



Marine Safety Investigation Unit



Transport Malta



## MARINE SAFETY INVESTIGATION REPORT

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Safety investigation into the grounding of the  
Togo registered oil tanker

***HEPHAESTUS***

in position 35° 57.61' N 014° 25.51' E  
on 10 February 2018

201802/008

MARINE SAFETY INVESTIGATION REPORT NO. 03/2018

FINAL

Investigations into marine casualties are conducted under the provisions of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 and therefore in accordance with Regulation XI-I/6 of the International Convention for the Safety of Life at Sea (SOLAS), and Directive 2009/18/EC of the European Parliament and of the Council of 23 April 2009, establishing the fundamental principles governing the investigation of accidents in the maritime transport sector and amending Council Directive 1999/35/EC and Directive 2002/59/EC of the European Parliament and of the Council.

This safety investigation report is not written, in terms of content and style, with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The objective of this safety investigation report is precautionary and seeks to avoid a repeat occurrence through an understanding of the events of 10 February 2018. Its sole purpose is confined to the promulgation of safety lessons and therefore may be misleading if used for other purposes.

The findings of the safety investigation are not binding on any party and the conclusions reached and recommendations made shall in no case create a presumption of liability (criminal and/or civil) or blame. It should be therefore noted that the content of this safety investigation report does not constitute legal advice in any way and should not be construed as such.

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Transport Malta - Valletta Vessel Traffic Service.

## **GLOSSARY OF TERMS AND ABBREVIATIONS**

Sea area A1	an area within the radiotelephone coverage of at least one VHF coast station in which continuous digital selective calling (DSC) alerting is available, as may be defined by a Contracting Government
Sea area A2	an area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available, as may be defined by a Contracting Government
AB	Able bodied seafarer
ABM	Automated Behaviour Monitoring
A/C	Air Condition
AFM	Armed Forces of Malta
AFS	Anti-fouling system
AIS	Automatic Identification System
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea, 1972, as amended
COT	Cargo Oil Tank
CPD	Civil Protection Department
CSSE	Cargo Ship Safety Equipment
CSSR	Cargo Ship Safety Radio
DB	Double Bottom
DWT	Deadweight
E	East
EMSA	European Maritime Safety Agency
ENE	East Northeast
EU	European Union
FW	Fresh water
GMT	Greenwich Mean Time
GPS	Global Positioning System
GT	Gross Tonnage
ILLC	International Loadline Certificate
ILO	International Labor Organization
IMMARBE	International Merchant Marine Registry of Belize
I.N.S.B.	International Naval Surveys Bureau
ITC	International Tonnage Certificate
ITF	International Transport Workers' Federation
kHz	Kilohertz
kW	Kilowatt
Lat	Latitude

LOA	Length Overall
Long	Longitude
LT	Local Time
m	Metres
m <sup>3</sup>	Cubic metres
MARPOL	The International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
MLC	The ILO Maritime Labour Convention, 2006
MSIU	Marine Safety Investigation Unit
MSM	Minimum Safe Manning
MT	Motor Tanker
mt	Metric tonne
N	North
NAVTEX	Navigational Telex
NE	Northeast
NM	Nautical miles
NNW	North Northwest
NT	Net Tonnage
NW	Northwest
ODM	Oil discharge monitoring
OOW	Navigational Officer of the Watch
PA	Public Address
P&I	Protection & Indemnity
RPM	Revolutions per Minute
SOLAS	International Convention on the Safety of Life at Sea, 1974, as amended
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended
TM	Transport Malta
VHF	Very High Frequency
VRM	Variable range marker
VTS	Vessel Traffic Service
W	West

## SUMMARY

On 10 February 2018, at about 0645<sup>1</sup>, the Marine Safety Investigation Unit (MSIU) was notified by Transport Malta (TM) officials from the Ports and Yachting Directorate, that the motor tanker *Hephaestus* had run aground in position 35° 57.61' N 014° 25.51' E, limits of Qawra Point, St Paul's Bay, Malta at about 0615. At the time, the vessel was in ballast condition.

Preliminary information indicated that *Hephaestus*, which had been at anchor for some days in position 35° 58.9' N 014° 25.30' E, *i.e.*, approximately 1.5 nautical miles (NM) from the shoreline, in Bunkering Area No. 1, dragged her anchor in Force 8 winds, gusting to Force 10, and eventually went aground. Some of the ship's bunkers and/or oily-water from the bilges escaped from the vessel several days after the grounding and eventually booms had to be deployed around the wreck.

As a result of the grounding, the vessel sustained extensive structural damages. The seven crew members, who disembarked from the vessel directly on the rocky shore using the vessel's pilot ladder, reported no serious injuries.

The safety investigation concluded that during the adverse weather conditions, the vessel was in unsheltered waters, which compromised the safety of the vessel.

Two recommendations have been made to the managers of the vessel, and TM's Ports and Yachting Directorate.

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<sup>1</sup> Unless otherwise stated, all times in this safety investigation report are GMT +1.

# 1 FACTUAL INFORMATION

## 1.1 Vessel, Voyage and Marine Casualty Particulars

Name	<i>Hephaestus</i>
Flag	Togo
Classification Society	International Naval Surveys Bureau (I.N.S.B.)
IMO Number	6519326
Type	Oil Tanker
Registered Owner	Orbiter Navigation Corp.
Managers	Volont Maritime S.A.
Construction	Steel
Length overall	61.33 m
Registered Length	55.90 m
Gross Tonnage	595
Minimum Safe Manning	6
Authorised Cargo	Liquid in bulk (Flammable products with Flash Point over 60 °C)
Port of Departure	Souda Port, Crete
Port of Arrival	Territorial waters, Malta
Type of Voyage	Short International
Cargo Information	In ballast
Manning	7
Date and Time	10 February 2018 at 06:30 (LT)
Type of Marine Casualty	Serious Marine Casualty
Place on Board	Engine-room, Ballast and cargo oil tanks
Injuries/Fatalities	None reported
Damage/Environmental Impact	None reported although a very small amount of oil / oily-water escaped from the stricken vessel
Ship Operation	On anchor
Voyage Segment	Arrival
External & Internal Environment	Cloudy and isolated showers at times, with Northerly winds Force 6 to 8, gusting to Force 10 at times and very rough seas.
Persons on Board	7



## 1.2 Description of Vessel

*Hephaestus*, a 595 gt oil tanker (Figure 1) was built in 1965 by Broderna Jonssons Torrdocka (Kallandsö Varv AB), Linköping, Sweden and was registered in Togo. She was owned by Orbiter Navigation Corp., managed by Volont Maritime S.A., and was classed by the International Naval Surveys Bureau (I.N.S.B.).

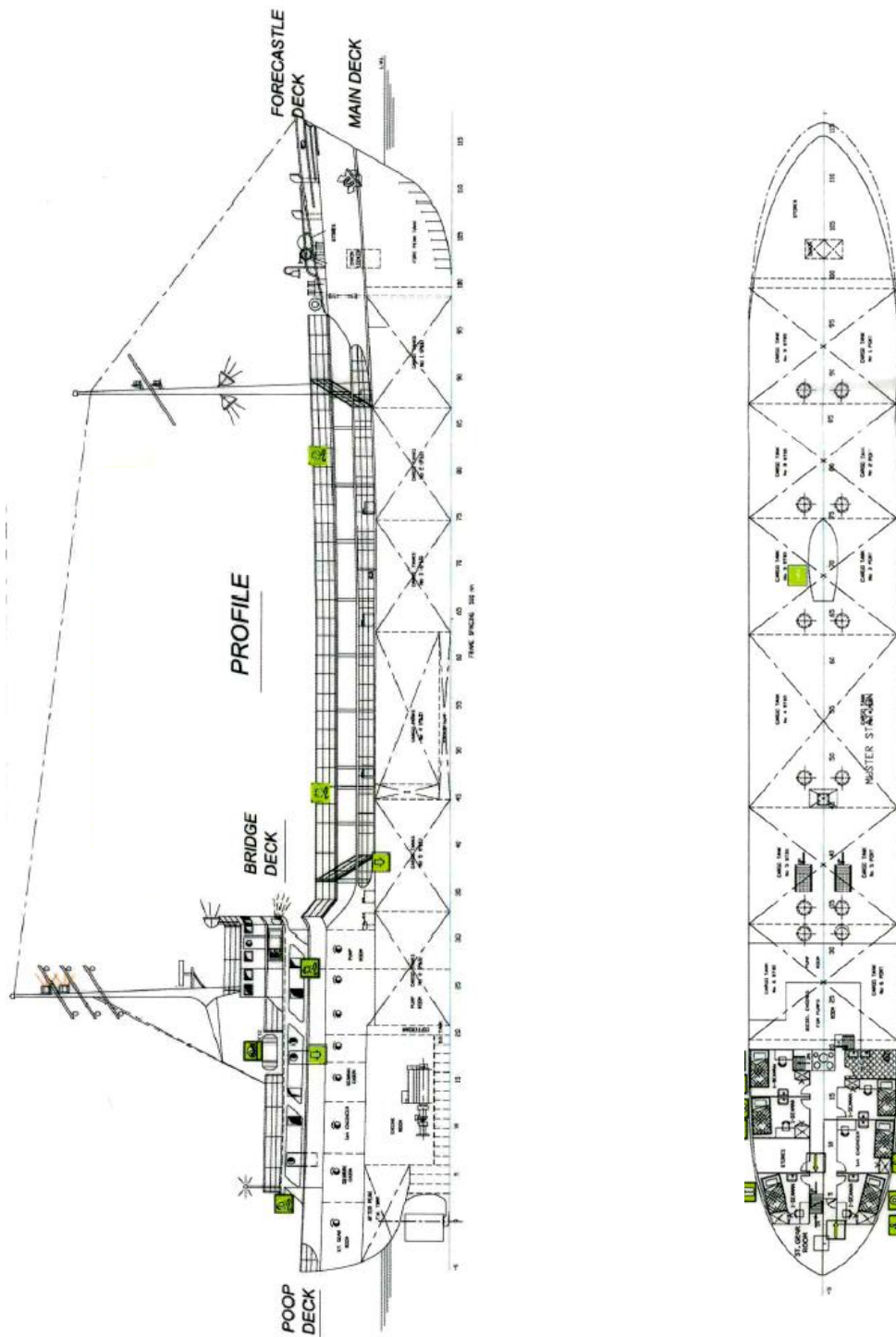


Figure 1: MT *Hephaestus*

*Hephaestus* had a length overall of 61.33 m, a moulded breadth of 7.9 m and a moulded depth of 4.02 m. The vessel had a summer draught of 3.86 m, corresponding to a summer deadweight of 885 tonnes.

Propulsive power was provided by a 6-cylinder Ruston Stafford 6 CSRKM, four stroke, medium speed single acting diesel engine, producing 410.13 kW at 700 rpm. This drove a single fixed pitch propeller to reach a service speed of 11.0 knots.

*Hephaestus* was equipped with the required navigation equipment listed on her Record of Equipment for Cargo Ship Safety Equipment Certificate-Form E, Section 3 'Details of Navigational Systems and Equipment', including, a VHF, AIS, GPS and one Furuno Radar (old type). It was reported that the equipment was in good working order. The vessel was not equipped with a voyage data recorder.

The navigation bridge layout was a conventional and a standard one for the type and size of this vessel (Figure 2). The console, which included the magnetic compass, the radio communications, AIS, NAVTEX, engine controls, autopilot and hand steering position, was located at the forward end of the bridge, right beneath the bridge windows (Figure 3). The radar was located on the port side of the bridge.



**Figure 2: Main navigation console on the bridge**



**Figure 3: Steering position on the navigation main console**

### **1.3 Crew**

At the time of grounding, *Hephaestus* had a crew of seven, *i.e.*, four officers and three ratings.

The crew consisted of four Bangladeshis, two Russians and one Egyptian. The working language on board was English.

The master, who was of 48 years of age, had first gone out to sea as a deck cadet in 1992. He obtained his Class 3 Certificate of Competence in 1995 from Bangladesh. His Class 2 Certificate was issued by the Indian authorities in 1997 and finally his IMMARBE Master's Certificate (STCW II/2), with no limitations was issued in June 2013.

This was his first contract with this ship management. He had signed his contract together with the other three Bangladeshis crew members through a crewing agency in Bangladesh. According to his Discharge Book, he had been sailing as a master since 2002, mainly in the Arabian Gulf.

The chief officer, who was the OOW at time of grounding, was 37 years old. He first gone out to sea in 1997 as a deck cadet. He studied in Russia and obtained his STCW II/1 Certificate in 2002, followed by the STCW II/2 in 2014 without any limitations. His sea experience has mainly been on Russian oil tankers. This was his first contract with this shipping company. Together with a Russian AB, he signed his contract, which was offered by a Russian crewing agency.

The 50 year old chief engineer from Bangladesh started his career at sea in 1994 as an engineer cadet. He studied in Bangladesh and got his IMMARBE STCW III/2 Certificate of Competence as chief engineer without limitations in 2014.

As for the other three crew members from Bangladesh, this was also his first contract with this Company, signed through a crewing agency in Bangladesh. He had joined this vessel on 18 October 2017, together with the master and two other crew members, all from Bangladesh.

The Egyptian second engineer was a 40 year old. He had been on board *Hephaestus* since July 2017, joining while the vessel was in Perama Dry-Docks in Greece. During the dry-dock period, he had been issued with a Cook Islands' STCW III/2 Certificate of Competence as second engineer without limitations. At the time of the accident, he had been at sea for over 15 years, mainly working on bunker barges in Greece.

#### **1.4 Vessel's Certification**

When the vessel left Perama Dry-Docks, she was in possession of 'Interim' Class and Statutory certificates, issued by I.N.S.B. *Hephaestus* also had a 'Provisional' Certificate of Registry and an MSM Document issued by the Directorate of Maritime Affairs, International Ship Register, of the Republic of Togo.

Except for the Interim Document of Compliance, all certificates had expired before the vessel's grounding on 10 February 2018.

## **1.5 Valletta VTS**

Malta has two VTS Centres namely, Malta VTS (Malta Coastal Station) and the Valletta VTS.

The Malta Coastal Station (Malta VTS), which provides an information service, is operated by the Armed Forces of Malta (AFM) and is responsible for the monitoring of shipping and receipt of vessel information within Maltese territorial waters, although it may also request additional information from ships beyond the territorial waters.

The Valletta Ports VTS (Valletta VTS), which is operated by TM, provides traffic organisation service and information service. A navigational assistance service is provided either on request or when deemed necessary. The scope of Valletta VTS is to regulate the movement of vessels within and between Maltese ports, in the approaches to port, and within territorial waters during maritime activities.

The areas of the Valletta VTS are mainly divided into two:

- Valletta Port Control – covers the approaches to the ports including the harbour areas (except the port of Marsaxlokk) and all the area falling within the limits delineating the territorial waters of Malta; and
- Marsaxlokk Port Control – covers the approach to the port of Marsaxlokk, including the harbour area.

Valletta VTS Centre is normally manned by three VTS officials per shift (morning shift: 0545 to 1400; afternoon shift: 1345 to 2100; and night shift: 2045 to 0600).

There is one VTS supervisor and two VTS operators on every shift. ‘Valletta Port Control’ and ‘Marsaxlokk Port Control’ are each assigned to the VTS operators / officers, while the VTS supervisor remains in charge of the watch and supports the VTS officers as necessary.

The VTS Centre is an ‘open plan’ set-up to allow for the VTS operators and VTS supervisor to interact easily among each other. They also have access to the main common monitors, which are mounted on the walls and the information that is displayed on them. The Valletta VTS Centre is equipped with the standard VTS



equipment including VHF sets (marine band), VTS radar and tracking system, AIS, geographical information system, dynamic traffic image and data recording capabilities.

The VTS operators and the VTS supervisor have their own workstations. As on any other regular day, on 10 February, the VTS Centre was manned with one VTS supervisor and two VTS operators. Both operators were monitoring ships' movements as vessels approached the ports of Valletta and Marsaxlokk and listening to VHF channels 12 and 14 respectively.

## **1.6 Environment**

Although the grounding happened in position  $35^{\circ} 57.61' N$   $014^{\circ} 25.51' E$  (close to Qawra Point in St. Paul's Bay), the vessel was originally anchored in position  $35^{\circ} 58.9' N$   $014^{\circ} 25.30' E$ , approximately 1.5 NM from the shoreline and in an anchorage area, known as 'Bunkering Area No. 1'. In this position, the vessel was fully exposed to the prevailing Northerly winds when eventually, she started dragging anchor at around 0515 towards a Southerly direction, directly towards the shore.

At the time of the grounding, the weather was cloudy with rain and isolated showers at times, with Northerly winds Force 6 to 8, gusting to Force 10 at times and very rough seas.

On 10 February 2018 at 0508, the local Metrological Office issued the following wind warning:

The strong locally very strong Northerly wind gradually become very strong Northwest by afternoon, and occasionally reach gale force over the exposed areas of the Maltese Islands. This warning is valid till 1800 this afternoon (10/1800) local time) and will be renewed accordingly.

Table 1 summarises the actual wind conditions between 09 February and 10 February, leading to the time of the grounding at 0615 on 10 February 2018. It is to be noted that on 09 February 2018 at 0919, the local Meteorological Office had issued the first wind warning.

**Table 1: Actual weather conditions extracted from Selmun Weather Station**

Date	Time (LT)	Mean Wind Speed (Knots)	Highest Gust (Knots / Force)	Wind Direction
09/02/2018	1900	16.6	28.2 / 7	NE by E
09/02/2018	2000	13.5	22.9 / 6	E by N
09/02/2018	2100	14.4	24.1 / 6	ENE
09/02/2018	2200	13.8	22.7 / 6	E by N
09/02/2018	2300	13.1	19.4 / 5	E
10/02/2018	0000	14.0	24.7 / 6	NE by E
10/02/2018	0100	14.4	23.3 / 6	NE
10/02/2018	0200	13.9	23.3 / 6	NE
10/02/2018	0300	13.5	22.2 / 6	ENE
10/02/2018	0400	23.4	40.6 / 8	NE by N
<b>10/02/2018</b>	<b>0500</b>	<b>31.2</b>	<b>49.4 / 10</b>	<b>N</b>
<b>10/02/2018</b>	<b>0600</b>	<b>35.5</b>	<b>52.7 / 10</b>	<b>NW by N</b>
<b>10/02/2018</b>	<b>0700</b>	<b>34.7</b>	<b>53.1 / 10</b>	<b>N by W</b>
10/02/2018	0800	28.0	45.7 / 9	NNW
10/02/2018	0900	22.6	40 / 8	NNW
10/02/2018	1000	20.0	34.6 / 8	NW by N

Source: Meteorological Services, Malta International Airport

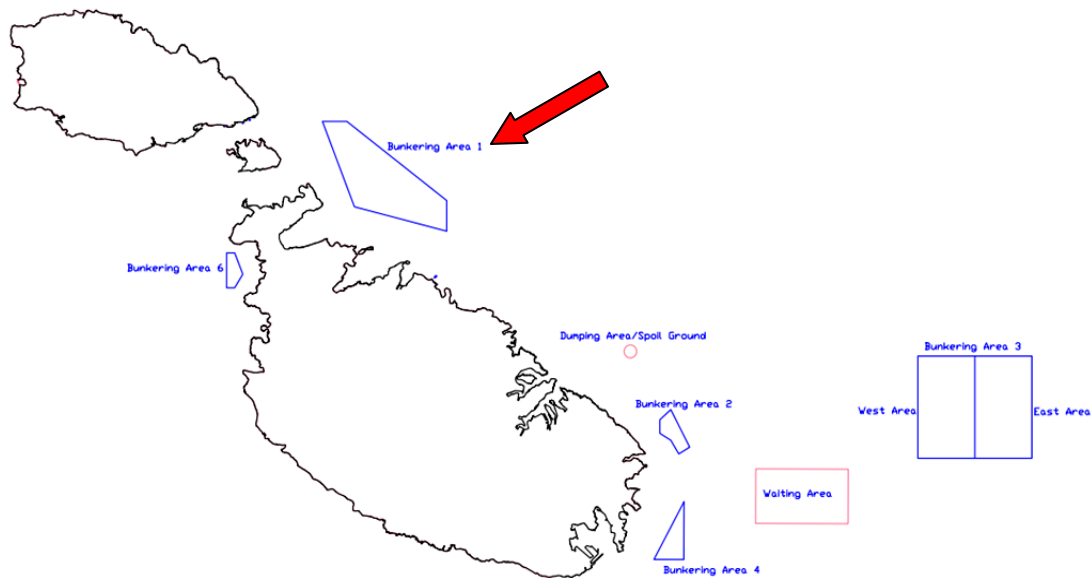
## 1.7 Narrative

### 1.7.1 Background to the events

*Hephaestus* had been alongside at Perama Dry-Docks during most of 2017.

On 07 September 2017, at 1900 (LT), *Hephaestus* sailed to Malta from Perama in ballast condition. On the morning of 08 September, the vessel arrived off Souda Port in Crete and went alongside on 11 September to take on fresh water (FW) and provisions. On 15 September, at 1530 (LT), the vessel resumed her voyage towards Malta.

*Hephaestus* arrived off Malta on 19 September 2017 and dropped anchor at Hurd Bank at 1010. Due to adverse Northwesterly (NW) weather conditions on the following day, the vessel had to heave up her anchor and remained drifting off Malta. *Hephaestus* then requested Valletta VTS permission to take shelter on the leeward side of the island. By 1530, *Hephaestus* dropped anchor in Bunkering Area No. 1 in position 35° 59.39' N 014° 24.09' E<sup>2</sup> (Figure 4).



**Figure 4: Designated bunkering areas around the Maltese Islands**

By 22 September, the master who delivered the vessel from Greece to Malta, had already indicated on the ship's logbook that the crew members were expecting to be relieved. This entry in the ship's logbook was recurrent until 08 October, when no more entries were made on this logbook. On, or soon after 08 October, the delivery crew members signed off the vessel, leaving behind just the second engineer<sup>3</sup>. A 'watchman' was engaged to stay on board until crew members arrived.

Given the second engineer could not speak in English, and since there were no more entries in the ship's logbook, it was not possible for the MSIU to establish exactly what happened on board the vessel during those days (about nine days), when the vessel had no crew on board (except for the second engineer and a 'watchman').

<sup>2</sup> Permission was granted because the vessel was in ballast condition and also due to her size. Over the five-month period since the vessel arrived in Malta, *Hephaestus* changed anchorage positions several times due to inclement weather conditions, normally either Bunkering Area No. 1 or No. 4.

<sup>3</sup> The MSIU neither had the exact date nor the exact number and composition of the disembarked crew members.



On 18 October<sup>4</sup>, a new master, chief engineer, bosun and one AB, all from Bangladesh, arrived in Malta and were transferred straight to the vessel, which was at anchor in the territorial waters of Malta. Given that the previous crew members had already left and the second engineer could only speak Arabic and few words in Greek, no handover was possible<sup>5</sup>. According to the master, there were very little FW, provisions and stores left.

As the only deck officer on board, the newly-joined master had to keep the anchor watches by himself, including the night. He also had to manoeuvre the ship during shifting from the anchorage position to another Bunkering Area, in order to seek shelter from the occasional inclement weather. According to the master, a Syrian chief officer joined the vessel on or about 22 December 2017 but had refused to work because of the conditions on board. He disembarked about a week later. No entries were made in the ship's logbook.

The situation on board regressed further, with almost no provisions and FW. The MSIU was informed that wages had also not been settled. On 31 December, the master wrote in the ship's logbook that all the crew members were waiting to sign off the ship. This message was followed by another one dated 02 January 2018, where the master made another entry in the ship's logbook that the crew members, including himself, had been waiting for over a month in order to sign off the vessel.

From 04 January 2018 onwards, the master had, practically on a daily basis, logged on the ship's logbook requests for FW, provisions and a doctor. In the meantime, he continued, as best as he could, with the general maintenance of the vessel. However, there were minimal amount of stores and tools.

On 11 January 2018, two new Russian crew members, namely, the chief officer and one AB, joined the vessel. However, it was reported that they soon wanted to sign off and since the launch had already left, they refused to work. The master recalled that on the next day, he had received instructions to list the two crew members as 'passengers/guests' until the next launch arrives alongside for their disembarkation.

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<sup>4</sup> A copy of a 'Notice of Arrival' Form found on board indicated that the vessel's purpose of call was weather / provisions.

<sup>5</sup> The 'watchman' had left the ship some days later (exact date could not be confirmed).

On 27 January 2018, the two Russian crew members received a copy of their employment contract through the International Transport Workers' Federation (ITF), and agreed to remain on board as part of the crew complement. Following this agreement, the master and the chief officer went on a 6-on, 6-off watch system; the master keeping the 6 to 12 watch while the chief officer maintained the 12 to 6 watch.

Throughout the months of October, November, December and January, the master sent a number of reports to the Company, highlighting amongst others:

- inter-com system for the engine-room, bridge, master and chief engineer's cabins was not fitted;
- problems with the crankshaft on auxiliary engine no. 1 which was deemed serious enough to be a cause of concern (blackout);
- auxiliary engine no. 2 was non-operational, requiring significant repairs to the cylinder heads and fuel injectors; and
- problems with the emergency power supply (emergency generator and batteries).

### **1.7.2 Accident dynamics**

According to the master, the ship's NAVTEX was in good working order but it was printing information in Greek and therefore it was of no use to him. To this effect, he used to call Valletta VTS (especially when the weather was bad) and ask for the weather forecast. The master stated that he would then ask Valletta VTS whether or not he needs to change the anchorage position. The master further recalled that VTS would normally advise him where to go and in which bunkering area he should seek shelter from the inclement weather at the time. The master clarified that he had adopted this approach because he was not familiar with this area.

On 02 February, when the vessel was at anchor in Bunkering Area No. 4, the master logged in the ship's logbook that "[a]t 2246 LT get instructions from P/C<sup>6</sup> to proceed anchorage Area 1 due to inclement weather." The master shifted the anchorage position and proceeded to Bunkering Area No. 1, where the vessel remained until the day of the accident. According to the master, the vessel's main engine was in good

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<sup>6</sup> 'P/C' refers to Port Control.

working order and never had any problems when shifting positions from one bunkering area to the other. The main engine consumed about 75 litres of marine diesel oil per hour and the master ensured that there was always enough bunkers to shift bunkering areas.

Arriving in Bunkering Area 1, early on 03 February, the vessel dropped the starboard anchor with 4½ shackles<sup>7</sup> in the water in position 35° 58.9' N 014° 25.30' E, approximately 1.5 NM from the shoreline. As indicated elsewhere in this safety investigation report, the vessel was in ballast condition with ballast water in the forepeak tank, cargo oil tanks (COT) no. 2 port and starboard, COT no. 6 port and starboard and no. 4 double bottom tank. The vessel had a forward draft of approximately 2.0 m and her draft aft was 3.0 m.

On 09 February, the weather conditions started to deteriorate. In fact, the weather forecast for that day was cloudy with rain, sea moderate to rough and Easterly winds Force 4 to Northeasterly Force 5 to 6, locally Force 7 overnight and backing to the North Northwest Force 5 to 6 by dawn. Furthermore, on 09 February at 0919, the local Meteorological Office had issued a 'Strong Wind' warning valid until 1700.

The designated Bunkering Area No. 1, where *Hephaestus* had anchored, was exposed to the Northerly to Easterly winds. At about 1424, the master contacted Valletta VTS for a weather forecast update in order to decide whether he will seek shelter or not. Raising the matter on whether he should seek shelter, Valletta VTS informed the master that he can remain on anchor in Bunkering Area No. 1, if this did not compromise his safety. Following the VHF communication, the master made an entry in the ship's logbook that "[a]s per P/C instructions can remain in Bunkering Area No. 1 as update weather report." In the meantime, all the other ships had left the Bunkering Area and *Hephaestus* was the only vessel at anchor, experiencing increased rolling and pitching as the weather deteriorated further.

At midnight of 09 February, the master and one of the ABs were relieved from their anchor watch by the chief officer and another AB<sup>8</sup>. The master, however, remained on the bridge with the chief officer until about 0200. He then went down to the

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<sup>7</sup> One shackle is equal to 27.5 m.

<sup>8</sup> According to the chief officer, the bosun was also on the bridge at midnight.

messroom to rest with the other crew members, including the chief engineer. On that night, nobody could sleep properly in his cabin because of the vessel's movement. At 0400, the AB was relieved by the bosun.

The chief officer observed that the vessel was rolling and pitching and even taking on water and spray on the main deck throughout his anchor watch, although the vessel was holding her position. However, at about 0500, the chief officer asked the AB to go down to the messroom and call the master on the bridge. Before proceeding to the bridge, the master informed the chief engineer (who was also in the messroom) to remain on 'standby'.

When the master arrived on the bridge, the chief officer informed him that according to the GPS readings and the radar's variable range marker (VRM), it appeared that the vessel had slowly started dragging her anchor. The master rechecked the vessel's position but concluded that the vessel was still holding position. However, by 0530, the master confirmed that the vessel was indeed dragging anchor and instructed the chief officer and the bosun to lower the port anchor to the waterline and apply the brake, ready to let go<sup>9</sup>. The chief officer and the bosun proceeded as instructed, walking on the raised walkway<sup>10</sup>.

At around 0603, when the vessel was about 0.5 NM from the shoreline and dragging in a Southerly direction towards the shore, the master called Valletta VTS and asked for advice as to where to take shelter. Valletta VTS replied that the vessel should proceed to Bunkering Area No. 4. Valletta VTS also asked the master whether the main engine was in good working order, to which the master replied in the affirmative, although he confirmed that it was difficult to start in such inclement weather.

At 0608, when the vessel was only 0.3 NM from the shoreline, Valletta VTS called the vessel and asked the master to advise whether he was turning back his vessel since he was getting closer to land. The master repeated that he needed five minutes to start the main engine and that then, he will be off. It was not clear as to when exactly the

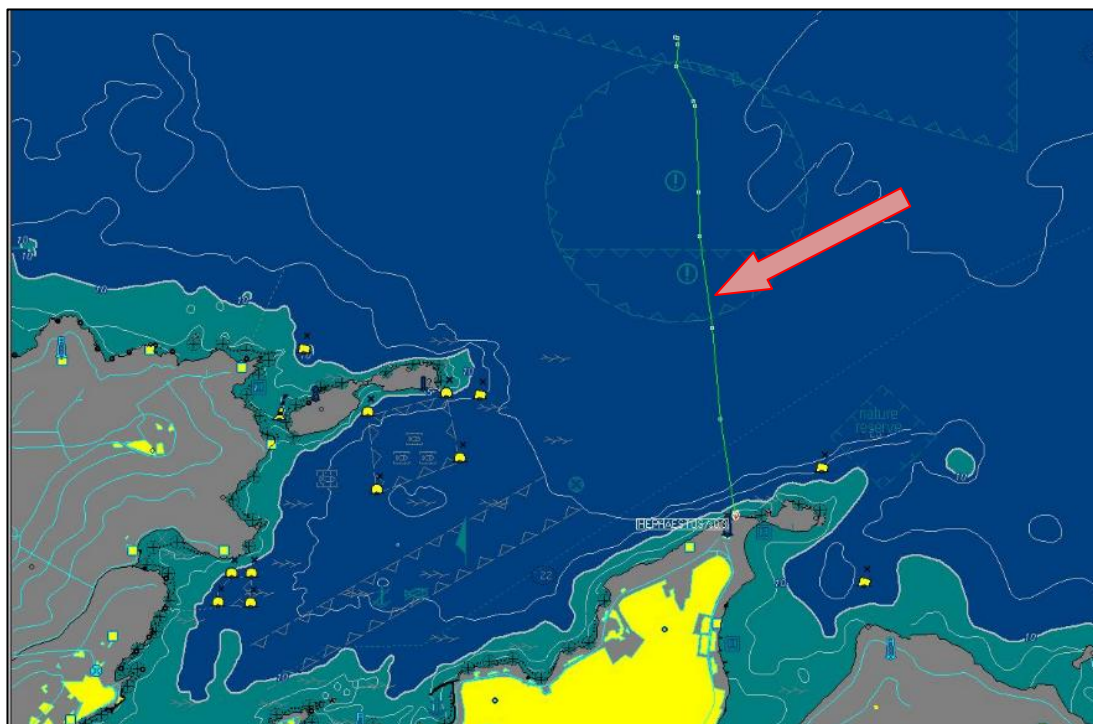
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<sup>9</sup> This matter is discussed in more detail in sub-section 2.4.3.

<sup>10</sup> Raised walkway is an elevated walkway, fitted over the vessel's main deck, leading from the accommodation to the forward part of the vessel, serving as a safe means of access for the crew.

master gave the orders to the chief engineer to start the main engine. However, it was stated that it was at around this time when the order was given. The chief engineer confirmed that the main engine was in good working order and that he needed around 20 to 30 minutes to get the engine ready. Both the master and the chief engineer stated that there was no means of communication between the engine-room and the bridge.

By 0611, the Northerly wind backed to Northwest by North was gusting to Force 10. Valletta VTS called again the vessel and again warned the master that he was running into danger and that he had to manoeuvre further out or drop the second anchor. Valletta VTS also asked the master if he required any assistance but the master replied again that he needs five minutes to start the engine. At this point, Valletta VTS informed the master that in five minutes time, his ship would be on the rocks. The vessel ran aground at about 0615 in position  $35^{\circ} 57.61' N$   $014^{\circ} 25.51' E$ , heeling heavily to her port side. The vessel's AIS track throughout this period is shown in Figure 5 and tabulated in Table 3<sup>11</sup>.



**Figure 5: Hephæstus AIS track**

<sup>11</sup> The vessel dragged her anchor through a partially dismantled fish farm. This will be discussed in more detail in sub-section 2.4.4.

<b>Time (LT)</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Distance off / NM</b>	<b>Drift Speed / knots</b>	<b>Drift Direction</b>	<b>Remarks</b>
0500	35° 58'.99	014° 25'.30	1.49	0.4	204°	
0515	35° 58'.97	014° 25'.31	1.49	0.5	101.3°	
0520	35° 58'.91	014° 25'.30	1.37	0.8	203.4°	
0526	35° 58'.85	014° 25'.35	1.30	1.1	147.5°	
0530	35° 58'.80	014° 25'.36	1.26	1.1	159°	
0535	35° 58'.69	014° 25'.35	1.15	0.9	185°	
0540	35° 58'.54	014° 25'.38	1.03	2.3	167.7°	
0545	35° 58'.42	014° 25'.38	0.91	1.4	192°	
0550	35° 58'.30	014° 25'.38	0.76	1.4	191.3°	
0555	35° 58'.15	014° 25'.43	0.65	1.8	147°	

**Table 3: Details of *Hephaestus* AIS track on 10 February extracted from the VTS system**

0600	35° 58' .05	014° 25' .45	0.54	1.3	173.9°	0603 – Vessel calls the VTS and asks for advice regarding shelter because the vessel is drifting fast. The VTS repeatedly instruct the vessel to go to Bunkering Area No. 4 and asked if the main engine is working or not and the master said yes but due to the inclement weather it is difficult to start the engine.
0605	35° 57' .89	014° 25' .46	0.38	1.3	186.9°	0608 – VTS calls the vessel and ask the master if he is turning away from the shore. The master replies that he needs five minutes to start the engine and he will be off.
0610	35° 57' .74	014° 25' .48	0.24	0.4	216.9°	0611 – VTS calls the vessel and again to inform the master that he is running into danger and ask him again if he requires assistance. The master again says that he needs five minutes to start the engine. The VTS replies that in five minutes he will be on the rocks. VTS requests the master to turn back or drop the vessel's second anchor.
0615	35° 57' .62	014° 25' .51	0.10	1.0	173.3°	Vessel aground.
0620	35° 57' .61	014° 25' .51	0	0.2	357.3°	
0625	35° 57' .61	014° 25' .51	0	0	0	

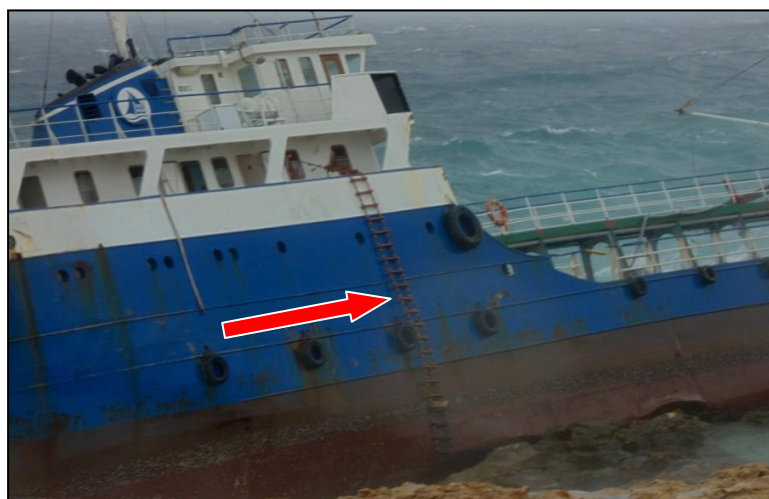
Table 3: Details of Hephaestus AIS track on 10 February (continued)

During the course of the safety investigation, the crew members confirmed that the main engine was never started. According to the master, the vessel felt like being hit by a cyclone and she drifted very quickly towards the shoreline, giving the crew members very little time to get the main engine started. No order was given by the master to release of the port anchor to slow down the drift of the vessel. At the time of the grounding, the vessel did not have a port anchor and chain (Figure 6).



**Figure 6: *Hephaestus* ground with her port anchor and chain missing**

Soon after the ship ran aground, the crew members disembarked from the vessel directly on the rocky shore, using the vessel's pilot ladder (Figure 7) and wearing their lifejackets. They did not make use of other life saving appliances. According to the master, the rescue boat could not be used as this was not stowed in its designated amidships position, but lashed against the forecastle bulkhead.



**Figure 7: Pilot ladder secured against the accommodation block**



## 1.8 Sustained Injuries

After their disembarkation, the crew members were met by TM's officials and provided shelter and assistance at a nearby restaurant until Civil Protection Department officials and ambulances arrived at the scene. None of the seven crew members was injured although the master, who had been complaining of pain in his shoulder, was taken to hospital. Following a medical check-up, he was released soon after. All seven crew members were eventually accommodated at the local Seaman's Mission until their repatriation.

## 1.9 Damages to the Ship

It was evident that the vessel had sustained extensive structural damages as a result of her grounding (Figures 8 and 9). Her starboard side bottom shell plating was deeply set in and buckled with structural damages also to her internal stiffeners.



**Figure 8: Bottom shell plating set in following the grounding**



**Figure 9: Bottom shell plating damage**

The bottom shell plating in way of the engine-room was also damaged. Natural light was observed coming through the damaged bottom (Figure 10). The access manhole to cargo oil tank (COT) no. 6 port suggested that there was sloshing inside the tank and it was evident that the COT was tidal.



**Figure 10: Damaged bottom shell plating in way of the engine-room**

## 1.10 Pollution

According to the chief engineer, at the time of grounding the vessel had on board around six tonnes of diesel oil in her bunker tanks. Several days after the grounding, a small amount of diesel oil escaped the damaged hull. An oil boom was deployed to contain the spill (Figure 11), which caused damages neither to the surrounding shore line nor to the marine life.



Figure 11: Oil boom being deployed to contain the light oil sheen

## 1.11 Refloating

Following the necessary temporary repairs carried out by a local ship repair company, the vessel was eventually pulled off the rocks and refloated on 15 August (Figure 12).



Figure 12: *Hephaestus* afloat

During the preparation for the refloating operation, and after the vessel was afloat again, the salvors made no attempts to start the main engine. Hard aground, the vessel had lost her supply of compressed air for the control and starting systems. Moreover, one of the generators was found dismantled as a result of the grounding and the main electrical panel was submerged in water.

The damages inside the engine-room were extensive enough to prevent the main engine from being started again even after the vessel had been safely towed to the shipyard<sup>12</sup>.

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<sup>12</sup> The MSIU was therefore unable to verify whether or not it was technically possible to start the main engine as claimed by the master and the chief engineer.

## **2 ANALYSIS**

### **2.1 Purpose**

The purpose of a marine safety investigation is to determine the circumstances and safety factors of the accident as a basis for making recommendations, to prevent further marine casualties or incidents from occurring in the future.

### **2.2 Use of Radar and other Bridge Navigational Equipment**

According to the master and the chief officer, all the navigational bridge equipment on board *Hephaestus* was in good working condition. The master had confirmed that during the anchor watch the vessel's position was always monitored by taking note of the GPS position, logging them on the 'GPS Logbook' and by using the ship's radar, in particular the VRM.

On the morning of the accident, the chief officer, who had the watch from 0000 to 0600, immediately noticed that the vessel had started dragging her anchor at around 0500 after verifications he made, using the radar and the GPS position.

### **2.3 Vessel's Anchoring Position**

*Hephaestus* was anchored, using the starboard anchor with 4½ shackles of cable in the water, at the edge of the designated Bunkering Area No. 1, in position 35° 58.9' N 014° 25.30' E, approximately 1.5 NM from the shoreline. This puts the vessel at the edge of the bunkering area, closest to the shoreline and also in an area where the depth of the water was deeper than other places within the bunkering area. It was not clear as to why the Master chose to anchor in this particular position. However, it is possible that when the master last shifted his position to Bunkering Area No. 1, this was already mostly occupied with other larger vessels awaiting bunkers and therefore opted to anchor at the edge of the bunkering area.

The seabed around this anchorage and between this anchorage position and the shoreline (where the vessel went aground) was a mixture of sand, fine sand, rocks, weed and coral in some places. The depth within the designated Bunkering Area



No. 1, varied from about 20.0 m up to 50.0 m. Then, from the vessel's anchoring position to the nearest shoreline, the average depth of water was over 40.0 m.

The recommended length of anchor cable to be paid out is related to the depth of the water where the vessel is at anchor. The recommended length of cable is six times the depth of the water and in inclement weather it is 10 times the depth of the water<sup>13</sup>.

The length of the anchor cable paid out is important for the anchor to achieve maximum holding power, particularly in heavy weather conditions. The anchor holds better when the cable is pulling horizontally to the anchor. Therefore, crew members must be prepared to pay out additional cable when conditions, such as an increase in sea and wind conditions, require the cable pull to remain horizontal.

*Hephaestus* was anchored in water depth of around 49.0 m and hence the vessel should have had a length of 294.0 m of cable laid out in fair weather, while 490.0 m of cable would have been required in inclement weather conditions. However, while the vessel had 4.5 shackles of anchor cable in the water, (which is equivalent to a length of 123.75 m), the vessel was only fitted with approximately 165.0 m (Figure 13). To this effect, the anchor holding power was less effective in this depth.

When *Hephaestus* started dragging her starboard anchor, the remaining anchor cable was not paid out.



**Figure 13: Anchor cable and starboard anchor after being retrieved by the salvor**

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<sup>13</sup> 'Anchoring System and Procedures', OCIMF, (2010).

## 2.4 Actions on the Vessel

### 2.4.1 Actions by the master

As already stated in sub-section 1.7.2, the NAVTEX on board was set to print weather forecasts in the Greek language and, therefore, it was of no use to the master. Instead of setting the equipment to view international messages<sup>14</sup>, the master never made use of this function. Rather, in order to receive weather forecasts and recommendations on shifting his anchorage positions, the master decided to rely completely on Valletta VTS. The master had in fact shifted his anchorage position, due to inclement weather, three times since the beginning of the year, between the designated Bunkering Areas Nos. 1 and 4.

On 09 February, at 1424, the master asked Valletta VTS for the weather forecast and shifting information. The master noted in the ship's logbook that the VTS had '*instructed*' him that he can remain in that position. The master remained in Bunkering Area No. 1 and the position had not been revised. Moreover, there were no records to indicate further communication between the vessel and Valletta VTS following the 1424 communication on the previous day.

During the early hours of 10 February, the wind was blowing generally from a Northeasterly direction, with a mean speed of 14.0 knots. The vessel maintained its anchorage position. At around 0400 on 10 February, the wind started to back to a Northerly direction with gusts reaching 40.0 knots. At this time, the remaining cable was not paid out on the starboard anchor and the port anchor was not let go<sup>15</sup>.

The situation was not considered to be alarming by the master, until at a late stage:

- when the chief officer called the master to the bridge at around 0500 because he was convinced that the vessel had started dragging anchor. The master, who was at the time resting in the messroom together with the chief engineer, had requested the latter to be 'on standby'. Then, it was only at about 0530 that the master reportedly requested the chief engineer to prepare the main

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<sup>14</sup> International frequency for NAVTEX is 518 kHz and will ensure that messages are received in English. The fact that this NAVTEX was receiving messages in Greek indicated that the message display was set on a national frequency, in all probability when she was operating in Greek waters.

<sup>15</sup> This matter will be analysed in more detail in sub-section 2.4.3.

engine<sup>16</sup> and instructed the chief officer, together with the bosun, to go forward and prepare the port anchor for letting go.

- VTS recordings confirmed that the master made contact with the Valletta VTS at 0603, when the vessel had already been dragging her anchor and was drifting towards shallower waters at a fast rate. At the time, *Hephaestus* was only 0.54 NM from the shoreline. The communication between the bridge and the engine-room was not working and according to the chief engineer, it was the chief officer who went down from the bridge to instruct the chief engineer to start the main engine.

Although there were no time records available, this must have happened after the chief officer and the bosun had returned from the forecandle. The chief engineer claimed that it was only a matter of minutes from receiving the order to start the main engine and the time the vessel ran aground and that he had no time to actually get the main engine running<sup>17</sup>.

The fact that no early action was taken, was suggestive that a number of factors had influenced the master to decide otherwise. *Hephaestus*' anchor was holding position and for the master, there were no signs of imminent danger to the ship and her crew. Irrespective of the weather conditions and the condition of the auxiliary engines, the master did not receive any negative cues, which either would perhaps have caused concerns, or which were serious enough to require navigating away from the Bunkering Area. This was also supported by the fact that although the master remained until late in the wheelhouse, he then proceeded downstairs to rest in the messroom. There was no doubt that had he been concerned that the safety of the vessel and her crew were being compromised, he would not have decided to hand over the anchor watch to the chief officer.

The master stated that he was instructed to remain in the Bunkering Area, however, as far as safety of navigation is concerned, Valletta VTS communicates navigational information and advice since the crew members on board are best placed to determine whether or not the situation warrants alternative actions.

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<sup>16</sup> According to the chief engineer, the order to go to the engine-room and *prepare* the main engine was received at around 0525.

<sup>17</sup> The chief engineer also reported that it was very dangerous down the engine-room because of the heavy movement of the vessel at the time.



It is for this reason that the master would still have had an overriding authority on the ship, by virtue of his geophysical location, *i.e.* the ship. It also appeared that there was a conflict / misunderstanding from the vessel's part *vis-à-vis* the communication with the VTS. The VHF communication transcript confirmed that VTS had communicated to the master that he could remain in the area *if* it were safe to do so. It is very probable that this critical qualifier ('if') made by the VTS had been missed by the master. It was clear, however, that at the time, no navigational advice was made to the master to leave the Area.

#### **2.4.2 Actions in perilous situations**

During the course of the safety investigation, the MSIU was unable to determine why the main engine was not started earlier by the crew members and why shore assistance was not requested by the vessel.

Transcripts of VHF recordings between the vessel and the VTS revealed that the starting of the main engine was mentioned three times. On two occasions, the master confirmed that he would only require five minutes to start the main engine, although during one of the calls, the master indicated that it was difficult to start the main engine due to the vessel's movement. As indicated elsewhere in this safety investigation report, the MSIU was unable to verify the condition of the main engine and whether it was immediately available.

According to the chief engineer, the time required to start the main engine was about 20 minutes. This conflicts with the master's information to the VTS, when he stated on more than one occasion that he only required five minutes to start the main engine. The MSIU believes that the reason behind this was the inappropriate communication means between the bridge and the engine-room<sup>18</sup>. Reportedly, at the time, the chief officer was still on the forecastle and in his absence, the master did not communicate with the chief engineer.

It is possible that the main engine had already been prepared by the chief engineer but not started because there was no direct order from the master. Neither was there any communication from the chief engineer to the master in this respect (the PA system

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<sup>18</sup> It has already been stated in sub-sections 1.7.2 and 2.4.1 that the master and the chief engineer had stated that there was no means of communication between the engine-room and the bridge.

fitted on board (Figures 14a and 14b) was a one-way communication system from the bridge to other areas and not *vice versa*). In fact, when the chief officer eventually requested the chief engineer to start the main engine, the vessel ran aground soon after.



**Figures 14a and 14b: PA system on the bridge and PA loudspeaker in the engine-room**

With reference to the propulsion power, the MSIU observed that the rope fouling one of the propeller blades and the rudder stock (Figure 15) was actually a mooring rope which may have been lost from *Hephaestus*' poop deck. While it was not possible to determine at what stage the mooring rope was lost overboard, this did not have a bearing on the outcome of the events, given that the main engine was not started prior to the grounding.



**Figure 15: Mooring rope fouling one of the propeller blades and the rudder stock**

In addition to the lack of propulsion power, there was no request for shore assistance. However, it has to be specified that in all probability, no assistance would have arrived in time to prevent the grounding from happening, even if it would have been requested as soon as it was suspected that *Hephaestus* was dragging anchor. It was therefore evident that the geographical position of the vessel, in combination with the adverse weather conditions, had compromised the safety of the vessel and her crew.

### 2.4.3 Condition of the port anchor

During the course of the safety investigation, the MSIU came across the master's handover document (SQMS-D-003-03/ 06)<sup>19</sup> which specified that “[p]resently anchor chain (cable) only stbd working condition” (*sic*). This was indicative that the port anchor was either not available on board (Figure 11) or, it was not in a working condition (although no technical reason was provided in the handover document).

After the vessel was refloated, MSIU safety investigators went on board and further to the missing port anchor and chain, they also found that the port anchor windlass brake was jammed closed (Figure 16) but with no indications of fresh damages which, perhaps, would have been indicative of anchor chain slippage (Figure 17).



**Figure 16: Jammed port side windlass brake**

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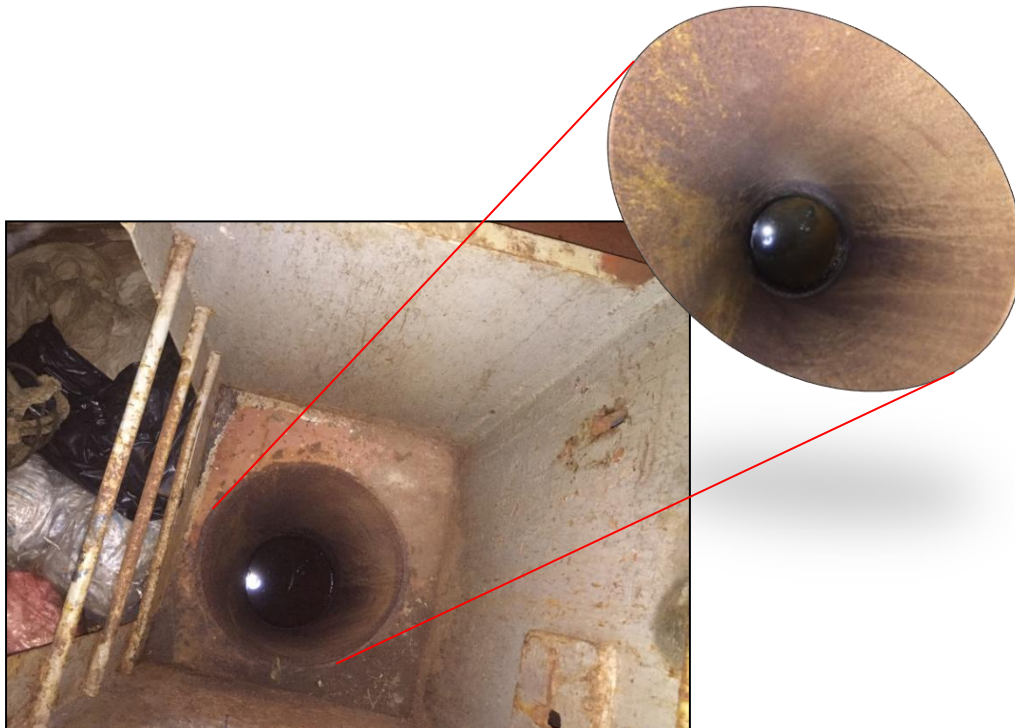
<sup>19</sup> The handover document carried no date but indicated that at the time, *Hephaestus* was anchored in Bunkering Area No. 4.





**Figure 17: No visible fresh damages on the port side hawse pipe**

The safety investigators did not have access to the chain locker due to the relatively small diameter and the presence of water and mud. The MSIU was therefore unable to inspect the condition of the bitter end on the port side (Figure 18).



**Figure 18: Port side chain locker**

However, the salvors confirmed that when they had first inspected the chain lockers, both bitter ends were found intact, with no visible damages. It was also recalled that there were about 2.5 m of anchor cable secured to the bitter end on the port side.

Taking into consideration the above findings and the claim made by the crew members that the port anchor had never been let go, the MSIU was of the opinion that the port anchor must have been lost some time before these events, but not reported to the Maltese authorities. The MSIU, therefore, approached the master again during the course of the safety investigation to seek further clarifications. When the matter was raised again, the master stated that he could recall that the port anchor was lost at sea and therefore it was never let go<sup>20</sup>. The Maltese authorities were not informed of the loss of the port anchor.

#### **2.4.4 Dragging of the starboard anchor**

The AIS track made available indicated that the vessel dragged her anchor through a partially dismantled fish farm. The Ports & Yachting Directorate of Transport Malta had issued ‘Local Notice to Mariners No. 75 of 2017’, titled ‘Danger to Navigation – No Go Zone’, notifying mariners that this area was a danger to navigation and sailing through this area was prohibited [**Annex A**].

Although the anchor dragged over the partially dismantled fish farm, picked up ground tackles and anchor weights, and her starboard anchor became fouled, however, this was not considered to have compromised the anchor’s holding power because the vessel had been dragging her anchor well before reaching the partially dismantled fish farm.

## **2.5 Safety Management System**

### **2.5.1 Effectiveness of safety management on board**

Adequate resources and documentation are two basic indicators of an effectively implemented safety management system. As indicated elsewhere (Section 1.4), at the time of the accident, the ship’s certificates had expired. The crew members had

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<sup>20</sup> During the initial interviews carried out by the MSIU, none of the interviewees had stated that the vessel had lost her port anchor.

limited provisions and for a period of about nine days, the vessel remained at anchor with only the second engineer on board.

Evidence suggested that during the days leading to the accident, leadership and commitment towards the safety of the vessel and the crew members from the Company was not apparent. The living conditions on board the ship were intolerable for the crew members, reaching a point where a number of them had refused to work, one crew member joined but immediately disembarked and others were also keen to follow him and disembark too. It would appear that the Company's safety policies, strategies and objectives were neither met nor supported. Of equal concern, related to the Company's safety policy, is the effective management of hazards which, in the absence of an operational safety management system was compromised.

### **2.5.2 Communication on board**

During the course of the safety investigation, it transpired that several crew members had limited understanding of English. The four officers on board were from three different nationalities and one of these officers was unable to communicate with the other officers because he could speak neither English nor any of the other languages spoken by the crew members. Moreover, it transpired that the Russian AB could only speak Russian and he could only communicate in Russian with the chief officer.

## **2.6 Actions by the VTS Centre**

### **2.6.1 Weather forecast**

On 10 February 2018, the Meteorological Office issued a wind warning at 0508, mainly stating that the very strong Northerly wind would gradually become very strong from the Northwest by the afternoon and occasionally reaching gale force over the exposed areas of the Maltese Islands.

The VTS Standard Operating Procedures, specified that gale warnings are to be broadcasted straight away upon receipt on VHF Channel 16 and then on VHF Channels 12 and 14, and repeated at half hourly intervals thereafter, immediately after the silence periods. Since the weather information issued at 0508 was a wind rather than a gale warning, (in line with the VTS Standard Operating Procedures) this

information had neither been broadcasted nor was it clear that this warning has been received by the vessel<sup>21</sup>.

### **2.6.2 VTS watch**

VTS Valletta's morning shift started at 0545, with an overlap of 15 minutes for the handover from the previous shift, which finishes at 0600. It is not uncommon that at this time, the VTS of Valletta and Marsaxlokk are very busy handing over watches.

Like any other working day, VTS operators on the morning of 10 February, were focused on their respective jobs, namely, monitoring their respective assigned ports, taking into consideration the added complexity of adverse weather conditions and the numerous regular calls from other vessels, including those anchored in Bunkering Area No. 4. In the absence of calls between *Hephaestus* and the VTS, Bunkering Area No. 1 at the North was not actively monitored by any of the VTS operators and supervisors.

When *Hephaestus* started dragging anchor at around 0515 and consequently drifting in a Southerly direction towards the shoreline, neither the VTS operators nor the supervisor noticed this on their monitors. It seems that it was only when the vessel called Valletta VTS at 0603 that the VTS personnel, who had just started their watch, became aware of the dangerous situation.

### **2.6.3 Workload and situational factors**

The safety investigation made a distinction between the data which one can see with the benefit of hindsight and the data which was observable at the time by the VTS staff. In so doing, various reasons were identified as to why the changes in the situation in Bunkering Area No. 1 mentioned in sub-section 2.6.2 were not detected earlier by the VTS staff. As already discussed, the context was made more complex by virtue of the absence of any communication over the night between the vessel and the VTS and the focus of the VTS staff on the two main Maltese ports.

As indicated elsewhere, until the VHF communication from the vessel, this was a normal working day for the VTS staff and notwithstanding the adverse weather conditions, they did not expect anything out of the ordinary; then, similar to the

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<sup>21</sup> Furthermore, during the 09 February call at 1424, the VTS operator had informed the master that VTS would be calling him immediately, should there be an updated weather forecast.

situation on board *Hephaestus*, there were no cues which would have suggested otherwise.

Although the VTS staff members were enabled to monitor the situation by means of the equipment available to them, they also had to rely on feedback from the vessels. VTS would only capture significant changes in the geographical location of the vessels; the actual behaviour (*e.g.* rolling, green seas on deck, *etc.*) would not necessarily be captured, even if notified by those persons actually experiencing them, *i.e.*, the crew members.

When the vessel actually started dragging anchor, the VTS staff members were alerted neither by a visual nor an audible alarm. That would have been the first opportunity for the (outgoing) VTS staff to notice that the status of the situation had changed. Then, given that the busiest and most complex areas were competing for the VTS staff's attention, it would have been rather easy for a change in the status of a solitary ship to be missed. This was considered to be a missing protective barrier system.

The safety investigation believes that in the absence of guard zone alarms, the VTS staff members would have to specifically and actively look at the display and expect to see changes in *Hephaestus*' status. As much as this is an impractical alternative, at that particular point in time, there was no reason for the VTS staff to become suspicious and focus on *Hephaestus* and hence, it is very likely that the VTS staff members were focussed on other traffic.

#### **2.6.4 Vessels awaiting orders in bunkering areas**

VTS Standard Operating Procedures stipulate that if the reason for a vessel to extend its stay in a Bunkering Area is to 'wait for orders', then the vessel should be requested to leave the area.

After the vessel's arrived at Hurd Bank on 19 September 2017, the master had logged 'awaiting orders' in the deck logbook. On the following day, Valletta VTS eventually granted permission to the vessel to anchor in Bunkering Area No. 1 following a request by the master to seek shelter. Since then, *Hephaestus* was granted permission to remain in Bunkering Area Nos. 1 and 4 while awaiting orders.



Although VTS Valletta had the discretion on whether or not a ship ‘awaiting orders’ should be requested to leave a Bunkering Area, there were a number of reasons as to why *Hephaestus* remained in various Bunkering Areas, notwithstanding that she was a vessel ‘awaiting orders’:

- although VTS Valletta had not been made aware of the manning issues that developed during the vessel’s duration at anchor, there were clear indications to the shore authorities that the crew members were short on provisions and low on fuel;
- bunkering areas were not congested and the presence of the vessel neither compromised safety nor did it pose a threat to the marine environment; and
- there were limited berthing spaces available inside the port of Valletta for the vessel to be allowed to berth without clear indications as to when she would eventually unberth and commence her commercial activities.

## **2.7 Automatic Detection and Alert Triggering of Ship Behaviour**

The European Maritime Safety Agency (EMSA) offers a service which uses automated behaviour monitoring (ABM) algorithms to enhance situation awareness. ABM is designed to be used by a number of maritime surveillance domains, including entities responsible for safety, security, border protection and fisheries<sup>22</sup>.

The system, which provides information in real time, analyses ship position reports using data from available tracking systems such as Long Range Identification and Tracking, Terrestrial-AIS, Vessel Monitoring System and Earth Observation satellites, among others. Patterns, such as entering an area of interest, encounters at sea, approaches to shore, drifting and deviations from usual routes, are detected and operators are automatically alerted in real time. The system has over 20 algorithms, with more being added in the future as the system grows according to user needs.

In the case of *Hephaestus*, the ABM could have been used to detect situations potentially compromising the safety of navigation, when a close approach to the shore

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<sup>22</sup> The system is accessible from EMSA’s SafeSeaNet Graphical User Interface on desktop and also on mobile devices from the Integrated Maritime Services application.

increases, *e.g.* the risk of grounding<sup>23</sup>. In the case of the risk of grounding, the system is triggered when the distance is less than a defined threshold, *i.e.*, intentional / unintentional entries of vessels in the areas of interest. Moreover, the creation of simple shapes / polygons for the areas of interest is allowed by the system to improve the time of detection and alerting since it is less computationally intensive to analyse position reports.

This service is not used by Malta<sup>24</sup>.

EMSA advised that the system is simple and easy to use, whereby the user is only required to:

- identify the type of behaviour to be monitored (*e.g.*, drifting, not reporting, sudden change of speed, *etc.*);
- define the area of interest;
- list the officials to be alerted; and
- select the preferred means of alert.

The system allows for alerts to be received via notification on the graphical user interface, via email to a user distribution list and, via system-to-system alerts made directly by the user's own national system.

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<sup>23</sup> In such cases, the system can also be used to monitor inshore traffic zones.

<sup>24</sup> At the time of writing of this safety investigation reports, the service was being used by 10 EU Member States and four EU bodies.

**THE FOLLOWING CONCLUSIONS AND SAFETY  
ACTIONS SHALL IN NO CASE CREATE A  
PRESUMPTION OF BLAME OR LIABILITY.  
NEITHER ARE THEY LISTED IN ANY ORDER OF  
PRIORITY.**

### 3 CONCLUSIONS

Findings and safety factors are not listed in any order of priority.

#### 3.1 Immediate Safety Factor

The vessel was at anchor in an exposed position in deteriorating weather conditions which compromised the safety of the vessel and her crew.

#### 3.2 Latent Conditions and other Safety Factors

- .1 The vessel was on the sudden edge of the bunkering area, close to the shoreline in water depths of 49.0 m;
- .2 *Hephaestus* did not have enough anchor cable paid out to effectively hold her position in the prevailing inclement weather conditions;
- .3 The master remained in Bunkering Area No. 1 and the position had not been revised with the sudden deterioration of the weather;
- .4 The situation was not considered to be alarming by the master, until the weather deteriorated;
- .5 The master may have misunderstood the communication with the VTS with regards to staying at anchor within Bunkering Area No. 1;
- .6 The vessel's main engine was ready but the master was not aware;
- .7 In the absence of an operational safety management system, effective management of hazards was compromised;
- .8 Bunkering Area No. 1 at the North was not actively monitored by any of the VTS operators and supervisors;
- .9 When *Hephaestus* started dragging anchor at around 0515 and consequently drifting in a Southerly direction towards the shoreline, neither the VTS operators nor the supervisor noticed this on their monitors;
- .10 Given that the busiest and most complex areas were competing for the VTS operators' attention, it would have been rather easy for a change in the status of a solitary ship to be missed;

- .11 The absence of guard zone alarms to alert the VTS operators that the status of *Hephaestus* had changed was considered to be a missing protective barrier system.

### **3.3 Other Findings**

- .1 The NAVTEX on board was set to print weather forecasts in the Greek language and which was not understood by the master;
- .2 The NAVTEX was not set to receive international messages;
- .3 During the days leading to the accident, there was lack of visible leadership and commitment towards the safety of the vessel and the crew members from the Company;
- .4 The Company's safety policies, strategies and objectives were neither met nor supported;
- .5 The wind warning had neither been broadcasted by the VTS nor was it clear that this warning has been received by the vessel;
- .6 The port anchor had been lost before it was let go.

## **4 RECOMMENDATIONS**

In view of the conclusions reached and taking into consideration the safety actions taken during the course of the safety investigation,

### **Volont Maritime S.A. is recommended to:**



**03/2019\_R1** engage in a detailed, strategic exercise possibly with the involvement of professionals to ensure that the current safety management structure is assessed, safety issues identified, address the problems related to implementation and ensure that communication and monitoring strategies are in place.

### **Transport Malta's Ports & Yachting Directorate is recommended to:**

**03/2019\_R2** determine whether VTS Valletta should activate guard zones and / or the Automatic Detection and Alert Triggering of Ship Behaviour service offered by EMSA.

# ANNEXES

## Annex A: Local Notice to Mariners No. 75 of 2017

		
PORTS AND YACHTING DIRECTORATE	<b>Transport Malta</b>	
<b>LOCAL NOTICE TO MARINERS NO 75 of 2017</b>	Malta Transport Centre Marsa, MRS 1917 Malta	
Our Ref: TM/PYD/229/81 TM/PYD/155/89	Tel: (356) 2122 2203 Fax: (356) 2125 0365 Email: info.tm@transport.gov.mt www.transport.gov.mt	
20 July 2017		
<b>Danger to Navigation – No Go Zone</b>		
Reference is made to BA chart 211A (Channels between Malta and Ghawdex).		
The Ports and Yachting Directorate, Transport Malta, notifies mariners that the chartered Comino tuna farm and the St. Paul's Bay (outer) tuna farm are still delineated by LIT marker buoys.		
Further to Notice to Mariners No.33 of 2017, several unit buoys and trailing ropes still exist within these areas and therefore considered a danger to navigation. Sailing through these areas is prohibited.		
The above mentioned areas are in the following positions:		
The Comino tuna farm in position:		
	<b>LATITUDE (N)</b>	<b>LONGITUDE (E)</b>
A	36° 00'.170	014° 19'.790
B	36° 00'.200	014° 20'.090
C	36° 00'.020	014° 20'.110
D	35° 59'.970	014° 19'.810
and the St. Paul's Bay (Outer) tuna farm in position:		
	<b>LATITUDE (N)</b>	<b>LONGITUDE (E)</b>
A	35° 58'.500	014° 24'.920
B	35° 58'.720	014° 24'.900
C	35° 58'.570	014° 25'.650
D	35° 58'.350	014° 25'.660
Mariners are instructed to give the above mentioned areas a wide berth, keep a sharp lookout and navigate at slow speed when in the vicinity.		
Chart affected:	BA 211, 2537, 2538	
<small>Transport Malta is the Authority for Transport in Malta set up by ACT XV of 2009</small>		