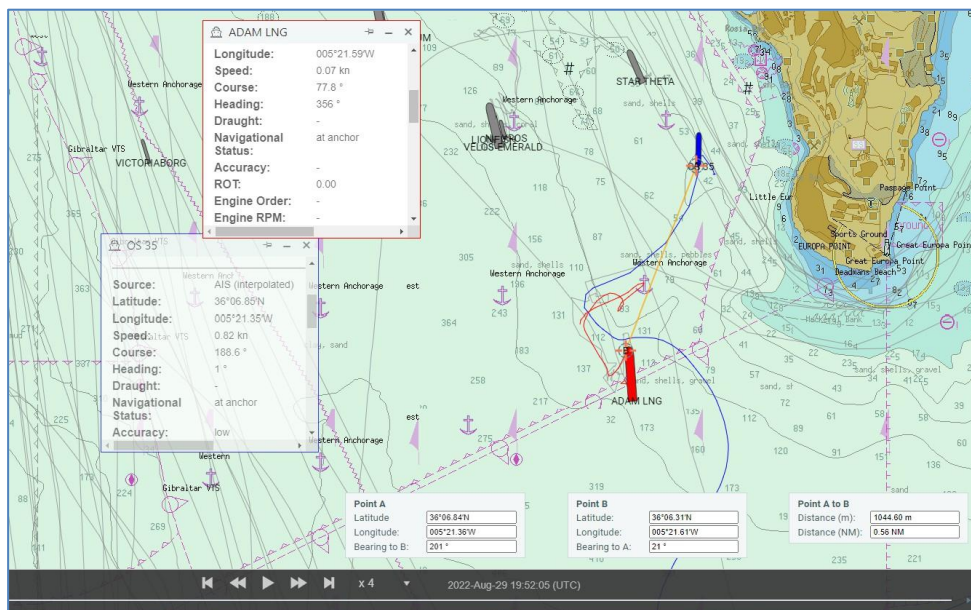


Figure 10 Positions of 'OS 35' and 'ADAM LNG' with 'OS 35' underway at 21:52:05

'ADAM LNG' monitored the presence of 'OS 35', as the closest anchored vessel, was observed and recorded by the cadet on watch who advised the watch officer.

At around 22:02 the master of 'OS 35', who reviewed the ARPA, ECDIS and visual situation during the manoeuvre, became concerned that his vessel was setting down onto 'ADAM LNG' due to the effects of the manoeuvre, tidal flow, and wind. The master stopped the main engine and then set the engine to Dead Slow Ahead and then Slow Ahead, with the rudder placed hard to port.

At 22:05 the main engine was ordered to Half Ahead. The master then telephoned the chief engineer in the engine control room and asked him to increase the ahead power to the maximum possible, which he did. However, the engine power available was limited by the hard-over position of the rudder.

At 22:06 'OS 35' informed VTS that they were now underway, and then provided VTS with their destination of the Netherlands when requested. The positions of the two vessels at this time is shown at Figure 11. Shortly afterwards the VTSO asked 'OS35' "...How do you intend to pass with the vessel south of you? How do you intend to pass 'ADAM LNG?' The reply from 'OS 35' was that they would "Pass around the vessel".

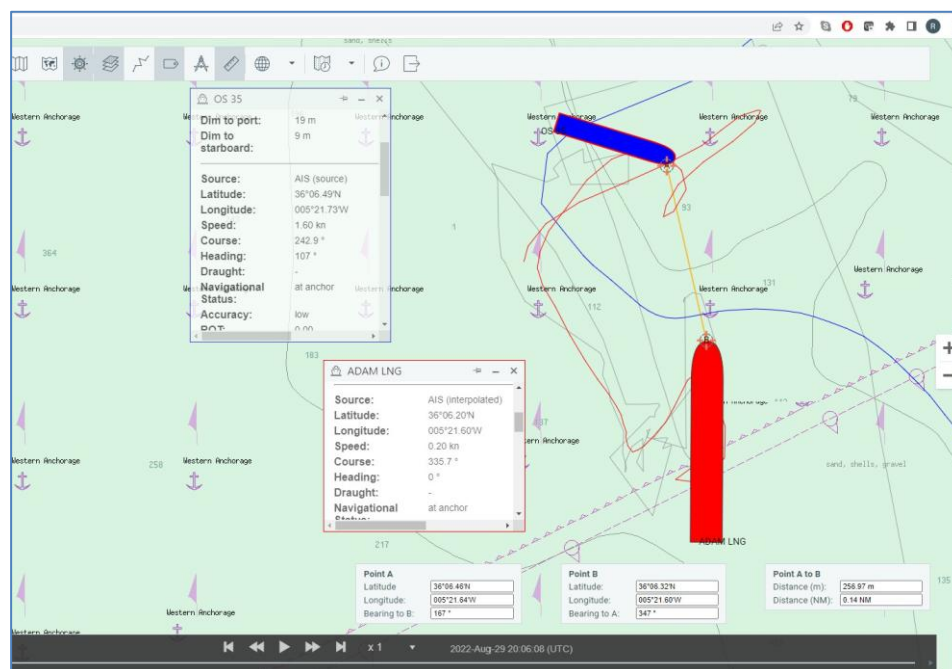


Figure 11 AIS positions of 'OS 35' and 'ADAM LNG' at 22:06:08

The astern speed of 'OS 35' reduced and 'OS 35's ground track turned more southerly, and the passing distance from 'ADAM LNG' was reduced.

'OS 35' continued to close with 'ADAM LNG', with the forward speed now increasing ahead. The Rapid Replay screenshot at 22:09:10, shown at Figure 12, showed that 'OS 35' was 147 metres from 'ADAM LNG' with the distance still closing and the SOG of 'OS 35' increasing to 1.5 knots.

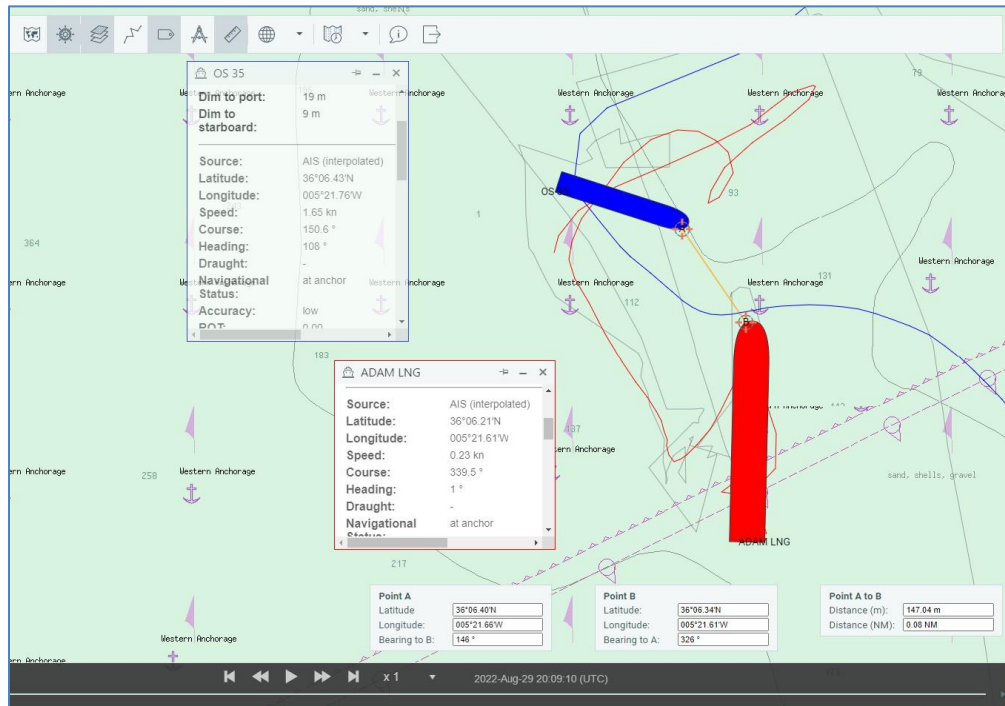


Figure 12 Rapid Replay reconstruction of the positions of 'OS 35' and 'ADAM LNG' at 22:09:10

At around 22:11:24 the starboard side of 'OS 35' made contact with the bulbous bow of 'ADAM LNG' in position 36° 06.4' N 005° 21.6' E as shown at Figure 13. The bow of the anchored 'ADAM LNG' swung to starboard during the contact. At the time of the accident 'OS 35' - with engine at Full Ahead and rudder hard to port - was swinging to port with a heading of 091° and COG of 130°. The COG indicated the direction of the stern, where the GPS antenna was located.

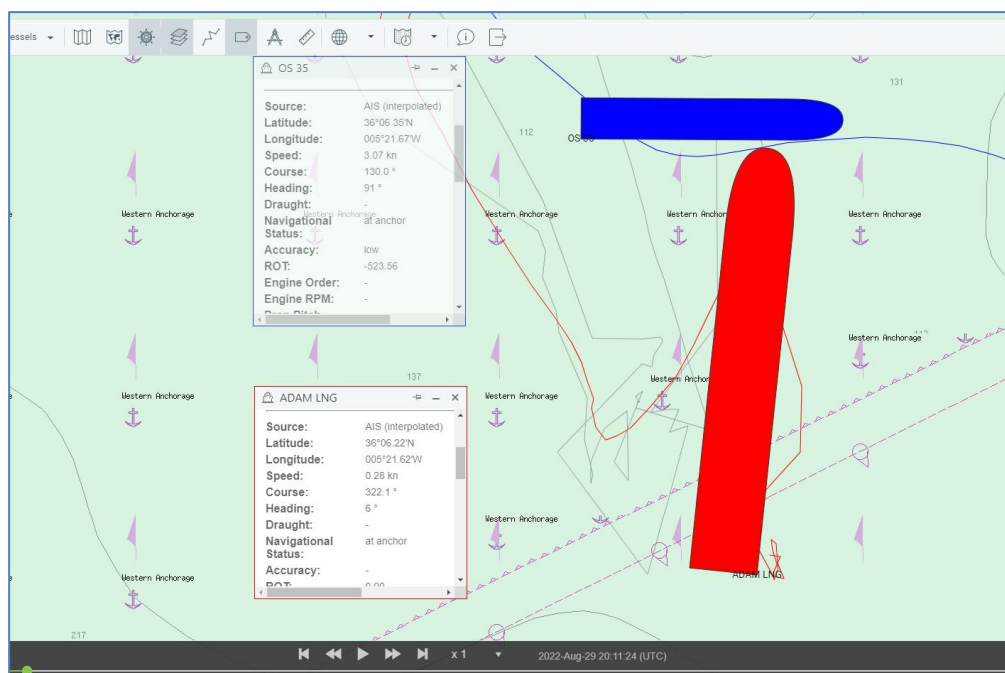


Figure 13 Rapid Replay reconstruction of the positions of 'OS 35' and 'ADAM LNG' at 22:11:24

The VTS recorded the Infrared CCTV and VTS radar and AIS display (Figure 14) at the same time of 22:11:24 which showed the likely time of the contact and the conditions at this time.

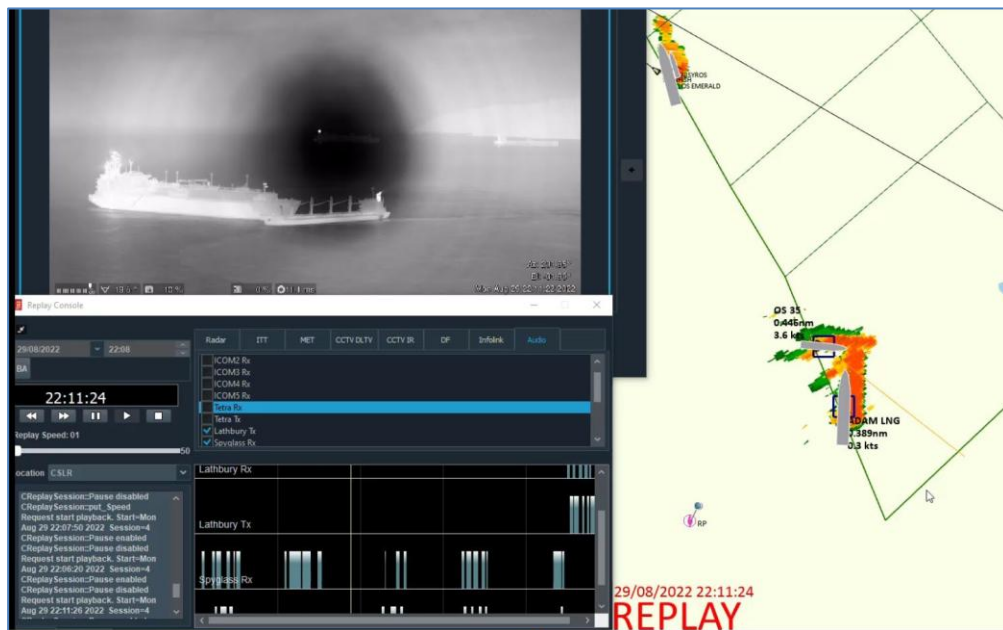


Figure 14 Port of Gibraltar VTS recording at 22:11:24

'ADAM LNG's Officer of the Watch then sounded the General Alarm and the crew mustered at their emergency stations.

At 22:12:10 (Figure 15) VTS contacted 'OS35' by VHF radio and stated "Warning...risk of collision". 'OS 35' acknowledged the warning of VTS.

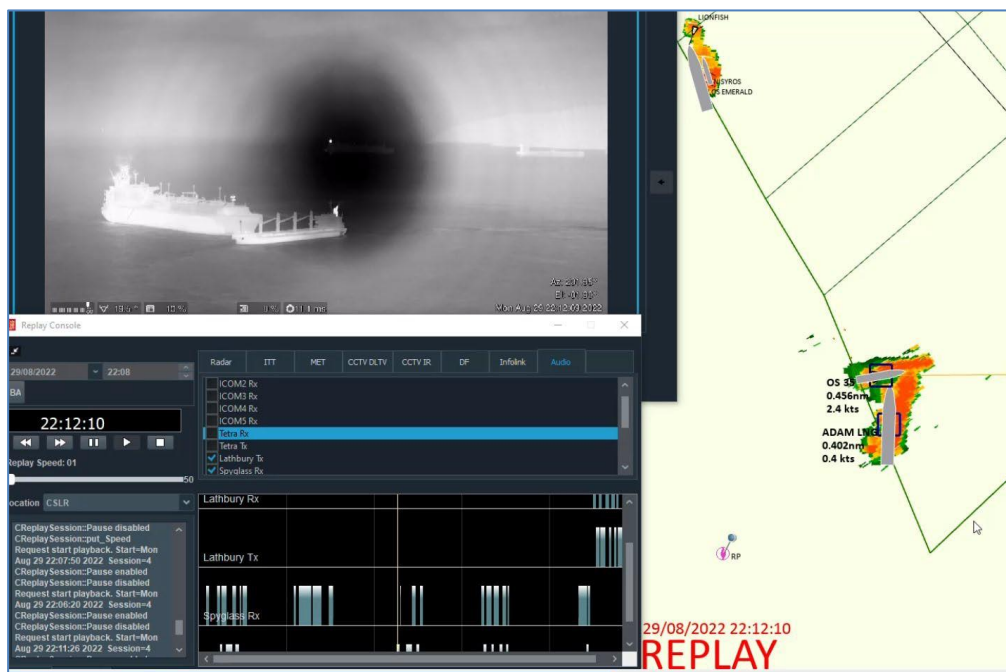


Figure 15 Port of Gibraltar VTS recording at 22:12:10

At 22:14 'ADAM LNG' informed VTS that 'OS 35' was passing very close to them (Figure 16) when their bow had turned to starboard. Also at 22:14 the main engine of 'OS 35' was reduced to Dead Slow Ahead.

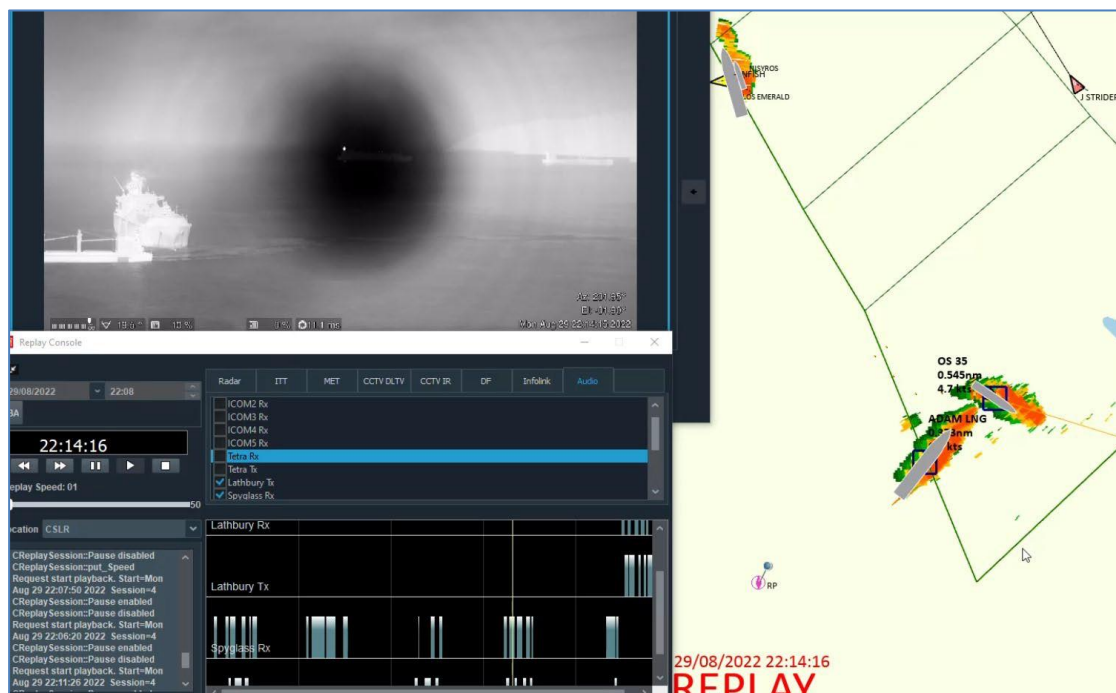


Figure 16 Port of Gibraltar VTS recording at 22:14:16

VTS contacted 'OS 35' at 22:16 and asked the master if there had been any contact, including the bulbous bow, with 'ADAM LNG'. The master of 'OS 35' replied that there had been no contact.

At 22:17 the VTS ordered 'OS 35' to *“proceed to a position 2 NM east of Europa Point light house and stop your vessel there. Do not proceed outside Gibraltar Territorial waters because we need to check first if you have had any contact with this vessel”*.

The master of 'OS 35' confirmed that he would stop his vessel as instructed at 22:18. At 22:20 'OS 35's main engine was stopped.

At 22:18 VTS asked *“ADAM LNG’ to launch their rescue boat to inspect the bow for damage confirm whether contact had been made”*. 'ADAM LNG' replied that they had ordered a service boat to carry out an inspection.

At 22:34 'ADAM LNG', following the arrival of a local service boat, advised VTS that there had been contact with their bulbous bow.

'OS 35' confirmed, at 22:38, that they were flooding into one of their cargo holds. VTS asked whether the flooding was controllable; the master of 'OS 35' stated that he would check and respond to VTS in 15 minutes.

At around 22:40 VTS informed the duty Senior Port Officer (SPO) of the situation.

At 22:53 VTS asked 'OS 35' for an update of the situation. The master of 'OS 35' replied that he would "Proceed to water with depth of 20 to 25 and then I will check our situation". VTS replied: "...you need to stop. You're in Gibraltar waters now. You need to stop your vessel, come close to Gibraltar water, to Gibraltar Beach and when you are twenty metres to stop [your vessel]. We are sending a pilot to attach to your vessel".

'VTS' instructed 'OS 35': "Captain, I am giving you instructions. You need to stop your vessel; the Gibraltar pilot is proceeding to you now. ETA 10 minutes" at 22:55.

At 22:58 VTS again stated: "You start turning to the...West Captain. Start turning to the West, you come to shallow waters". The master of OS 35 replied: "I will come to the shallow water ok".

At 23:00 'OS 35' turned to port towards the coast (Figure 17).

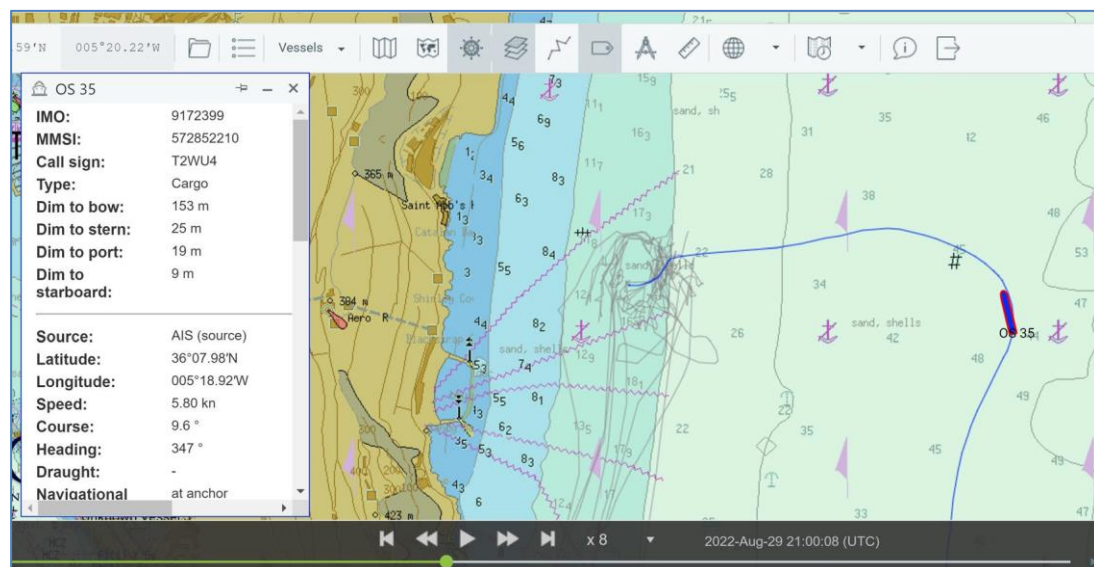


Figure 17 Rapid Replay reconstruction of the position of 'OS 35' at 23:00:08

At 23:01 VTS stated: "OK, you need to do anything to stop the vessel from sinking. So you come if its best for you, you come to the shore to shallow waters and let the bow go and rest on the shore. You have shallow waters there. Come closer.". The master of 'OS 35' replied: "I will close to the shore better. I will close to the shore where the ship, yes, I cannot drop anchor close at the beach, maybe the 20 metre, 18 metre where the ship we cannot drop anchor also.".

'OS 35' dropped anchor at 23:10 and the way was taken off the vessel, which swung to starboard, parallel to the coast.

At around 23:16 (Figure 18) 'OS 35' appears, from the VTS and AIS data available, to ground in the forward section.

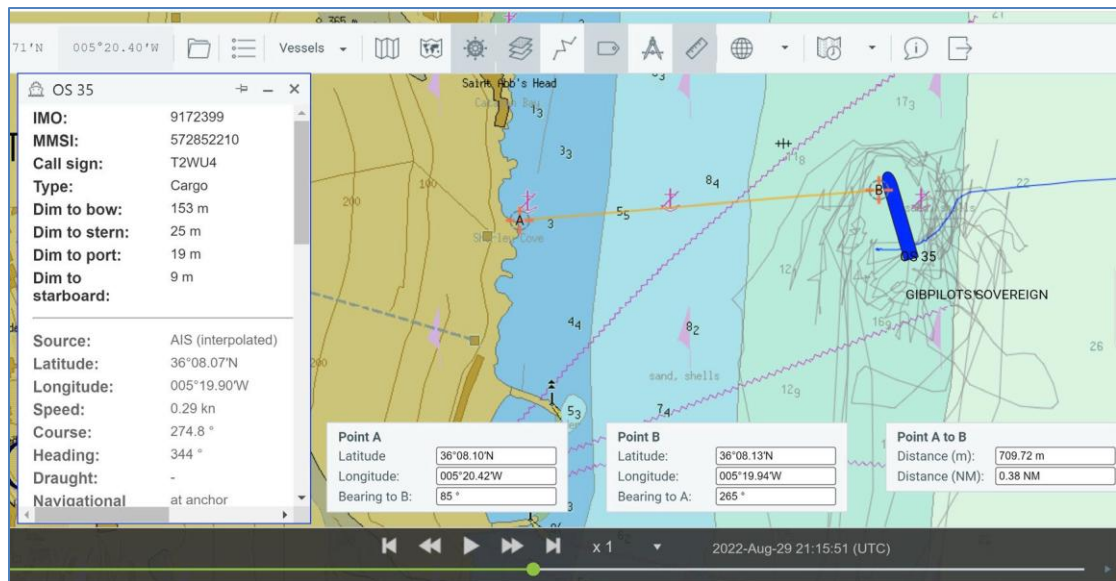


Figure 18 Rapid Replay reconstruction of the position of 'OS 35' at 23:15:51

At 23:19 VTS stated “OS35 Instructions: You need to bring the vessel to beach it, you need to touch the bottom. You need to come as close as possible so that your hull is touching the bottom”.

At 23:20 the VTS again stated: “OK, please let me repeat the message. My question is to bring your vessel closer to shore to stop your vessel from sinking. We would like the vessel to touch the bottom in order to stop the vessel from sinking”. The master of ‘OS 35’ replied: “Yes, eh, yes I, yes I will bring because it is sinking go two meters more and touch *inaudible* to avoid the coming more water, to avoid the yes the sinking yes”. The crew of ‘OS 35’ mustered on their emergency station on deck.

At 23:21 the VTS again requested the master of ‘OS 35’ to manoeuvre his vessel closer to the shore.

At 23:43 The master of ‘OS 35’, requested by VTS, stated that 183 Tonnes of Low sulphur fuel oil and 250 Tonnes of gas oil remained on board.

At 23:45 The Gibraltar pilot embarked ‘OS 35’ and the pilot vessel remained on scene. The pilot informed the VTS and port officials of the status of ‘OS 35’ as he saw them. The Gibraltar pilot confirmed that the vessel was likely aground in the forward section.

At 23:48 the master of ‘OS 35’ stated to VTS that the situation had stabilised.

At 00:02 on 30 August the master of ‘OS 35’ confirmed to VTS that he was ready to evacuate the crew if required.

At around 00:15 the tugs ‘ROOKE’ and ‘ELIOT’ arrived at the position of ‘OS 35’ and offered to evacuate the crew if required. The vessels in attendance at 00:23 are shown at Figure 19.



Figure 19 Rapid Replay reconstruction of the position of 'OS 35' at 00:23:30 on 30 August 2022

As the bow of 'OS 35' submerged further the Gibraltar Pilot disembarked to the pilot vessel and remained on site.

'OS 35' Accident Report.

The master of 'OS 35' completed the Company accident report that stated that: *"Due to strong current, vessel drifting to starboard. Vessel with Full Speed and [rudder] max to port side still drifting to starboard. Caused touch with anchor chain of vessel [ADAM] LNG"*.

'ADAM LNG' Statement of Fact

The master of 'ADAM LNG's Statement of Fact (SOF) stated: "22:10 Outbound vessel Bulk Carrier OS35 departing Gibraltar Western anchorage made contact with the ships bulbous bow. 22:10 Gibraltar VTIS informed about incident. 22.12 Outbound vessel Bulk Carrier OS 35 clear of own vessel"

SECTION 2 - ANALYSIS

2.1 Actions Onboard 'OS 35'

The manoeuvre to leave the anchorage by 'OS 35' was not effectively planned or discussed by the bridge team prior to departure, nor did the vessel's SMS require that this was carried out.

The passage plan included a completed departure checklist; however, the track was not amended to be berth (or anchorage) to berth. The existing passage plan, which considered Gibraltar anchorage as a waypoint on the voyage, was not amended to show the vessel leaving from the actual anchorage position. The passage planning procedure identified that the weather, tide, and traffic situation should be considered as part of the passage planning process. It is evident that while the traffic situation was apparent to the master and second officer, that the effects of tidal flow and wind, and the necessity to monitor the passage of 'OS 35', were not taken.

As pilotage was not compulsory the master did not take, or consider taking, a pilot for departure.

While the designated anchorages to the north and south of 'OS 35' were occupied with anchored vessels, the Camp Bay Out anchorage to the south-west of 'OS 35' was vacant. Had the anchorage been fully occupied the available room for 'OS 35' to depart from the anchorage would have been further reduced.

The master's decision to manoeuvre astern was made when the bow started to swing to starboard when the anchor was aweigh. Had the bow swung to port, it is considered likely that the master would have continued to turn to port with the engine turning ahead and the ship departed with a more controlled ahead, rather than astern, manoeuvre.

The bridge equipment, and notably the Transas ECDIS, fitted to the bridge of 'OS 35' provided a means to monitor the track of 'OS 35'.

The second officer was unaware of the master's intended manoeuvre to depart the anchorage and carried out various duties to assist with departure. The second officer did not provide the master with position or track information as the vessel manoeuvred astern.

The screenshot at Figure 20 shows the ECDIS display recovered from 'OS 35' after the collision. The vector shows the projected path of the vessel should the displayed COG and SOG be maintained. The vector does not take into account the vessel's Rate of Turn (ROT)

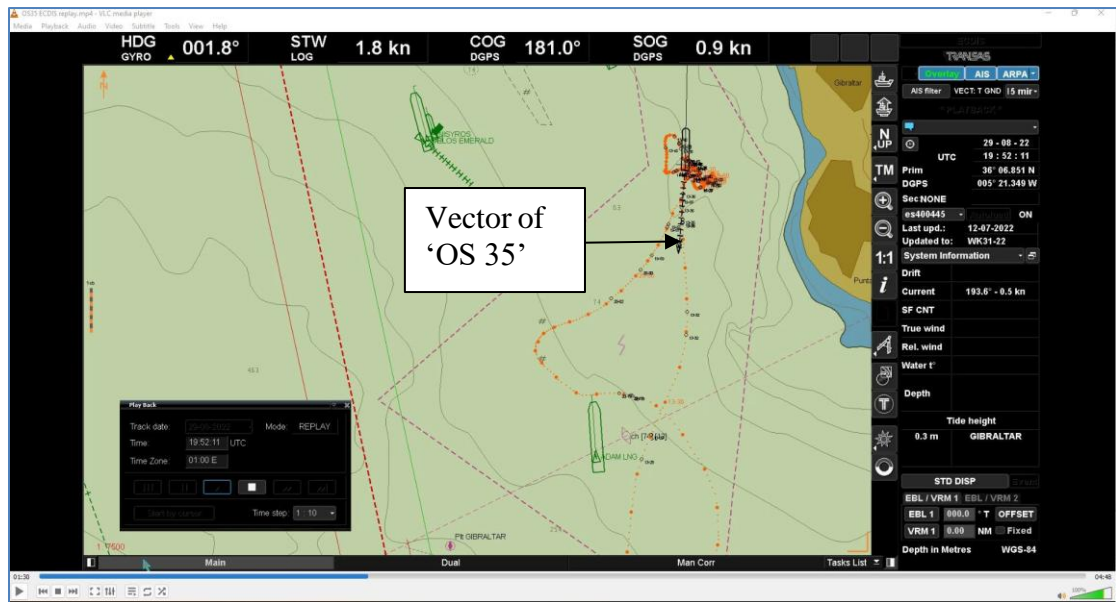


Figure 20 'OS 35' ECDIS display showing the vector with SOG and COG

Manoeuvres astern, due to the effects of transverse thrust as the propeller turns astern, are unreliable and the rate of swing is difficult to predict. Manoeuvres ahead provide a greater level of heading and speed control.

The breadcrumb track and vector shown at Figure 21 at 22:01:59 when the master stopped the engine operating astern and started to apply power ahead, and placed the rudder hard to port, predicted that 'OS 35' would pass clear of 'ADAM LNG' at a distance of around 2 cables.



Figure 21 'OS 35' ECDIS display at 22:01:59

Had either the master or the second officer effectively monitored the track of 'OS 35' they would have observed that, as the heading continued to swing to starboard as shown at Figure 22 at 22:06, that the existing manoeuvre was providing an effective clearing distance from 'ADAM LNG'.



Figure 22 'OS 35' ECDIS display at 22:06:14

The master's concern was that 'OS 35', due partly to his perception of the visually looming 'ADAM LNG', was in a collision situation due to the manoeuvre, tidal flow, and wind. The master reviewed the ARPA, ECDIS and visual situation, which informed his decision to change his departure manoeuvre.

The master's perception of the effect of tidal flow and wind was, as shown at Figure 22, incorrect. The evidence available to the master from the wind, and other vessel's anchors during the early part of the manoeuvre and the information from the ECDIS would have provided both the master and second officer with the evidence required to show that tidal flow and wind were not significant factors.

The effect of the master's revised manoeuvre of full ahead propulsion and the rudder placed hard to port manoeuvred the stern of 'OS 35' towards 'ADAM LNG' as shown at Figure 23. The master's decision was not effectively challenged by the second officer, who was not consulted by the master as to whether the change of plan would be effective and did not monitor the vessel's track to advise the master accordingly.



Figure 23 'OS 35' ECDIS display at 22:10:06

The ECDIS vector that showed the change of COG and SOG during the manoeuvre was available to the master and second officer; however, this vector did not alert either of them that their actions were increasing, rather than decreasing, the risk of collision with 'ADAM LNG' as shown by the vector of 'OS 35' shown at Figure 24 below.

The VHF interventions of VTS did not change the actions or behaviours of the master, who continued with his intended manoeuvre believing that this was the best course of action.



Figure 24 'OS 35' ECDIS display at 22:11:18

The manoeuvre was decided after the anchor was raised, and the vessel started to swing. Had the vessel's head swung to port the master would likely have turned to port which would have provided a greater control of the manoeuvre and allowed 'OS 35' to clear the anchorage to the West before

heading South-West to transit the Gibraltar Strait on passage to the Netherlands.

Other manoeuvres from the anchorage, driving the vessel ahead, where the ship's response to rudder and engine speed is more reliable, were available.

The 190-metre-long geared bulk carrier 'STAR THETA', anchored to the north of 'OS 35', departed shortly after the collision and its track is shown at Figure 25.

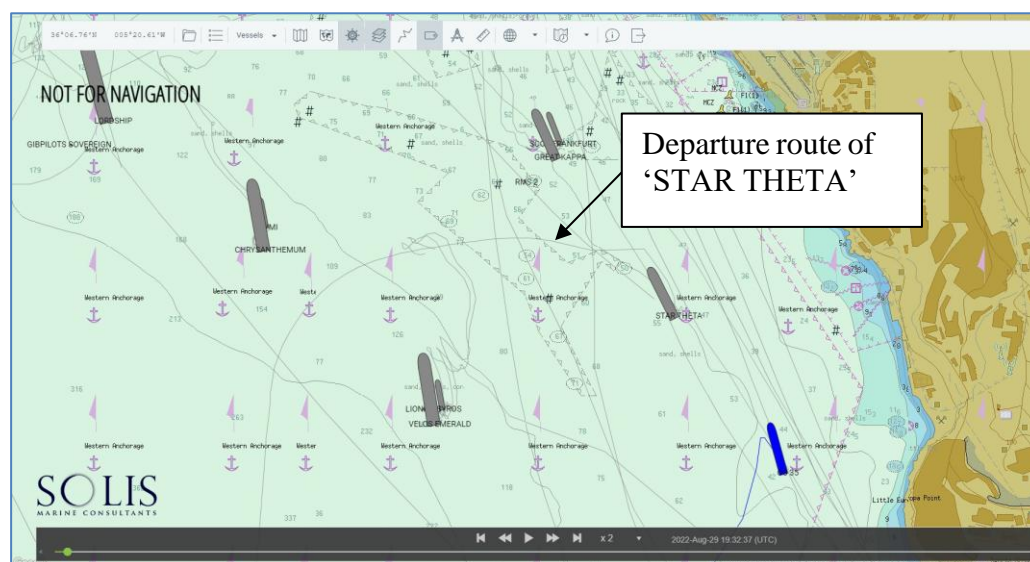


Figure 25 Rapid Replay reconstruction showing the track of 'STAR THETA' departing the Western Anchorage

The first engine movement from 'OS 35' was made when the anchor was aweigh, and the swing to starboard had been initiated. Had the need to swing the bow to port, rather than allow the bow to swing to starboard, been identified by the master as the anchor was being raised, then the engine and rudder could have been operated to ensure that the bow turned to port. With the bow turning to port a departure ahead, rather than astern, would have been possible. This ahead manoeuvre, as shown by the track of 'STAR THETA', provides greater control of the vessel.

The departure of 'OS 35' from the Western Anchorage was not effectively planned or monitored by the master or second officer. The decision of the master to change his manoeuvre, when the ECDIS vector showed he was passing ahead of 'ADAM LNG', led to the collision.

2.2 Actions Onboard 'ADAM LNG'

The 'ADAM LNG' OOW effectively monitored the departure of 'OS 35' from the anchorage. The cadet informed the OOW of the departure of 'OS 35' from the anchorage, which was also watched by the AB on deck. 'ADAM LNG' passed ahead of 'OS 35' at 20:04 as shown at Figure 26. The OOW anticipated that

'OS 35' would pass ahead of 'ADAM LNG' with an acceptable CPA and that no action was required.

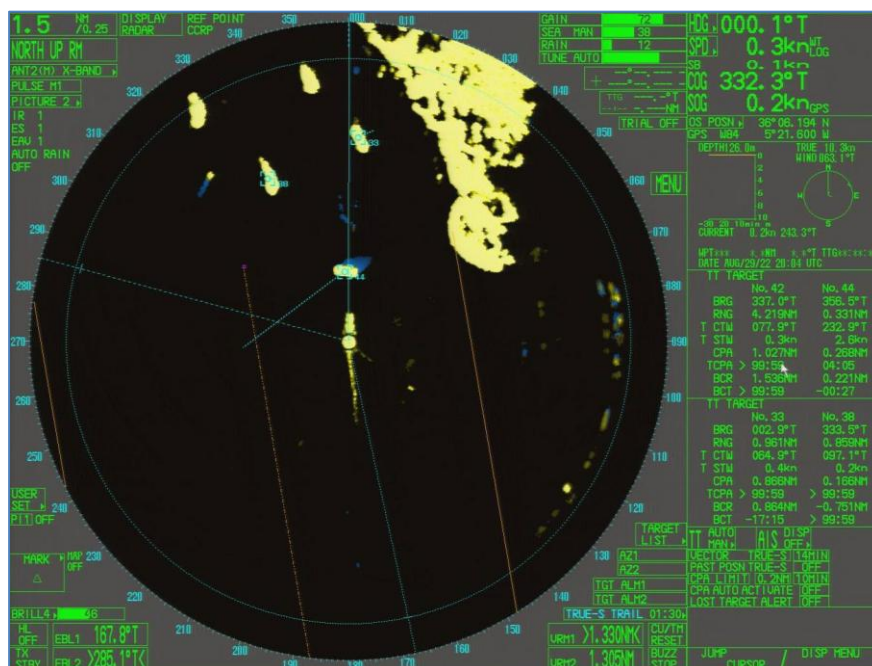


Figure 26 Radar Image from 'ADAM LNG' showing the position and vector of 'OS 35' at 22:04

The earliest that a change to the manoeuvre of 'OS 35' could have been observed by the 'ADAM LNG' OOW would have been at around 22:04. The risk of collision would only have been fully apparent to the OOW around 2 minutes prior to the collision. This time period did not provide the OOW sufficient time to take any action, such as using the engine or releasing anchor cable, to prevent the collision.

The actions of the OOW in calling the master and sounding the General Alarm were the actions that would be expected of an OOW at a busy anchorage. In practical seamanship terms, there was no action that the bridge team of 'ADAM LNG' could have taken to prevent the collision.

2.3 Intervention of VTS

The VTSOs were monitoring the departure of 'OS 35' throughout, including by eye.

The VTSOs were aware that the weather and tidal flow conditions were benign, in good visibility, and with no conflicting traffic movements that would interfere with the departure of 'OS 35'.

The VTSO did not advise the master, as was accepted practice, to proceed to the west of Gibraltar Bay, before heading south into the Gibraltar Strait. However, it is considered likely that the master would have confirmed that he

intended to manoeuvre, albeit astern, to the west prior to heading for the Gibraltar Strait.

There was no requirement for the master of 'OS 35' to advise VTS of his intended manoeuvre prior to the anchor being aweigh, or when the vessel was underway. Had the master been required to communicate his departure plan effectively, prior to VTS giving approval to depart, then VTS may have been better placed to identify when a deviation from the plan was observed. It is also possible that this request would have required the master to consider his plan more fully, prior to raising the anchor. The existing procedure for advising the vessels in the Western Anchorage to proceed to the west, which is not a written procedure, should be formalised to ensure that communication with all vessels is consistent.

VTS called the 'OS 35' to enquire as to their intended manoeuvre when they became concerned. At that time the master of 'OS 35' had already ordered the engine to full power ahead and the rudder hard to port.

Even if the master had been clearer in communicating his plan to VTS, it is considered unlikely that their intervention would have altered the master's intended plan to keep maximum power ahead and the rudder hard to port, which he believed was the best action to take to avoid collision.

By the time VTS provided a warning to 'OS 35' that a collision was imminent the collision had already occurred.

While the information provided to 'OS 35' by VTS was too late to prevent the collision; had the warnings been provided earlier they would very likely, due to the master's change of plan, not have prevented the collision.

A written procedure to ensure that the advice provided to vessels departing the Western Anchorage would ensure that the information provided to them is consistent.

2.4 Pilotage

Pilotage, compulsory for vessels arriving at the Western Anchorage, is not compulsory for departing vessels.

Pilotage ensures that vessels arriving at anchor are located in positions that ensure that the Western Anchorage is safely and efficiently used for the delivery of bunkering services in Gibraltar.

Departure from the Western Anchorage in light wind and weak tidal conditions is a relatively straight forward manoeuvre, which is monitored by VTS.

It is considered unlikely that the actions of VTS or 'ADAM LNG' could have prevented the collision.

While collisions of vessels departing the western anchorage are rare, the risk does exist.

Pilotage is provided to ensure the safe arrival of vessels to the anchorage, and to ensure that the available anchorage is effectively used. Had pilots been obliged to provide advice to masters on the most effective manoeuvres, accepting that traffic, wind, and tidal conditions will change, for departing the anchorage this could assist masters in their passage planning.

Had a pilot been on board 'OS 35' the manoeuvre astern would not have been their chosen option for the location and conditions that were found on the day. Had the 'OS 35's' turn to port been initiated as the anchor was being lifted there was sufficient sea room to continue moving ahead and turn to port to depart the anchorage to the west. There was also suitable sea room to pass between the vessels ahead, which would have provided greater control of the vessel than by manoeuvring astern, where the manoeuvre is more difficult to control and monitor.

2.5 Actions following the collision

The verbal communication from 'OS 35' to VTS was difficult and required some repetition. The master of 'OS 35' stated at 22:16 that no contact had been made, while a collision had taken place. VTS made the valid assumption that a collision was likely to have occurred and acted accordingly.

While numerous attempts were made by VTS to confirm that 'OS 35' was going to ground to the east of Gibraltar, the master of 'OS 35' only replied that he would anchor in shallow water of around 20 metres depth.

The actions of VTS in sending a pilot on board to verify the situation was successful in resolving the communications with the master of 'OS 35' and providing VTS with a report of the actual situation onboard.

While communications were difficult, the tenacity of VTS in their communication ensured that the plan to ground 'OS 35' to the east of Gibraltar was successfully completed.

2.6 Port Emergency Response

The actions of VTS, in requiring 'OS 35' to wait in British Gibraltar Territorial Waters (BGTW), and in directing the vessel to ground to the East of Gibraltar were commendable.

The escalation of the incident to the Harbour Master, and to the relevant government officials was carried out effectively, with support provided quickly to the VTS team.

The deployment of the pilot to board 'OS 35' and the deployment of the two tugs to the scene were also carried out in good time.

While the incident would benefit from a review to identify any improvements, including to the requirement for drug and alcohol testing, that could be made to Gibraltar Port's response to a similar incident, the port's emergency plan worked appropriately.

The Port of Gibraltar's response to the collision is considered to have been effective and in accordance with their emergency planning.

2.7 Previous Accidents

The frequency of collisions on departure from the anchorage is low. However, the potential impact of vessel collisions is high, with the associated risk of serious oil pollution. No significant collisions, with a pilot on board - with around 8,700 pilotage acts carried out each year - have been formally investigated during the same 15-year period.

However, the potential impact of vessel collisions is high due to the frequency of vessels arriving into and departing from Gibraltar and nearby Spanish ports.

2.8 Voyage Data Recorder

The 'OS 35' VDR did not record the events at the time of the collision. The 'ADAM LNG' VDR was partially operating, however, no NMEA data was recorded. Both vessels had valid verification certificates stating that their VDRs were compliant with the required standard. VDR is fitted to provide the evidence to effectively investigate marine accidents, that was not available for 'OS35' and only partially available for 'ADAM LNG', this loss of evidence hindered the investigation.

Had the VDR been fully functional on board 'OS 35' and 'ADAM LNG' the investigation would have been provided with a better understanding of the actions on the bridge of 'OS 35', and more frequent positions of the anchored 'ADAM LNG' recorded

SECTION 3 – CONCLUSIONS

1. The master of 'OS 35' made an error of judgement, which was not detected by the bridge team, departing from the Western Anchorage. As 'OS 35' was manoeuvring astern the ECDIS track showed that, as the heading continued to swing to starboard, that 'OS 35' would have passed well clear ahead of 'ADAM LNG' in light wind and negligible tidal flow. However, the master's perception was that 'OS 35' was drifting towards 'ADAM LNG' and that the vessels would collide. This error led to the master of 'OS 35' setting the engine to full power ahead, and the rudder hard to port. Rather than avoiding the collision, this action led to the collision of 'OS 35' with 'ADAM LNG' at a speed of 3 knots, with the stern of 'OS 35' swinging towards the bow of 'ADAM LNG'.
2. Pilotage is not compulsory for departure from the Gibraltar Western Anchorage and the master did not choose to take a pilot. The pilotage information provided does not recommend or provide guidance for requesting a pilot for departing the anchorage.
3. Had a pilot been embarked it is considered very likely that an alternative manoeuvre would have been used to depart the anchorage, which would not have included the prolonged astern manoeuvre.
4. The frequency of collisions on departure from the anchorage is low. However, the potential impact of vessel collisions is high, with the associated risk of serious oil pollution. No significant collisions, with a pilot on board - with around 8,700 pilotage acts carried out each year - have been formally investigated during the same 15-year period.
5. Had a pilot been onboard, it is considered very likely that the collision would have been prevented. The option of compulsory pilotage would provide an effective barrier to similar future accidents occurring.
6. The VTSO did not advise, as was usual practice, that 'OS 35' should manoeuvre to the west from the Western Anchorage prior to heading south into the Gibraltar Strait.
7. VTS was not aware of the change of 'OS 35's intended manoeuvre until it was too late to prevent the collision, and their intervention was ineffective. When VTS warned 'OS 35' that a risk of collision existed, the collision had already occurred. Had VTS been aware of the

intended manoeuvre of 'OS 35' prior to permission being given to depart the anchorage, then they would have been better prepared to verify whether the manoeuvre was being carried out effectively.

'ADAM LNG' was, in the time available, unable to take any action that would have prevented the collision from occurring once the risk of a collision became apparent.

8. The response by VTS following the collision was effective. VTS correctly predicted, despite the information provided by the master of 'OS 35', that a collision had occurred. The incident was quickly escalated to the highest levels of the Gibraltar Administration, and the decision to ground the vessel to the east of Gibraltar to prevent sinking in deeper water, or outside of BGTW, was quickly made and effectively communicated to the master of 'OS 35'.
9. Had the VDR been fully functional on board 'OS 35' and 'ADAM LNG' the investigation would have been provided with a better understanding of the actions taken on the bridge of 'OS 35', and more frequent positions of the anchored 'ADAM LNG' would have been provided.

SECTION 4 – SAFETY RECOMMENDATIONS

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

The owner / operator of 'OS 35' is recommended to:

- Ensure that the planning of manoeuvres to and from anchorages, and the effective monitoring of such manoeuvres, is included in their passage planning, pre-arrival and pre-departure procedures (and associated checklists), particularly when no pilot is onboard.
- Ensure that the lessons learnt from this accident are promulgated to their fleet and included in future training programmes.

The owner / operators of 'OS 35' and 'ADAM LNG' are recommended to instigate procedures to ensure that VDR's are fully operational at all times.

The Gibraltar Port VTS is recommended to formalise the procedure for advising departing vessels, with no pilot embarked, of the recommended route for departing the Western Anchorage.

Gibraltar Pilots are recommended to:

- Provide masters, on arrival and on their website, with the information required of the option to take a pilot from anchorage to sea.
- Formalise the information provided to masters for departing the Western Anchorage on arrival.

Alternatively:

The Gibraltar Port Authority is recommended to consider introducing compulsory pilotage for vessels departing the Western Anchorage.

**Office of the Maritime Accident Investigation Compliance Officer
HM Government of Gibraltar**