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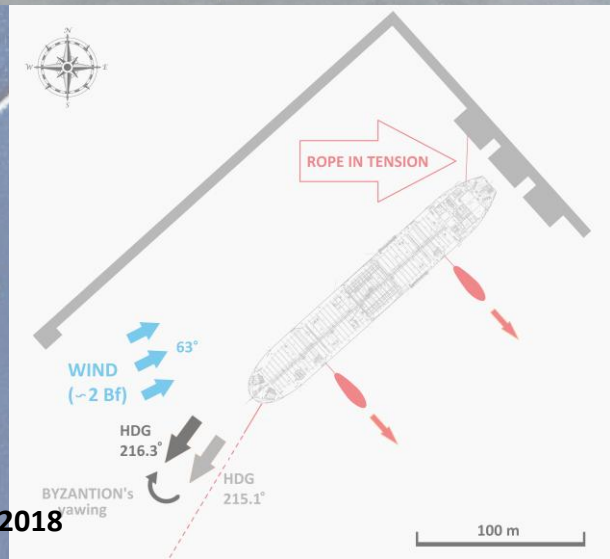
HELLENIC BUREAU FOR MARINE CASUALTIES INVESTIGATION



MARINE CASUALTY SAFETY INVESTIGATION REPORT

01/2018

**PARTING OF A MOORING ROPE
OF M/T "BYZANTION", FLAG GREECE, IMO 9315898
DURING UNMOORING OPERATION
RESULTING TO THE DEATH OF AN O/S, PHILIPPINE NATIONALITY
AT DORTYOL, TURKEY ON 7TH JUNE 2018**



December 2018

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Glossary of Abbreviations and Acronyms

1.	AB	Able seaman
2.	Aft	Towards the stern
3.	Bf	Beaufort (wind force measuring unit of Beaufort Scale)
4.	BHP	Brake Horse Power (power unit)
5.	C/O	Chief Officer
6.	CoC	Certificate of Competency
7.	CPR	Cardiopulmonary resuscitation
8.	DNV GL	Det Norske Veritas – Germanischer Lloyd (Classification Society)
9.	DWT	Dead Weight Tonnage (measured in tons)
10.	E	East
11.	EC	European Commission
12.	EMSA	European Maritime Safety Agency
13.	EU	European Union
14.	Fore	Towards the bow
15.	Fr.	Frame
16.	Fwd	Foreward
17.	GT	Gross Tonnage (dimensionless measure of a ship's overall internal volume)
18.	HBMCI	Hellenic Bureau for Marine Casualties Investigation
19.	HCG	Hellenic Coast Guard
20.	HDG	Heading
21.	IMO	International Maritime Organization
22.	ISGOTT	International Safety Guide for Oil Tankers and Terminals
23.	ISM Code	International Safety Management Code
24.	ISO	International Organization for Standardization
25.	kg	Kilogram (mass unit)
26.	kN	Kilo Newton (force unit)
27.	kn	Knot (speed unit equal to one nautical mile (1.852 km) per hour)
28.	ktex	kilotex [linear density unit (kg/km)]
29.	kW	kilo Watt (power unit)
30.	Lat.	Latitude
31.	L _{OA}	Length Overall
32.	Long.	Longitude
33.	LT	Local Time
34.	m	Meters (length unit)
35.	MBL	Minimum Breaking Load (force that is much less than that required to make the equipment fail or yield)
36.	M/E	Main Engine
37.	Mld	Moulded (for dimensions)
38.	mm	Millimeters (length unit)
39.	M/T	Motor Tanker
40.	M/V	Motor Vessel
41.	N	North
42.	nm	Nautical mile (length unit defined as 1852 meters)
43.	NT	Net Tonnage (dimensionless index calculated from the total moulded volume of the ship's cargo spaces)
44.	OCIMF	Oil Companies International Marine Forum

45.	O/S	Ordinary Seaman
46.	P&I	Protection and Indemnity
47.	port	The left-hand side of a vessel, facing forward
48.	PVC	Polyvinyl Chloride
49.	RPM	Revolutions per Minute
50.	S	South
51.	SMS	Safety Management System
52.	SOLAS	The International Convention for the Safety of Life at Sea
53.	stbd	Starboard (the right-hand side of a vessel, facing forward)
54.	STCW	The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
55.	T/B	Tugboat
56.	tn	Force unit
57.	UTC	Coordinated Universal Time
58.	U.V.	Ultraviolet (electromagnetic radiation)
59.	VDR	Voyage Data Recorder
60.	W	West
61.	2/O	2 nd Officer
62.	°	Degrees

Foreword

The Hellenic Bureau for Marine Casualties Investigation was established by Law 4033/2011 (Government Gazette 264/12.22.2011), in the context of implementing EU Directive 2009/18/EC.

HBMCI conducts technical investigations into marine casualties or marine incidents with the sole objective to identify and ascertain the circumstances and contributing factors that caused them through analysis and to draw useful conclusions and lessons learned that may lead, if necessary, to safety recommendations addressed to parties involved or stakeholders interested in the marine casualty, aiming to prevent or avoid similar future marine accidents.

The conduct of Safety Investigations into marine casualties or incidents is independent from criminal, discipline, administrative or civil proceedings whose purpose is to apportion blame or determine liability.

This investigation report has been produced without taking into consideration any administrative, disciplinary, judicial (civil or criminal) proceedings and with no litigation in mind. It does not constitute legal advice in any way and should not be construed as such. It seeks to understand the sequence of the events that occurred on the 07th of June 2018 and resulted in the examined very serious marine casualty and aims to prevent and deter repetition.

Fragmentary or partial disposal of the contents of this report, for other purposes than those produced may lead to misleading conclusions.

The investigation report has been prepared in accordance with the format of Annex I of respective Law (Directive 2009/18/EC) and all times quoted are local times (UTC +3) unless otherwise stated.

Under the above framework HBMCI has been examining the circumstances of the parting of a mooring line of M/T BYZANTION during her unmooring operation at the Port of Dortyol, Turkey on 7th June 2018, resulting in the fatal injury of one crew member (O/S, Philippine Nationality) of the M/T.

1. Executive summary

On 07th June 2018 at 19:24, one O/S of M/T BYZANTION was fatally injured during her unmooring operation in the port area of Dortyol, Turkey.



Figure 1/1: Location of Dortyol, Turkey (Source: Google Maps)

The vessel had moored by stern at BOTAS Terminal, Dortyol, Iskenderun Turkey on 06th June 2018 for discharging operation.



Figure 1 / 2:
Depiction of a vessel's mooring position at the Dortyol terminal
(Source: Google Maps)

The discharging operation was completed on 7th June at 17:00 and the Port pilot boarded BYZANTION at 19:14. Following the Pilot's instructions, 2 Tug Boats had been assigned for the unberthing operation. Both Tug Boats were fasted at the fore and the mid section of the vessel's port side and the operation commenced at 19:20.

During the unmooring operation and while the Tug Boats were towing the vessel by her port side, one mooring line at the stbd stern which had not yet been slackened parted, resulting to the fatal injury of one O/S, member of the stern unmooring team.

2. Factual information

2.1. Vessels' details

2.1.1. M/T "BYZANTION"

BYZANTION was a 39,589 DWT double hull Combined chemical and oil tanker built at Ulsan, Korea in 2007. During the casualty she was in ballast condition, unberthing from the BOTAS Terminal, Dortyol, Turkey with the assistance of 2 Tug Boats. The vessel's details are included in the following table:

Name of Vessel	BYZANTION
Flag State	Greece
Port of Registry	Piraeus (Reg. no 11605)
Call Sign	SZMH
Type of Vessel	Combined chemical and oil tanker
IMO Number	9315898
L _{OA} (Length over all)	182.55 m
Breadth (Mld)	27.34 m
Depth (Mld)	16.70 m
Summer Draught	11.70 m
Year built	2007
Place built	Hyundai Mipo Dockyard Co. Ltd., Ulsan, Korea
Hull material	Steel
Gross Tonnage	23,310
Net Tonnage	11,070
DWT (tn)	39,589
Statutory Certificates Issuing Authority	DNV GL
ISM Certificates Issuing Authority	Lloyd's Register
Classification Society	DNV GL
Engine / Power /Speed	HHI, Engine & Machinery Division / 12,900 BHP / 127 RPM
Minimum Safe Manning	10
Crew on board	26
Trading Area	International voyages (Sea areas: A1, A2, A3)
Managing Company	Tsakos Columbia Shipmanagement ("TCM") S.A.



Figure 2.1.1/1:
M/T BYZANTION
(Source:
www.marinetraffic.com)

2.1.2. The two Tug Boats

2 Tug Boats were used for the unberthing operation of BYZANTION. T/B “KAPTAN SUREYYA GULER”, with a Bollard Pull of 62 tn which was fasted at the Fwd part and T/B “KAPTAN BURHANETTIN OZBILEN”, with a Bollard Pull of 35 tn, which was fasted at the Aft part of BYZANTION. Their main particulars are included in the following table:

Name of Tug Boat	KAPTAN BURHANETTIN OZBILEN	KAPTAN SUREYYA GULER
Flag State	Turkey	Turkey
Port of Registry	Istanbul	Istanbul
Call Sign	TC5786	TCVJ9
Type of Vessel	Tug	Tug
IMO Number	9040297	9633367
Loa (Length over all)	30.50 m	31.50 m
Breadth (Mld)	10.72 m	11.20 m
Year built	1992	2012
Place built	Gemak Shipbuilding Industry and Trading S.A., Tuzla, Turkey	Ceksan Shipbuilding Steel Construction Industry and Trading Co., Tuzla, Turkey
Hull material	Steel	Steel
GT (Gross Tonnage)	331	445
Bollard Pull	35 tn	62 tn
Location during the Casualty	Fasted Aft (Fr. 51 of BYZANTION)	Fasted Fwd (Fr. 152 of BYZANTION)
Managing Company	Baru Hatlari Ile Petrol Tasima Anonim Sirketi Genel Mudurlugu (BOTAS)	Baru Hatlari Ile Petrol Tasima Anonim Sirketi Genel Mudurlugu (BOTAS)



Figures 2.1.2/1 & 2: T/B KAPTAN BURHANETTIN OZBILEN (left picture) and T/B KAPTAN SUREYYA GULER (right picture). (Source: www.marinetraffic.com)

2.2. Voyage details

On 05th June 2018 at 16:12 M/T BYZANTION arrived in laden condition and anchored at the port of Dortyol, Turkey, awaiting berthing instructions. On the following morning, 06th June, the mooring operation at the terminal was executed and was completed at 07:30. The vessel's discharging operation commenced at 10:12 and was completed on the following day, 07th June, at 17:00.

The Port Pilot for the unberthing operation boarded at 19:14 and the 2 Tug Boats were fasted at the vessel's port side.

The unmooring operation commenced at 19:20 and shortly after, at 19:24 one mooring line at the stbd side aft parted, injuring one crew member of BYZANTION (O/S, Philippine nationality).

The operation was paused and the casualty was transferred ashore by the T/B KAPTAN BURHANETTIN OZBILEN. Despite the medical treatment provided, the injured crew member passed away.

2.3. Marine casualty information

Vessel's name	BYZANTION
Type of casualty	Very serious
Date and time	07 th June 2018, 19:24 Local Time
Position	BOTAS Terminal, Dortyol, Turkey (Lat.: 36° 51.190' N / Long.: 36° 07.807' E)
External environment	Wind S-SW 2 Bf / Sea state calm / Good visibility
Ship operation	Unmooring
Location on board	Poop Deck, Aft Stbd side
Consequences	Fatal injury of 01 crew member

2.4. Emergency response actions and shore Authorities involvement

Following the parting of the mooring line and the injury of the O/S, the 2nd Officer who was in charge of the aft unmooring team turned the casualty steadily on his back and started performing CPR. Less than one minute later the Master and the Port Pilot reached the casualty area and the resuscitation efforts were continued. The Master returned to the bridge and informed the ship's Managing Company and the agent representatives at the terminal.

At 19:48 the casualty was secured on a stretcher and with the use of the ship's aft stbd crane was lowered at the deck of T/B "KAPTAN BURHANETTIN OZBILEN" which transferred him to the shore, where an ambulance received him.

Unfortunately the victim succumbed to his traumas as was announced to the Master approximately one hour after the accident.

The unberthing operation which was resumed at 19:50, was finally completed at 20:12. BYZANTION proceeded to the Dortyol anchorage where the competent Authorities (Coroner, Coast Guard) boarded her. The vessel's agent and P&I surveyor also boarded, as well as her Company's marine manager, the following noon.

On 8th June, at 22:00 BYZANTION received port clearance and sailed at 23:30. She arrived at Piraeus anchorage on 13th June, where one HBMCI Investigating Team consisting of 2 Investigators boarded her.

3. Narrative

3.1 The mooring arrangement of BYZANTION at the BOTAS terminal

The berth of BOTAS Dortyol Oil Terminal was designed to accommodate vessels from 14,500 up to 50,000tn DWT. The mooring was conducted only with daylight and the use of a Port Pilot was compulsory for mooring and unmooring operations. The vessels moored at the pier by stern. A typical position of a vessel moored at the BOTAS terminal is shown at **Figure 1/2**.

BYZANTION was moored according to the arrangement shown in the following plan (**Figure 3.1/1**), prepared by the Master and the Pilot on 06th June¹.

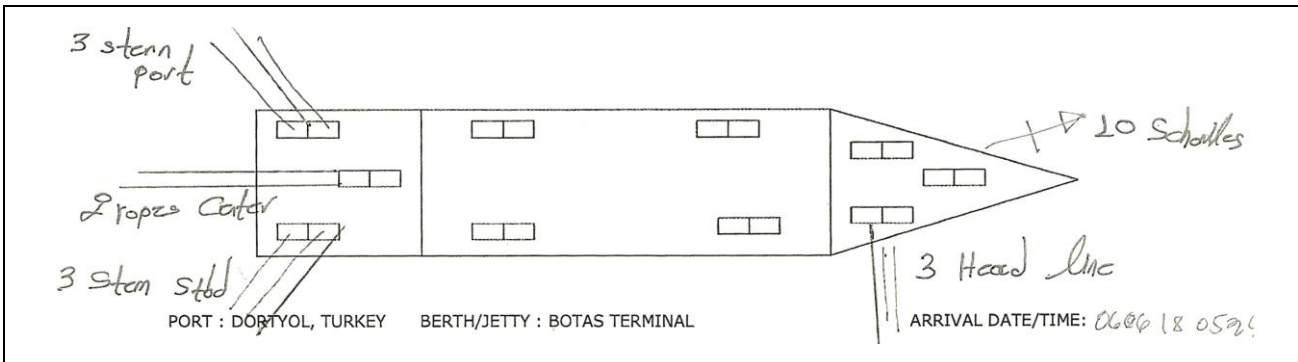


Figure 3.1/1: The mooring arrangement of BYZANTION at BOTAS terminal.

For the FWD mooring arrangement, the Port anchor was dropped (10 shackles in the water) and 3 mooring lines from the Stbd side Forecastle Deck mooring drums were connected to a dolphin fender of the terminal.

For the AFT mooring arrangement, 3 lines from the Stbd side Stern mooring drums and 3 lines from the Port side Stern mooring drums were connected to the pier, as well as 2 loose ropes on stern bits, passing through the stern centre chock.

3.2 The unberthing operation plan

The part of the drawing included in the relevant “Master-Pilot Exchange” Form, contained in the Company’s Navigation Procedures Manual, as prepared by the Master and the Pilot on 7th June for the unmooring operation of BYZANTION is shown in the following **Figure 3.2/1**.

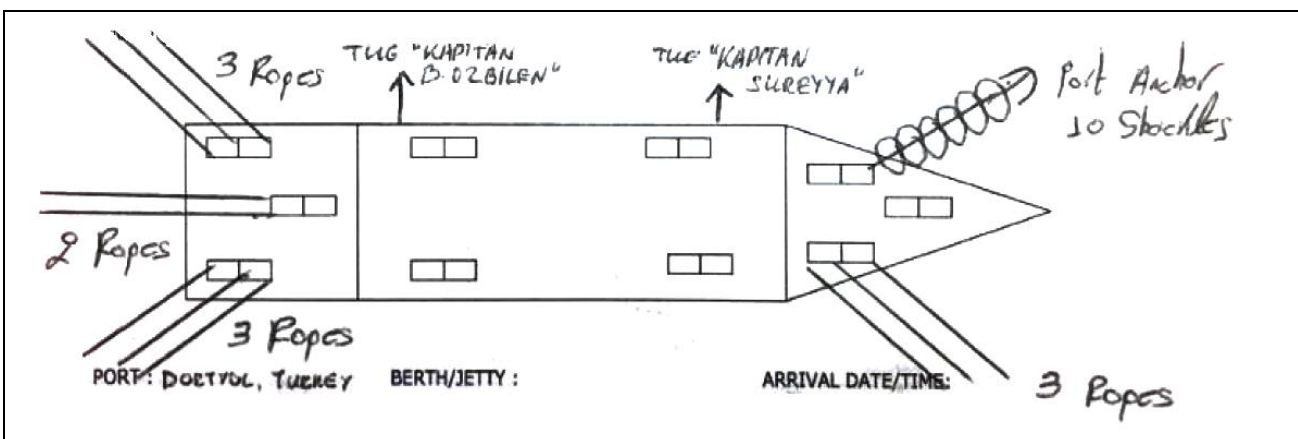


Figure 3.2/1: The mooring arrangement of BYZANTION at BOTAS terminal.

The two unmooring teams were composed as follows:

¹ Part of the drawing included in the relevant “Master-Pilot Exchange” Form, contained in the Company’s Navigation Procedures Manual, as prepared on 6th June 2018 for the mooring operation.

- The fore unmooring team was composed by the Chief Officer as head of the team, the Bosun and one O/S.
- The aft unmooring team was composed by one 2nd Officer as head of the team, three A/Bs and one O/S

The Master was coordinating the operation stationed at the port bridge wing, along with the Pilot. The Master and the Pilot were communicating in English. The Master was communicating with both Officers who were the unmooring team heads via portable VHF devices, at channel 68. All three (Master, Chief Officer and 2nd Officer) were of the same nationality (Greek), and their communication during the operation was conducted in their native language (Greek).

On the other hand, the Port Pilot (Turkish national) was communicating with the two Tugboat Commanders at a different VHF channel (channels 16 and 22) in Turkish language.

As derived by VDR data, as well as by information collected during the interviewing procedure, the unberthing plan agreed during the Master-Pilot exchange was as follows:

1. Both Tug Boats to be fasted at the Port side towing positions Fore (fr. 152) and Aft (fr. 51).
2. The 3 mooring lines from the Stbd side Forecastle Deck mooring drums to be released and the anchor to be engaged.
3. The 2 loose ropes at the aft bitts to be released from the pier and collected through the stern centre chock.
4. The 2 aftmost ropes (1 of total 3 on each side) to be released and collected on their drums.
5. All rest 4 ropes (2 of total 3 on each side) to be released and collected on their drums.
6. Both Tug Boats to pull the vessel sideways in order to clear her from the pier.
7. Heave up the anchor.

The unberthing sequence as per above, is depicted in the following **Figure 3.2/2**.

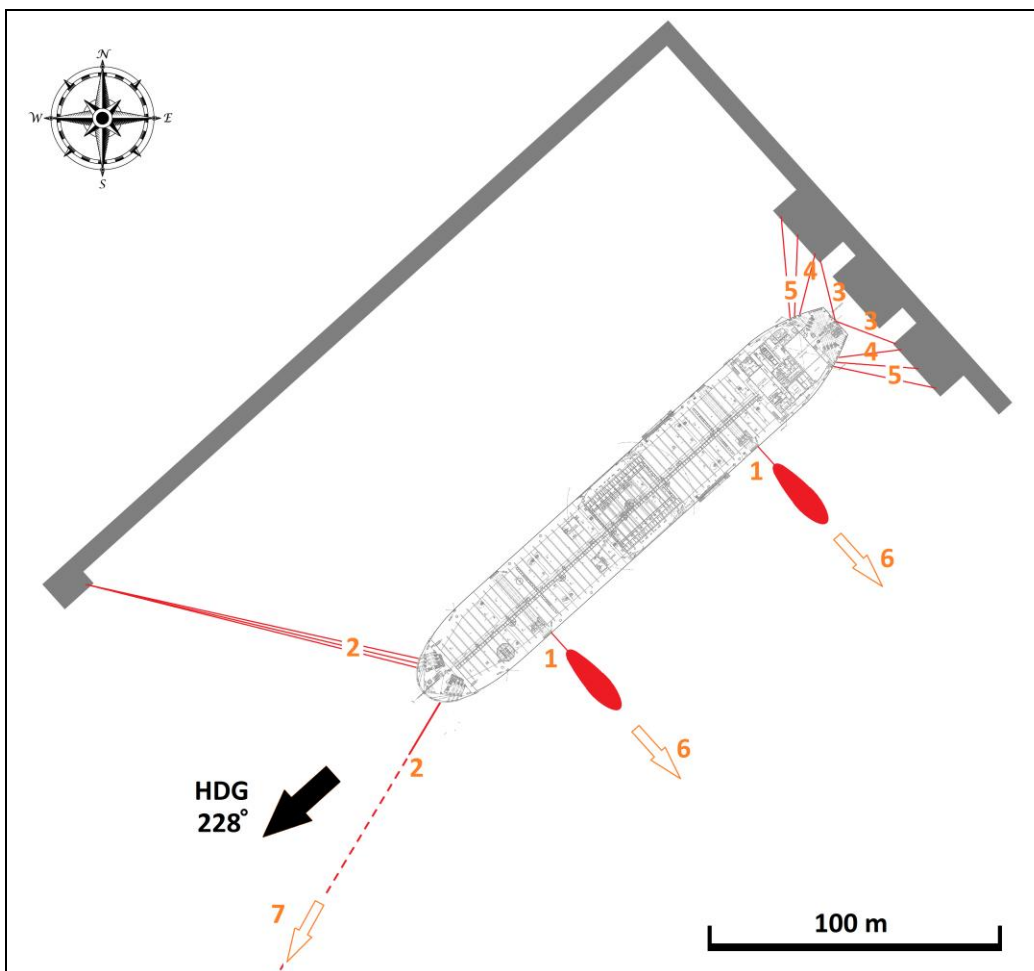


Figure 3.2/2:
(Scaled) depiction of the sequence for the unberthing of BYZANTION as planned during the Master-Pilot exchange.

3.3. The casualty

As derived by VDR data, as well as by information collected during the interviewing procedure, the communications between the involved key persons for the unberthing operation and the movements of BYZANTION during the procedure and until the accident, are as shown in the following **Table 3.3/1** (the indicated times are based on the VDR time).

Time (VDR)	Communications and Actions	BYZANTION movement
At 19:13':42"	<ul style="list-style-type: none"> Master ordered "Standby Fore and Aft" 	<p>From the beginning of the Unberthing operation, at 19:13':42" and for approximately 10.5 mins, up to 19:24':16", BYZANTION kept yawing anticlockwise, due to the fact that the 3 ropes stbd fwd were released and a quartering light breeze from S-SW direction (10°-15° off her stbd bow) was affecting her, producing a yawing moment on the ship. During that yawing movement (rotation), her HDG kept dropping from 228° to 215.1°, at 19:24':16" (as shown in Figure 3.3/1).</p>
At 19:14':23"	<ul style="list-style-type: none"> The Pilot arrived at the bridge. 	
From 19:14':30" Until 19:14':49"	<ul style="list-style-type: none"> The Pilot described the suggested unberthing procedure to the Master. 	
At 19:14':50"	<ul style="list-style-type: none"> The Master instructed the Chief Officer at the Fore Mooring station: "Make Fast the Tug Boat FWD and then release the 3 ropes stbd". 	
At 19:16'	<ul style="list-style-type: none"> The Tug Boat FWD fasted. 	
At 19:17':39"	<ul style="list-style-type: none"> The Master instructed again the Chief Officer at the Fore Mooring station: "Take them² onboard. When you are ready engage the anchor and stay stand by at the anchor". 	
At 19:18'	<ul style="list-style-type: none"> The Tug Boat AFT fasted. 	
At 19:19'	<ul style="list-style-type: none"> The Master instructed the 2nd Officer at the Aft Mooring station: "First let go the 2 loose ropes. Then the first outer³ ropes from both sides. When you collect the 2 ropes and the 2 ropes from both sides then you will engage both 2 together to be collected both from port and from stbd side". The aft unmooring team released first and collected onboard the two "loose ropes" that were fasted on the bitts. Then they engaged the 2 aftmost ropes (1 of total 3 on each side) on the drums and slackened them until they touched the sea surface. Discussions from the bridge VHF probably in Turkish (inconceivable) were heard. They were probably part of the communication conducted between the Pilot (stationed at the port bridge wing) and the Tug Boats' Governors. 	
At 19:22':33"	<ul style="list-style-type: none"> The Master asked the 2nd Officer to report him the distance of the port stern from the pier, because of the vessel's continuous anticlockwise yawing motion. 	
At 19:22':50"	<ul style="list-style-type: none"> The 2nd Officer replied: "Approximately 7 meters". 	
At 19:23':34"	<ul style="list-style-type: none"> The Master requested from the 2nd Officer to engage the 2 aftmost ropes from each side. 	
At 19:23':35"	<ul style="list-style-type: none"> The 2nd Officer replied: "OK". 	
From 19:23':37" Until 19:23':47"	<ul style="list-style-type: none"> The Master (changing his decision regarding the unmooring sequence) asked the 2nd Officer: "Can you engage all three (ropes) from both sides and collect them?" The 2nd Officer replied: "Yes, we shall try". The Master then told the 2nd Officer: "What do you mean you will try? It's easy, you will engage one after the other". The 2nd Officer replied: "One ON, one OFF, ok"⁴. 	

² The 3 ropes stbd

³ The aftmost ropes

⁴ Actually both phrases in yellow were the same phrase in Greek: "ENA ΠΑΡΑ ENA" (Phonetically: "ENA PARA ENA"). The misunderstanding between the Master's order and the 2nd Officer's reply, is explained further in the relevant analysis paragraph (§ 4.4).

Time (VDR)	Communications and Actions	BYZANTION movement
At 19:24'	<ul style="list-style-type: none"> The 2nd Officer instructed the A/B operating the port winch controller to engage and slack only the aftmost and the foremost rope drums, leaving the mid drum disengaged (at that point all 3 port stern mooring ropes were already slackened and floating on the sea surface). He gave the same order to the A/B operating the stbd winch controller. As a result, BYZANTION remained moored to the pier by one sole mooring rope (the mid rope) from her stbd stern. The Master, still standing at the port bridge wing and not able to see the stbd stern mooring ropes' condition, discussed with the Pilot that the 2 Tug Boats had to start pulling the vessel sideways, away from the pier and the Pilot ordered (in Turkish) both Tugs to start pulling. The Master requested from the Chief Officer at the Fore Mooring Station to heave the anchor chain 1-2 meters (not shackles) and the Chief Officer confirmed the order. 	<p>Due to the effect of the T/B aft beginning to pull, BYZANTION's anticlockwise yawing stopped and her HDG remained constant (at 215.1°) for 15 seconds, from 19:24':16" until 19:24':31".</p> <p>Due to the effect of the T/Bs continuous pulling, BYZANTION started yawing in the clockwise direction. Her HDG started increasing slowly from 215.1° at 19:24':32", up to 216.3°, at 19:24':54".</p>
At 19:24':50"	<ul style="list-style-type: none"> The Master moved from the port bridge wing to the stbd bridge wing. 	<p>During her clockwise movement, her stbd stern started moving away from the pier, causing the remaining mooring line to be strained until it reached its breaking point (as shown in Figure 3.3/2).</p>
At 19:24':54"	<ul style="list-style-type: none"> The stbd side rope of the stern mid drum parted. 	<p>During her clockwise movement, her stbd stern started moving away from the pier, causing the remaining mooring line to be strained until it reached its breaking point (as shown in Figure 3.3/2).</p>

Table 3.3/1: The communications between the involved key persons for the unberthing operation and the movements of BYZANTION during the procedure and until the accident.

The phases of the unberthing procedure are depicted in the following **Figures 3.3/1 & 2**.

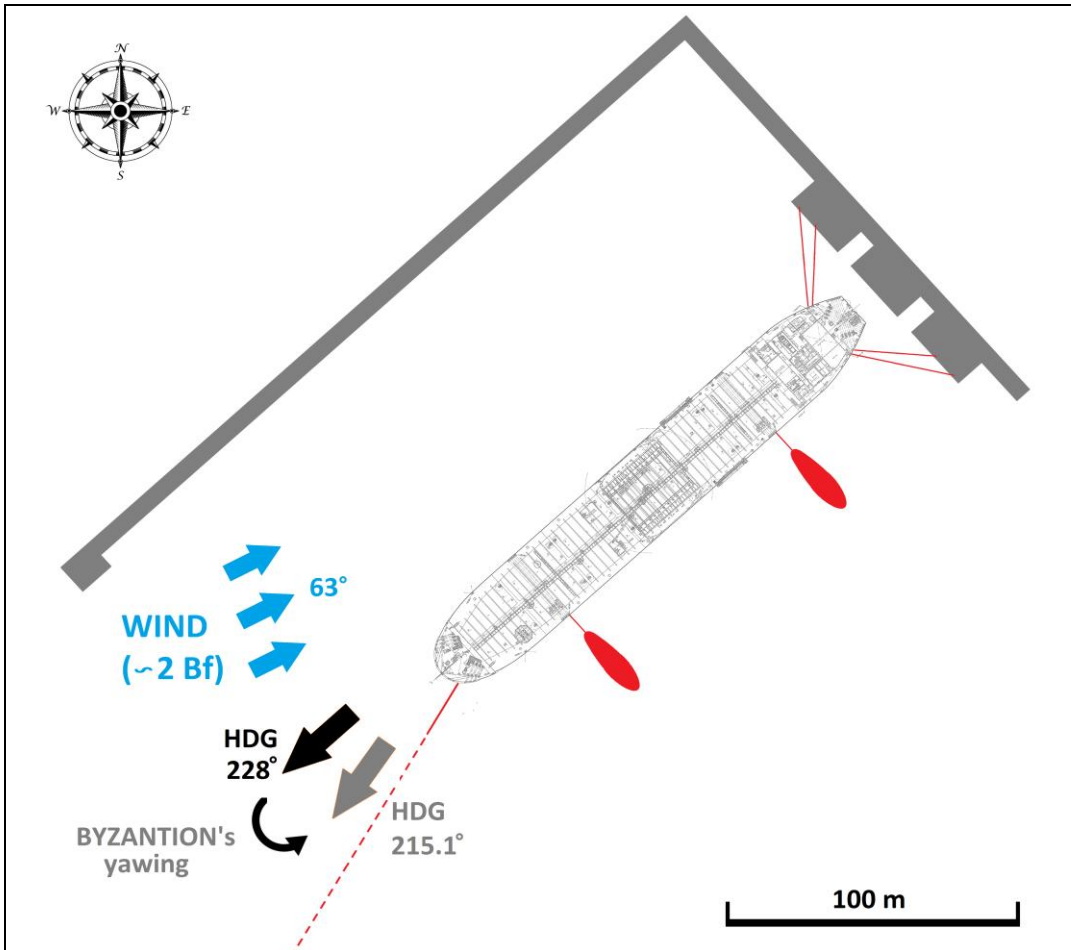


Figure 3.3/1:

From the beginning of the unberthing operation, until 19:24:16", BYZANTION kept yawing anticlockwise, due to the fact that the 3 ropes stbd fwd were released and a quartering light breeze from S-SW direction (10°-15° off her stbd bow) was affecting her. Her HDG kept dropping from 228° to 215.1°.

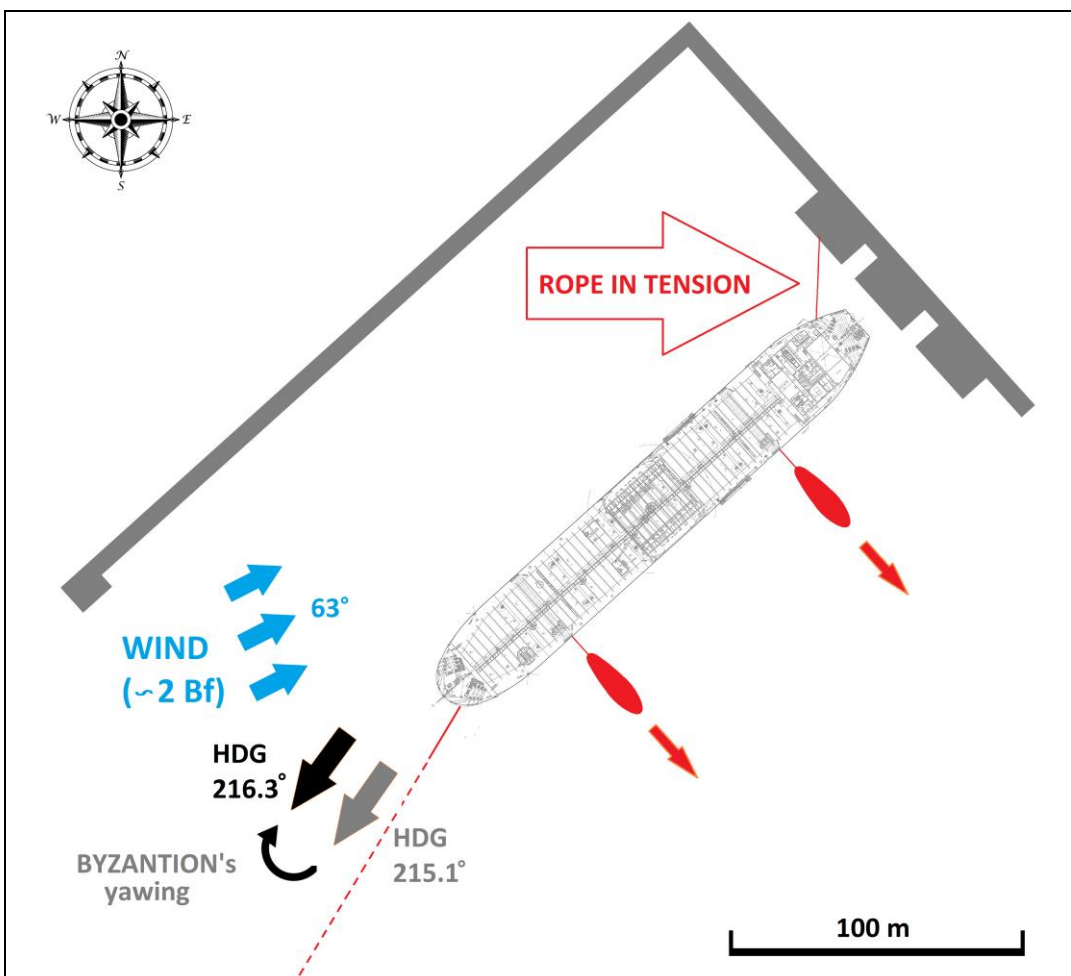


Figure 3.3/2:

Due to the effect of the T/Bs continuous pulling, BYZANTION started yawing in the clockwise direction. Her HDG started increasing slowly from 215.1° at 19:24:32", up to 216.3°, at 19:24:54". During her clockwise movement, her stbd stern started moving away from the pier, causing the remaining mooring line to be strained until it reached its breaking point.

3.4. Consequences of the casualty

The part of the mooring line remaining connected to the drum whiplashed and hit one O/S, who was member of the aft unmooring team, at his back, at the lower part of the cervical curve, injuring him severely. Despite the resuscitation efforts performed both onboard BYZANTION and at shore by competent personnel, the victim succumbed to his traumas.

No other injuries or damages to the ship were reported.

4. Analysis

The analysis of the examined marine casualty aims to identify the factors and causes that contributed to the marine casualty, taking into account the sequence of events and the collection of investigation information in order to draw useful conclusions leading to safety recommendations.

It is noted that during the investigation process the majority of the information derived from the analysis of the VDR data, the interviewing process, the testing of mooring equipment onboard the vessel and the data from laboratory testing methods used for the parted mooring line.

4.1. The crew involved in the unberthing of BYZANTION

M/T BYZANTION counted a crew of 26. Her Minimum Safe Manning provided 10 crewmembers, according to the relevant Document issued by the Hellenic Coast Guard competent Port Authority.

8 of the 11 Officers onboard were of Greek nationality. The rest 3 (2nd Officer, 2nd Engineer and Assistant Electrician) were of Russian, Ukrainian and Philippine nationality, respectively. All 12 ratings were of Philippine nationality and there were also 3 trainees of Greek nationality.

All crewmembers carried Certificates of Competence according to their grades on board. The established working language on the vessel was English. The experience and competency of the key persons involved in the vessel's unberthing operation are presented in the following paragraphs.

4.1.1. The Master

The Greek Master of BYZANTION was 41 years old and had been working for the same Managing Company from the beginning of his career, since he was a cadet. His entire service was onboard Chemical / Oil Tankers. He had acquired his Master's Certificate at 2010 and had been serving as a Master for 1.5 year prior to the casualty. He had served as Master and Chief Officer onboard BYZANTION and other Company's vessels of such size. He boarded BYZANTION on 31st May 2018, approximately 1 week prior to the casualty.

In the past he had approached the port of Dortyol, Turkey 3 times. Based on his previous sea experience he was considered to be an experienced Master for a M/T of the size of BYZANTION.

4.1.2. The Chief Officer, head of the fore unmooring team

The Greek Chief Officer was 56 years old and had been working for the Managing Company of BYZANTION for more than 4 years prior to the casualty. For approximately 13 years he had been serving as a 2nd Officer and Chief Officer at Oil and Chemical Tankers. He had acquired his C/O's Certificate at 2012. He joined BYZANTION on 15th May 2018. In the past he had approached several times the port of Dortyol, Turkey. He was considered to be an experienced C/O.

4.1.3. The 2nd Officer, head of the aft unmooring team

The Greek 39-year-old 2nd Officer had recently (March 2018) acquired the license of C/O. Through all his sea service as a 2nd Officer he had been working for the Managing Company of BYZANTION. For a period of approximately 5.5 years, from April 2009 until October 2014, he had stopped sailing.

Looking back at the vessels he had served as an Officer, since 2002, one can see that almost all the Oil Tankers he had joined were of similar size: Suezmax (Oil Tankers of DWT > 150,000 tn), apart from one Aframax (Tankers of DWT > 100,000 tn).

He had never in the past served as an Officer on a Handysize Carrier such as BYZANTION (39,589 tn DWT) and had never participated as head of an unmooring team at such a vessel.

He had joined BYZANTION on 31st May 2018 at Elefsis, Greece, and during those 7 days until the casualty he hadn't had the opportunity to participate actively as head of the aft unmooring team at an unmooring operation of the specific vessel.

In view of the above it is considered that his selection as head of the aft unmooring team was premature, given his short familiarization period with such ship's operations.

4.1.4. The A/Bs of the aft unmooring team

The 3 A/Bs composing the aft unmooring team were experienced for their duties, as they had considerable sea service at their rank onboard vessels such as BYZANTION. Information regarding their experience are mentioned herebelow:

- The 38-year-old Philippine A/B situated at the port side fore drum had been serving on Oil Tankers for his entire career, since 2009. He was an A/B since 2012. He had been working for the Managing Company of BYZANTION since 2016 and had joined the vessel on 16th September 2017. He also performed the 04:00-08:00 Bridge Watch.
- The 41-year-old Philippine A/B situated at the port side aft drum and also handling the winch controller, had started his sea career in 2006. He had been working for the Managing Company of BYZANTION for almost 10 years and had joined the vessel on 24th April 2018. He was an A/B since 2016 and also performed the 08:00-12:00 Bridge Watch.
- The 34-year-old Philippine A/B situated at the stbd side aft drum and also handling the winch controller, had started his sea career in 2007. He had been serving on Oil Tankers since 2009. He had been working for the Managing Company of BYZANTION for almost 7 years and had joined the vessel on 24th April 2018. He was an A/B since 2011 and also performed the 00:00-04:00 Bridge Watch.

4.1.5. The O/S who was fatally injured

The Philippine O/S who was fatally injured during the investigated casualty was 25 years old and had been working for the Managing Company of BYZANTION for almost 3 years. He had a sea experience of 2 years and 3 months as an O/S and had joined the vessel on 24th April 2018.

4.2. The failure of the mooring line

According to OCIMF's "Mooring Equipment Guidelines", all mooring lines can pose a great danger to personnel if not properly used, and handling of mooring lines has a higher potential accident risk than most other shipboard activities. A significant danger is snap-back, the sudden release of the energy stored in the tensioned mooring line when it brakes. When the line breaks, this energy is suddenly released.

The ends of the line snap back, striking anything in their path with significant force. In the case of the investigated accident, the end of the line remaining onboard struck the O/S standing within its snap-back zone, causing him severe traumas.

A safety barrier preventing the line load from becoming excessive, is a safety function of the winch brake. In case the line load overcomes a predefined limit, the winch brake renders allowing the line to shed its load before it breaks.

In the investigated casualty, the mooring line broke prior to the rendering of the winch brake. In order to define the reasons for the line failure, both the winch brake's parameters and the mooring line's properties were examined. The outcomes of these examinations are presented in the following paragraphs.

4.2.1. The Mooring equipment of BYZANTION

BYZANTION was originally fitted with TTS KOCKS GMBH Windlass and Winches integrated system. There were a total of 2 Windlasses and 4 Winches hydraulic motors in the system, facilitating the vessel's mooring needs. The Aft part of mooring arrangement was equipped with 2 hydraulic winches that drove 3 mooring drums each. The mooring equipment machinery arrangement is shown in the following **Figure 4.2.1/1**.

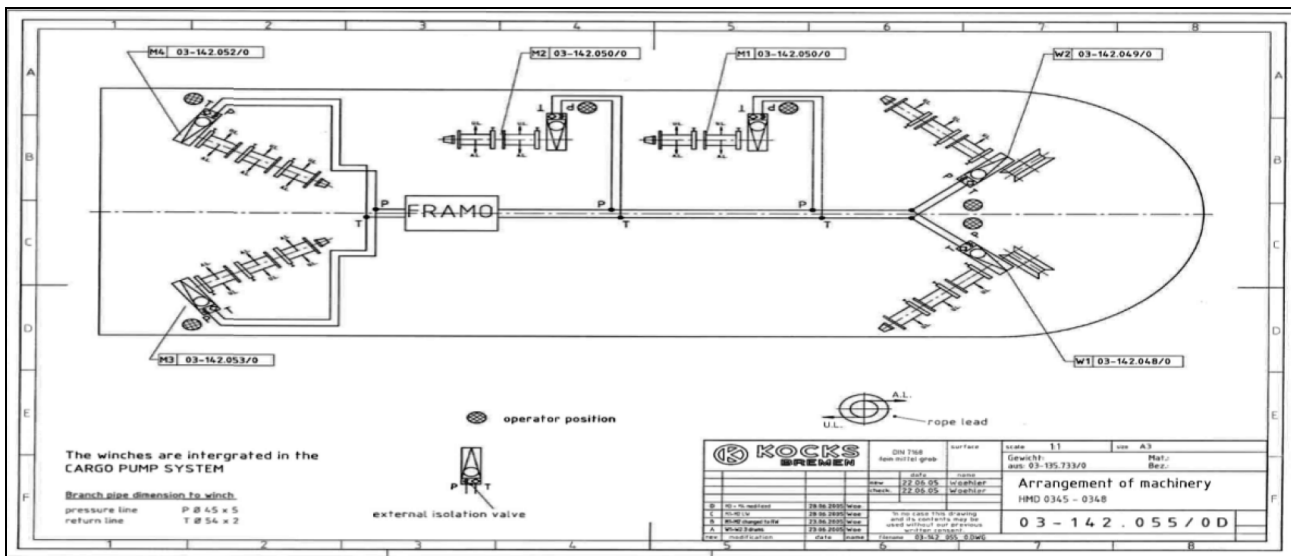


Figure 4.2.1/1: The mooring equipment machinery arrangement.

The last Mooring Equipment 2-month routine inspection, according to the vessel’s records had been conducted on 4th June 1018, with no findings.

The Design MBL of the stern mooring lines was equal to 51 tn. A rope’s Design MBL leads to the following Winch parameters:

- Brake Design Load = 80% of line MBL = 40.8 tn
- Brake Holding Load = 60% of line MBL = 30.6 tn

According to the above parameters, the Winch brake was designed to render at 30.6 tn.

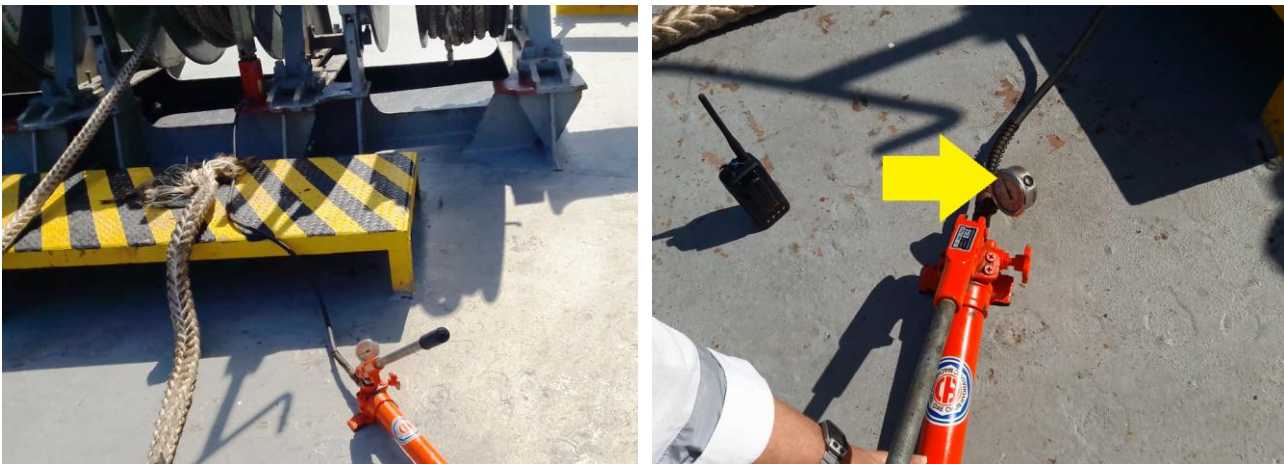
Following recommendations in the International Safety Guide for Oil Tankers and Terminals (ISGOTT) each winch brake should be tested individually every year after the ship’s delivery, and after completion of any repair. The test is conducted in order to prove that the brake renders at a load equivalent to 60% of the mooring line’s MBL.

According to the vessel’s records, the last test of the mooring winch brake had been conducted by BYZANTION’s crew on 1st February 2018, after the planned replacement of its brake bands. The adjustment of the winch Brake Holding Load at 30.6 tn was confirmed by the end of the test and the relevant signings were written and fitted on the drum and on the brake tightening screw, as can be seen in Figures 4.2.1/2 & 3.



Figures 4.2.1/2 & 3: The signings written and fitted on the drum and on the brake tightening screw following the last brake test of 1st February 2018.

A Brake Holding Test was also carried out onboard during the HBMCI Investigators' visit after the casualty, on 13th June 2018 and the proper adjustment of the mooring winch brake was verified.



Figures 4.2.1/4 & 5: The brake holding test equipment used and the jack piston pressure indication while reaching the expected load, during the test conducted on 13th June 2018.

Although the possibility of an improper adjustment of the brake tightening screw during the casualty cannot be excluded, no evidence of malfunction of the system was found during the investigation.

4.2.2. The mooring line that parted

As measured after the casualty, the parted mooring line remaining onboard had a length of approximately 192.40 m and its length from the drum until the breaking point was approximately 10.90m. Its part that remained on the BOTAS terminal mooring bollard was 15.20 m long.

According to the vessel's records the mooring line had been supplied on 15th July 2016 and had been installed on 06th August 2016. During its inspection it was evident that at some time during its operation since then, it had been reversed, however no records regarding its reversal date were kept onboard BYZANTION.

The last inspection of all vessel's mooring lines prior to the casualty, as per the records provided during the investigation, had been carried out on 5th June 2018. Their condition had been evaluated as "Very Good" by the Officers who had conducted the inspection.

The closed chock through which the line passed for the mooring operation was thoroughly inspected by HBMCI's Investigators and its contact surfaces were found to be smooth and free from chafe points.



Figure 4.2.2/1:
The part of the closed chock against which the rope passed during the mooring operation.

Both rope parts were apprehended by HBMCI after the casualty and on 20th June 2018 they were transferred to an external laboratory equipped with necessary equipment for further examination.

4.2.2.1. The parted mooring line's visual inspection

Both parts of the broken line were visually examined. It should be highlighted that **no constructor's permanent marking was found on either part of the rope**, in order a positive identification with a corresponding certificate to be feasible.

The rope was a 12-strand rope and its diameter was found to be generally consistent, varying from 48.7mm to 49.7mm.



Figure 4.2.2.1/1: The rope's breaking point at the part that remained onboard (left part of the photo) and at the part that remained on the terminal's bollard (right part of the photo).

The rope was visually inspected over its entire length and its outer filaments were found to have a furry appearance, probably caused by the normal slight abrasion while in service. No signs of abrasion due to contact with rust or untreated surfaces were evident, neither indications of fibres melted together or of localized areas of stiffness.

No powdered fibre, indicative of internal wear, was found to the parts of the rope which were practical to be opened up and no plucked or cut strands were evident either.

4.2.2.2. The parted mooring line's physical properties

A document indicating the rope's specifications was requested by the Managing Company of BYZANTION. The document presented was the one shown in [Appendix 1](#) of this report, with the title "Test Certificate". According to that document, the rope was supposedly a 220m 12-strand rope with a diameter of 52mm and a MBL of 60tn.

- As measured after the casualty, the long part of the mooring line which had remained onboard was 192.40m and the short part that had remained on the terminal mooring bitt was 15.20m. Adding the lengths of those two parts and adding also 3m plus 3m for the eyes at both ends, there is a total of 213.6m of rope length.

According to the provisions of ISO 10556:2009 "Fibre ropes of polyester/polyolefin dual fibres", a rope of such type with a diameter of 52mm should have a linear density of 1500 ktex \pm 5%.

The rope was weighed and found to be approximately 250kgs. Therefore, its linear density, according to ISO 2307:2010 "Fibre ropes-Determination of certain physical and mechanical properties" was calculated to be 1170 ktex⁵.

⁵ 1 ktex = 1 kg/km.

According to the above, the parted rope was found to have a **linear density 22% less than the expected one**, as per the prementioned Standard.

- A Tensile Test was conducted by use of the laboratory’s Approved Test Bench, according to ISO 2307:2010. The rope parted at 333kn (or 33.96 tn), which was about **57% of the nominal MBL of the rope**, according to the document presented as its “Test Certificate”.

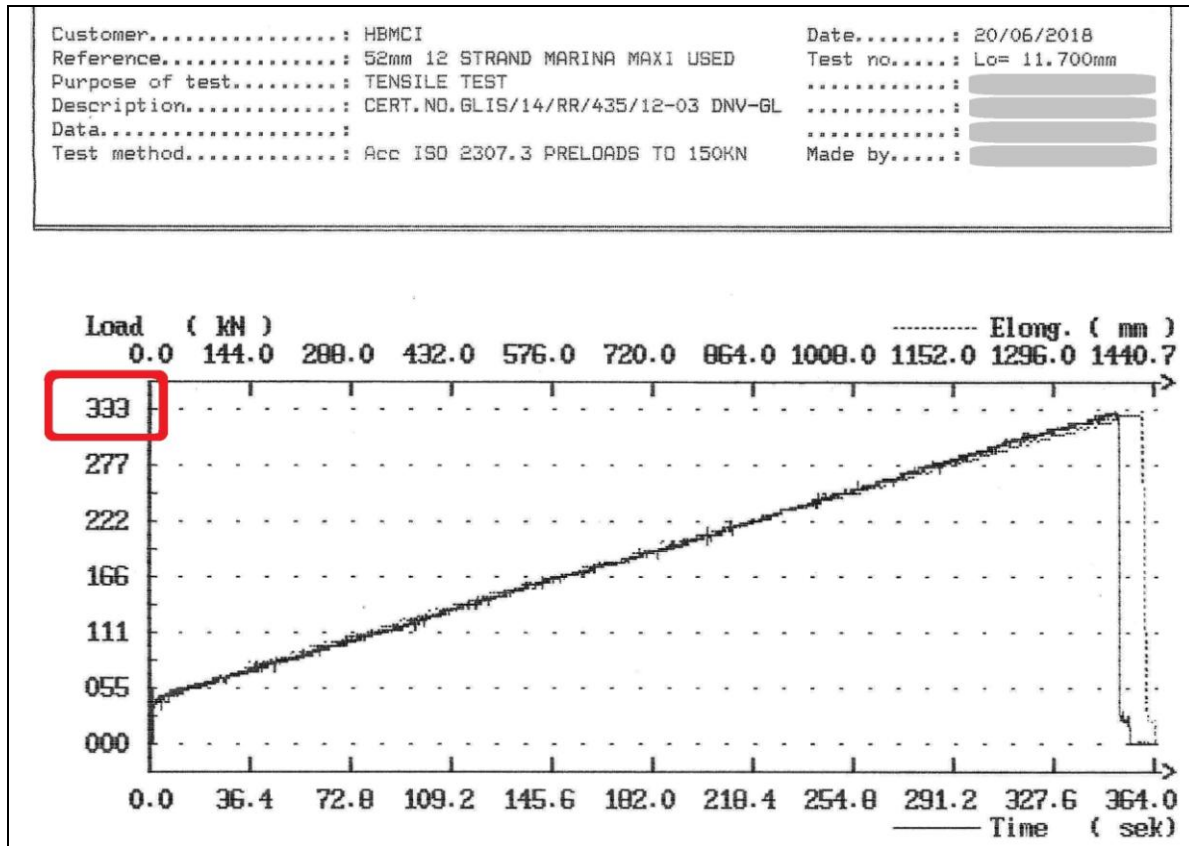


Figure 4.2.2.2/1: Part of the Tensile Test result, during which the rope broke at a load of 333kN.

The breaking of the rope at the load of 33.96 tn in laboratory circumstances and following the process provided by ISO 2307:2010 (such as conducting proper pre-tensioning of the rope and maintaining a slow rate of tensioning until the breaking point), suggests that the breaking load of that rope under dynamically acting forces would be significantly reduced. This parameter is explanatory of the non-function of BYZANTION’s Mooring Winch Brake rendering, as the examined mooring rope, due to its dynamic loading, probably broke prior to its loading up to 30.6 tn, which was the Mooring Winch Brake limit.

Taking into account the above results, it was decided that further investigation had to be conducted for the parted rope.

In that direction, a sample was sent on 21st June 2018 to the Greek General Chemical State Laboratory, in order its composition to be verified. The results showed that its fibres were a mixture of **High-density polyethylene (HDPE) and Polypropylene (PP)**, with the Polypropylene existing in greater percentage. The results of the rope composition differed from the “Material description” mentioned in the document presented as its “Test Certificate”, according to which the rope was composed by **Polyester and Polypropylene**.

In parallel, a correspondence between HBMCI and the alleged issuer (Classification Society DNV GL) of the document in question was transacted.

4.2.2.3. The mooring line lack of certification

From the correspondence conducted between HBMCI and the alleged issuer (DNV GL) of the document presented as “Test Certificate” of the parted rope, it resulted that the document had never been issued by DNV GL. Therefore, the non-authenticity of the document was verified.

Recognizing the potentially dangerous circumstance for ships carrying mooring lines for which no certification would be available, HBMCI issued a relevant “EARLY SAFETY ALERT”, according to Article 16 of the EU Directive 2009/18/EC. By that, HBMCI raised awareness to all interested parties, in order to recognize the document shown also in Appendix 1 of this report as Non-authentic and therefore not to consider the data contained in it as true.

Moreover, via that Safety Alert, HBMCI strongly recommended to all parties related to the supply and survey process of marine equipment, and especially of critical safety equipment components, to verify the authenticity of documentation certifying the characteristics of such equipment, by communicating directly with the issuing organization written on them.

The Safety Alert was published also at HBMCI’s web page, at the following links:

<http://www.hbmci.gov.gr/js/Early%20Alerts/HBMCI/ENGLISH/EARLY%20ALERT%2001-2018%20ENG.pdf>
<http://www.hbmci.gov.gr/js/Early%20Alerts/HBMCI/GREEK/EARLY%20ALERT%2001-2018%20GRE.pdf>

4.2.2.4. The mooring line lack of verification during its delivery

For the supply of the mooring rope that parted, the requisition that had been made back on 23rd June 2016 from BYZANTION to her Managing Company, included the following description:

“Five (5) coils of Mooring rope Kapa Silver Strong / 24 Strand / 50% Polyester – 50% Polysteel, Diam: 52 MM Breaking Load = 60 Tons / PVC protected eyes at both ends, Length: 220 meters, with certificate.”

Due to the fact that the vessel was expected to call at Istanbul after a few days and the ropes could not be shipped there in time by the suppliers usually cooperating with the Managing Company, a supplier based in Istanbul, Turkey was selected ad hoc by the Company. The basic criteria for that selection were the supplier’s location and the delivery time.

The invoice for the mooring ropes received by the Managing Company of BYZANTION described them as per vessel’s request.

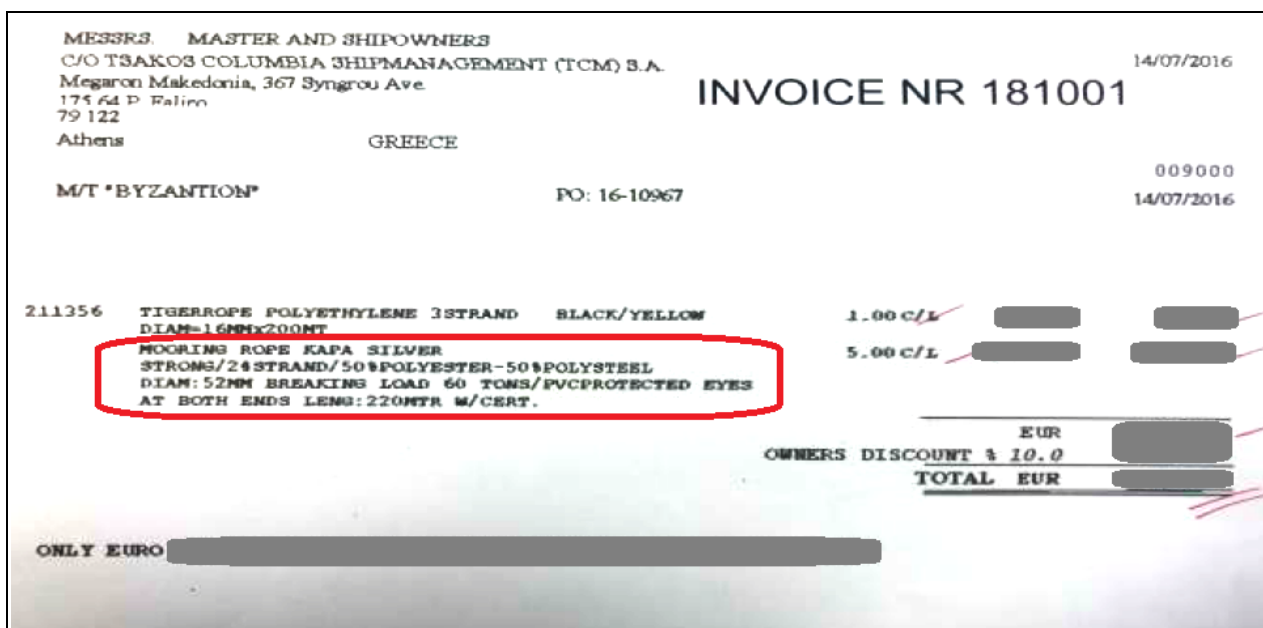


Figure 4.2.2.4/1: The supplier’s description of the mooring ropes as written on the ropes’ invoice.

Despite the fact that the description of the mooring ropes in the ship’s requisition and in the supplier’s invoice were the same, the document entitled “Test Certificate” received together with the ropes when they were supplied onboard, on 15th July 2016, indicated a different description, as follows:

“12-Strand “Marina Maxi”, U.V. Stabilized High Grade Synthetic Compound with Polyester and Polypropylene White Colour (6-Feet Canvas covered and FIV Tucks with compliance to OCIMFStandard Eyes Splice at both ends)”.

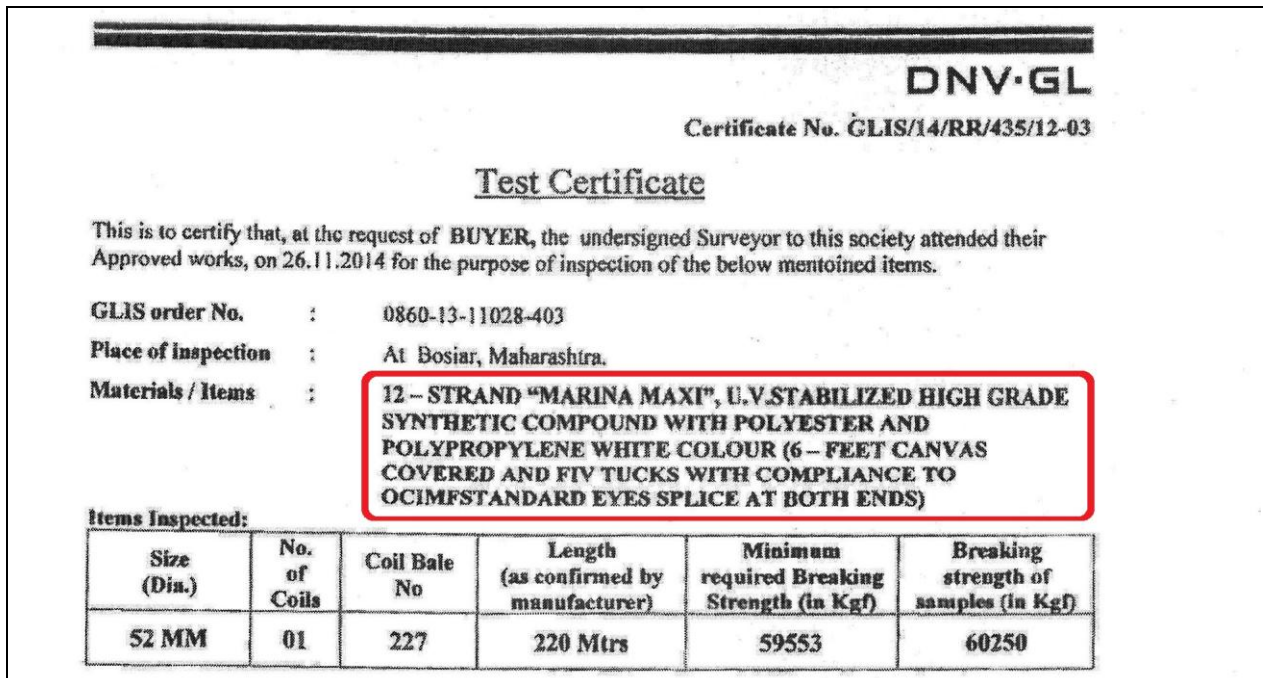


Figure 4.2.2.4/2: The description of the mooring rope as written on the document presented to be its “Test Certificate”.

As it has already been mentioned in a previous paragraph (§ 4.2.2.1), no constructor’s permanent marking existed on the rope, in order a positive identification using a corresponding certificate to be feasible.

Apparently no comparison between the descriptions on the vessel’s requisition form, on the supplier’s invoice and on the document presented as “Test Certificate” was conducted during the receipt of the rope. Therefore, even the obvious difference of the number of strands of the rope (a 24-strand rope was requested whereas a 12-strand rope was delivered) was not observed.



Figures 4.2.2.4 / 3, 4, 5 & 6: Comparison of the form of a 12-strand rope (left side) and a 24-strand rope (right side).

From the above it is evident that no proper verification of the supplied mooring ropes was conducted by the crew who received them onboard.

The ad hoc selection by the Managing Company of a supplier for the mooring equipment in contrast with an effective supplier Quality Management procedure, as well as the failure of BYZANTION’s crew to conduct a proper verification of the supplied mooring equipment, are considered to have been contributing factors in the examined marine casualty.

4.3 The positions of the aft unmooring team members

As derived by the interviewing procedure, the positions of the aft unmooring team members, the Master and the Pilot onboard BYZANTION, a few seconds prior to the casualty, are the ones indicated in **Figure 4.3/1**.

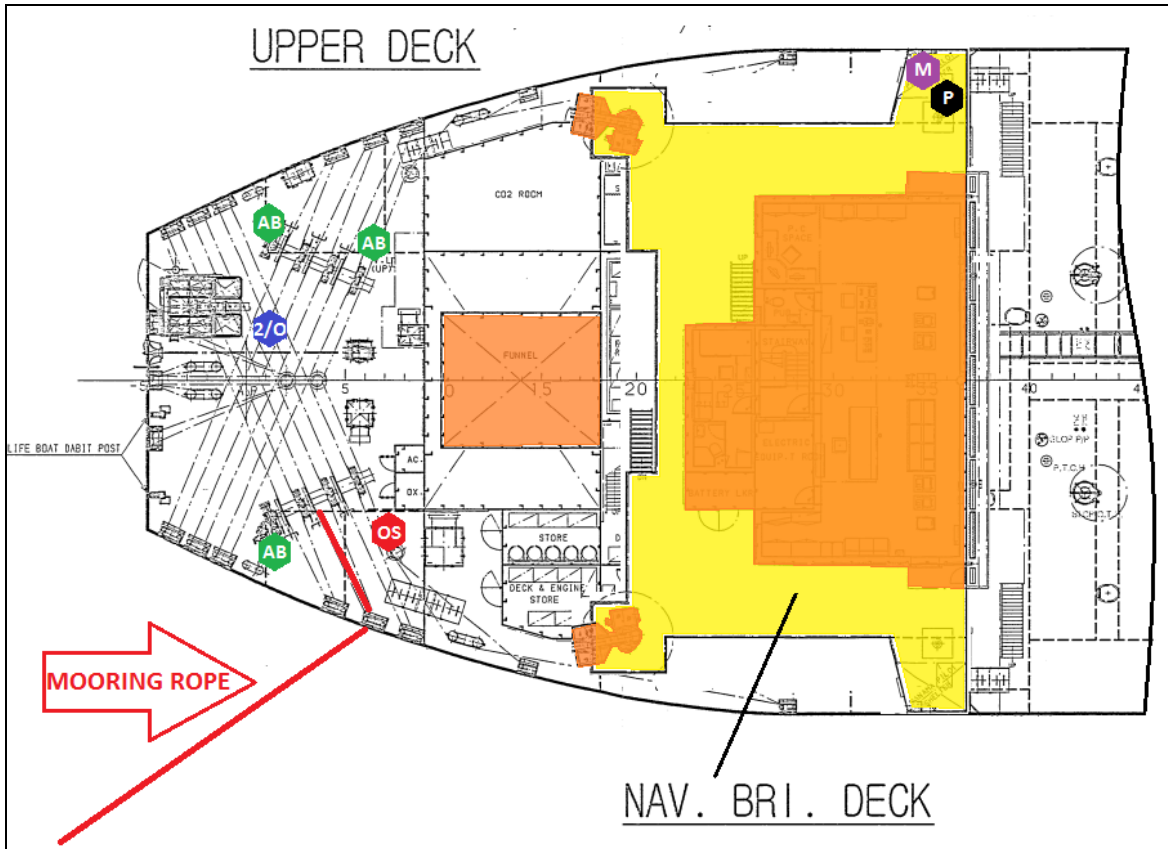


Figure 4.3/1: For illustration purposes, both Upper Deck (aft part) and Navigation Bridge Deck (yellow colour) are included in this picture. The positions of the aft unmooring team are evident, as well as the positions of the Master (M) and the Pilot (P) on the port bridge wing. Obstacles above the Navigation Bridge Deck (bridge, cranes, funnel) are coloured in orange.

Figure 4.3/1 shows the dangerous position of the victim (O/S) near the mooring rope in tension, as well as the fact that the 2nd Officer, head of the team, had no visibility of the O/S, since the stbd mooring winch was between them, hindering his view.

The Master also had no visibility of the entire stbd side of the stern from his position.

Figure 4.3/2 shows a photo depicting the actual arrangement of the stbd stern, as well as the positions of the 2nd Officer, the A/B near the stbd winch controller and the O/S who at the time of the casualty was stowing the fore mooring rope on its drum, with his back turned to the mid mooring line, which was under tension.



Figure 4.3/2: The actual arrangement of the stbd stern and the positions of the 2nd Officer, the A/B near the stbd winch controller and the O/S who at the time of the casualty was stowing the fore mooring rope on its drum, with his back turned to the mid mooring line, which was under tension.

The entire stern mooring station was properly marked as dangerous snap back area. **Figure 4.3** shows an attention indication near the position where the O/S was hit by the mooring rope.

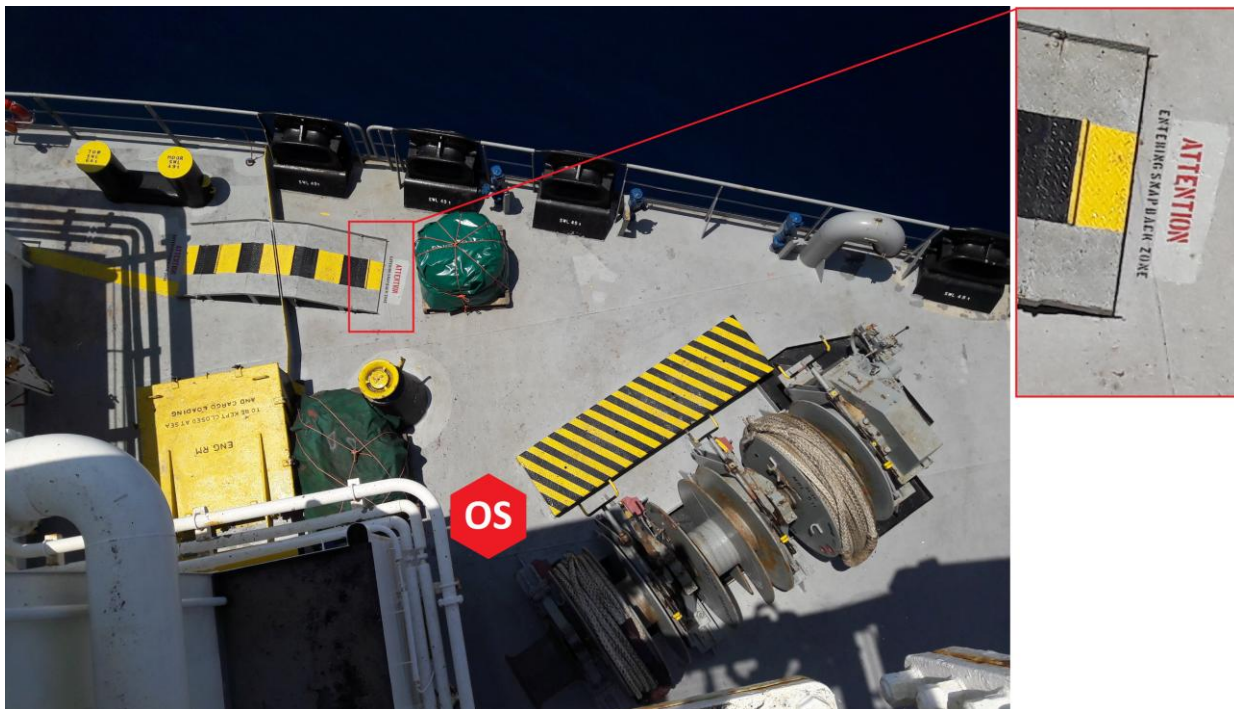


Figure 4.3: The marking for the dangerous snap back zone was near the position of the injured O/S, however he hadn't realized that he was standing inside a dangerous area.

The lack of supervision by the head of the Aft Unmooring Team regarding his team member's dangerous position, as well as the victim's lack of situational awareness, are considered to have been contributing factors in the examined marine casualty.

4.4 The miscommunication resulting to a misunderstanding regarding the unmooring sequence

As already mentioned in the relative Narrative paragraph, in [Table 3.3/1](#), the initially decided unmooring sequence was altered in the middle of the operation, and the Master requested, using his VHF device, from the 2nd Officer who was head of the Aft Unmooring Team, to engage all 6 ropes (3 ropes from each side) and collect them.

The 2nd Officer replied that he "would try" to execute the order, and the Master told him: "What do you mean you will try? It's easy, you will engage **one after the other**". The 2nd Officer replied: "**One ON, one OFF, ok**"⁶.

The 2nd Officer, having misunderstood the Master's order, and also not being aware of the fact that the Tug Boats had commenced the pulling of the vessel sideways (despite that it was within his duties to closely monitor the tug boat movements), instructed the A/Bs operating the winch controllers to engage and slack only the aftmost and the foremost rope drums, leaving the mid drums (both port and stbd) disengaged. As a result, BYZANTION remained moored to the pier by one sole mooring rope (the mid rope) from her stbd stern, resulting to the known catastrophic consequences.

⁶ As already mentioned, both phrases in yellow were the same phrase in Greek: "ENA ΠΑΡΑ ENA" (Phonetically: "ENA PARA ENA").

4.4.1. The misunderstanding between the Master and the 2nd Officer

As mentioned in the previous page footnote, both phrases in yellow were the same phrase in Greek: “ENA ΠΑΡΑ ENA” (Phonetically: “ENA PARA ENA”). Unfortunately, this greek phrase, can be interpreted in both ways, depending on the circumstances.

As already mentioned in the relevant Analysis part (§ 4.1.3), concerning the 2nd Officer’s experience, It was his first time he was the head of the Aft Unmooring Team in BYZANTION, and also had no previous experience onboard handymax product carriers.

In addition, the following parameters should be taken into consideration:

- The 2nd Officer had never served in the past with the Master of BYZANTION. The Master’s reaction to the 2/O’s initial phrase “Yes, we shall try” by reprimanding him (“What do you mean you will try?”), and by telling him “It’s easy, you will...” might have deterred the 2/O from asking for further instructions.
- The phrase used by the Master was not one included in the commonly Greek marine terminology. It was a phrase that either should have been avoided, or further explained.
- The Master was aware of the fact that the Tug Boats had commenced pulling the vessel sideways, based on his discussions with the Pilot and also by having visual contact with them, from his position. However, neither the Fore Mooring Team head (Chief Officer) nor the Aft Mooring Team head (2nd Officer) were aware of this movement, in order their actions to be weighed accordingly.

The Master’s reaction which probably deterred the 2/O from asking for clarifications, the failure by both Officers to use proper marine terminology and the lack of dissemination of critical information for the unberthing operation, are considered to have been contributing factors in the examined marine casualty.

4.4.2. The role of the Port Pilot and the language barrier

The Port Pilot onboard the vessel for her unberthing operation, was the same who had participated in her mooring operation, the previous day.

As already mentioned in the relevant paragraph (§ 3.2), the 7-step unberthing plan had been discussed with the Master during the Master-Pilot exchange process. The Master was coordinating the operation stationed at the port bridge wing, along with the Pilot. The Master and the Pilot were communicating in English.

The Master was communicating with both Officers who were the unmooring team heads via portable VHF devices, at channel 68. All three (Master, Chief Officer and 2nd Officer) were of the same nationality (Greek), and their communication during the operation was conducted in their native language (Greek). On the other hand, the Port Pilot (Turkish national) was communicating with the two Tugboat Commanders at a different VHF channel (channels 16 and 22) in Turkish language.

The following points are raised from the above:

- The Pilot was communicating with the Port Tugs at a different VHF channel (16 or 22) than the one used among the BYZANTION crew (channel 68). This is common practice during berthing and unberthing operations, in order the communication with the Tug Boats not to be interfered by the communication among the vessel’s crew. However, this practice also hindered the Unmooring Teams Heads from becoming aware of the Tug Boats’ movements, in order their actions to be weighed accordingly.
- Even if the Pilot’s communication with the Tug Boats’ Commanders could be heard by BYZANTION unmooring stations’ Heads (of Greek nationality), it wouldn’t be comprehended, as it was made in the Pilot’s native language (Turkish).

- The communication among the Master, the Chief Officer and the 2nd Officer of BYZANTION during the operation was conducted in their native language (Greek). The Port Pilot (Turkish national), who was standing together with the Master and could hear that communication, could also not comprehend it, and perhaps discuss further with the Master on an action which he could perceive as risky for the operation.

The failure of the involved in the unberthing operation parties to use proper marine terminology in a language perceived by all, in order the dissemination of critical information for the operation to become feasible, is considered to have been a contributing factor in the examined marine casualty.

4.5. Risk assessment

The International Safety Management Code (ISM Code-SOLAS 74), as applied in Chapter. 1.2.2 & 1.2.2.2 states that: “The Safety Management objectives of the Company should inter alia assess all identified risks to its ships, personnel and the environment and to establish appropriate safeguards”.

Even though the ISM Code does not provide any further explicit reference apart from the above general requirement, risk assessment⁷ or risk analysis is fundamental for the compliance with most of the Code’s clauses.

It is to be noted that although there is not an exact formal definition of risk, IMO defines it as: “*The combination of the frequency and the severity of the consequence*”⁸.

The BYZANTION Managing Company’s SMS comprised in the SMS Manual the risk assessment procedure, for Mooring and Unmooring operations. During the investigation process, the relevant Risk Assessment form was presented, having an assessment date of 05th June 2018, that is the day prior to the vessel’s arrival at Dortyol.

However, as already mentioned in previous parts of this report’s Analysis section, risk control measures included in the Risk Assessment procedures, were not properly implemented. The following are indicatively mentioned:

- In order the hazard of an inadequate plan or the inadequate supervision to be controlled, measures such as the adequate communication of the Master with the involved crew and the supervision of the crew’s safety positioning outside the snap-back zones by the Officer in charge were assessed to be implemented.
- In order the hazard of the inadequate internal communication to be controlled, measures such as that all internal communications should be made only in English, was assessed to be implemented.
- In order the hazard of the inadequate co-ordination with the tug boat to be controlled, measures such as that the Deck Officer in charge should closely monitor the tug boat movements, was assessed to be implemented.

Considering the aforementioned measures, it is inferred that had they been applied as appropriate, it is highly possible that the unberthing operation of BYZANTION would have been coordinated in a way that the investigated casualty would have been prevented.

The failure to apply risk control measures already provided by the risk assessment procedure is considered to have been a contributing factor in the examined marine casualty.

⁷ Risk management may be defined as: “The process whereby decisions are made to accept a known or assessed risk and/or the implementation of actions to reduce the consequences or probability of occurrence.” (ISO 8402:1995/BS 4778)

⁸ Reference to (MSC Circ.1023/MEPC Circ.392)

4.6. Fatigue

According to the data collected regarding the working-resting hours records, as well as the interviewing process, no indication was evident that fatigue had contributed to the investigated marine casualty.

The following conclusions, safety measures and safety recommendations should not under any circumstances be taken as a presumption of blame or liability. The juxtaposition of these should not be considered as an order of priority or importance.

5. Conclusions

- 5.1 The selection of the 2nd Officer as head of the aft unmooring team was premature, given his lack of previous experience on vessels of BYZANTION's size and his short familiarization period with such ship's operations. (§ 4.1.3)
- 5.2 From the Brake Holding Test carried out onboard after the casualty, on 13th June 2018, the proper adjustment of the mooring winch brake was verified. Although the possibility of an improper adjustment of the brake tightening screw during the casualty cannot be excluded, no evidence of malfunction of the system was found during the investigation. (§ 4.2.1)
- 5.3 No records regarding the reversal date of the mooring line that parted were kept onboard BYZANTION. (§ 4.2.2)
- 5.4 The last inspection of all vessel's mooring lines prior to the casualty, as per the records provided during the investigation, had been carried out on 5th June 2018. Their condition had been evaluated as "Very Good" by the Officers who had conducted the inspection. From the visual inspection of the 2 parts of the broken mooring line, after the casualty, no signs of wear that would render it not acceptable for its use, were evident. (§ 4.2.2 & 4.2.2.1)
- 5.5 The parted mooring rope's physical and mechanical properties were found to be significantly inferior to the ones expected according to the document presented as its "Test Certificate". The fact that at the Tensile Test the rope parted at a load of 33.96 tn in laboratory circumstances, suggests that the breaking load of that rope under dynamically acting forces would be significantly reduced. This parameter is explanatory of the non-function of BYZANTION's Mooring Winch Brake rendering, as the examined mooring rope, due to its dynamic loading, probably broke prior to its loading up to 30.6 tn, which was the Mooring Winch Brake limit. (§ 4.2.2.2)
- 5.6 The non-authenticity of the document presented as "Test Certificate" of the parted rope was verified. HBMC I issued a relevant "EARLY SAFETY ALERT", raising awareness to all interested parties, in order to recognize the document shown also in Appendix 1 of this report as Non-authentic and therefore not to consider the data contained in it as true. The Safety Alert was published also at HBMC I's web page, at the following links:
<http://www.hbmci.gov.gr/js/Early%20Alerts/HBMC I/ENGLISH/EARLY%20ALERT%2001-2018%20ENG.pdf>
<http://www.hbmci.gov.gr/js/Early%20Alerts/HBMC I/GREEK/EARLY%20ALERT%2001-2018%20GRE.pdf>
(§ 4.2.2.3)
- 5.7 The ad hoc selection by the Managing Company of a supplier for the mooring equipment in contrast with an effective supplier Quality Management procedure, as well as the failure of BYZANTION's crew to conduct a proper verification of the supplied mooring equipment, are considered to have been contributing factors in the examined marine casualty. (§ 4.2.2.4)

- 5.8 The lack of supervision by the head of the Aft Unmooring Team regarding his team member's dangerous position, as well as the victim's lack of situational awareness, are considered to have been contributing factors in the examined marine casualty. (§ 4.3)
- 5.9 The Master's reaction which probably deterred the 2/O from asking for clarifications, the failure by both Officers to use proper marine terminology and the lack of dissemination of information regarding the T/Bs' movements, critical for the unberthing operation, are considered to have been contributing factors in the examined marine casualty. (§ 4.4 & § 4.4.1)
- 5.10 The failure of the involved in the unberthing operation parties to use proper marine terminology in a language perceived by all, in order the dissemination of critical information for the operation to become feasible, is considered to have been a contributing factor in the examined marine casualty. (§ 4.4.2)
- 5.11 The failure to apply risk control measures already provided by the risk assessment procedure is considered to have been a contributing factor in the examined marine casualty. (§ 4.5)

6. Actions taken

According to information provided by the vessel's managers during the consultation period of the draft investigation report, following measures were taken:

- The Company alerted all fleet vessels and instructed to conduct one day safety stand down. All related company's material was brought to the attention of the on-board teams for further awareness and compliance to the mooring safety procedures.
- The fleet vessels were instructed to remove immediately from service the mooring ropes of the same type.
- The incident is being communicated to all crewmembers prior joining Company's vessels, during the briefing process.
- Company's training requirements revised to include theoretical and practical training ashore on mooring safety for all deck officers. Provision for refresher training included as well. The first courses have already been delivered in Athens and in Manila on 4,5 and 6 July 2018. Relevant revision in the SMS manuals amended accordingly.
- Procedures related with the supply of mooring lines will be revised. Mooring lines will be only supplied directly by established and recognized high standard makers. Supply of mooring lines will require approval from the Senior Managers and final approval from the Top Management. The certificates of the mooring lines will be reviewed and verified prior to supply. The revised procedures have already been communicated to all personnel involved through an internal letter and are already in force. Revision of the SMS manuals will be will be amended accordingly.
- The Company's mooring procedures (MSMP) reviewed and enhanced as necessary considering the causes and lessons learned from this incident. Amongst others, the revised procedures will include a mooring operation real time audit, which will be carried out annually during marine superintendent sailing attendances.
- The incident investigation and LL report was shared throughout the fleet and manning agencies with the aim to enhance awareness of the crewmembers on the causes and lessons learned from this incident.
- A training video was developed to demonstrate this incident, address and highlight the causes and lesson learned.
- Safety Campaign was launched with the aim to promote and stimulate positive innervations and the significant importance of the stop work authority.

7. Safety recommendations

Taking into consideration the analysis and the conclusions derived from the safety investigation conducted, as well as the actions taken after the investigated marine casualty, the following recommendation is issued.

7.1. Recommendation for the Managing Company of BYZANTION

01/2018: The Managing Company, is recommended to Instruct its crews to use proper marine terminology in ship's common working language during critical operations such as mooring, navigation, cargo or bunker transfer etc. When third parties are involved in the aforementioned critical operations, any verbal communication done by them, if not in English, must be repeated forthwith in English for Master's and crew full understanding.

Produced and edited by the Hellenic Bureau for Marine Casualties Investigation (HBMCI), under the provisions of the article 16 of Law 4033/2011 (Government Gazette A' 264)

This report was written solely for the purposes of the investigation and is uploaded on the website of HBMCI (see below)

Accident Investigation Report No 01/2018

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Appendix 1

The non-authentic document presented as "Test Certificate" of the parted mooring line



Certificate No. GLIS/14/RR/435/12-03

Test Certificate

This is to certify that, at the request of BUYER, the undersigned Surveyor to this society attended their Approved works, on 26.11.2014 for the purpose of inspection of the below mentoined items.

GLIS order No. : 0860-13-11028-403

Place of inspection : At Bosiar, Maharashtra.

Materials / Items : 12 – STRAND "MARINA MAXI", U.V.STABILIZED HIGH GRADE SYNTHETIC COMPOUND WITH POLYESTER AND POLYPROPYLENE WHITE COLOUR (6 – FEET CANVAS COVERED AND FIV TUCKS WITH COMPLIANCE TO OCIMFSTANDARD EYES SPLICE AT BOTH ENDS)

Items Inspected:

Size (Dia.)	No. of Coils	Coil Bale No	Length (as confirmed by manufacturer)	Minimum required Breaking Strength (in Kgf)	Breaking strength of samples (in Kgf)
52 MM	01	227	220 Mtrs	59553	60250

Inspection / Verification Performed: Selection of random samples, Witnessing Breaking Load Testing. (Testing performed as per BS EN ISO 2307:2010 & BS EN ISO 1346)


Identification : By Name of the Client / Item / Bale No. / Size – DIA MM / Length and has been hard Stamped on Lead seal As "G.L.". *

Results : The test gave no reason for objection, it is confirmed that the ropes comply with the Minimum Guaranteed breaking strength requirement of BUYER.

Note : Testing performed as per BS EN ISO 2307:2010 & BS EN ISO 1346. Certificate issued based on test results of randomly drawn sample no. 221 from Coil Bale no. 225 TO 234.

The inspection performed and certificate issued without prejudice to whomsoever it may concern.

Attending Surveyor: [Redacted] *



[Redacted] *

For Germanischer Lloyd
Industrial Services GmbH

INDUSTRIAL SERVICES
20816

Date
02.12.2014

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Germanischer Lloyd Industrial Services GmbH India Branch trading as DNV GL
Company Registration No FC3288

The **non-authentic** document presented along with the parted mooring line.

*: The personal data (names and signatures) of the representatives of the organization indicated as the issuing organization of the document have been covered, according to the provisions of the General Data Protection Regulation.