



**Federal Bureau for the Investigation  
of Maritime Accidents**

Vooruitgangstraat 56  
B - 1210 Brussels  
Belgium

2022/017548

Report on the investigation into the  
death of a crewmember on board  
the mts MAGNIFICA during  
manoeuvring in the ZANDVLIET  
lock at the  
Port of Antwerp on  
26th of July 2022



**Federal Bureau for the Investigation of Maritime Accidents**

## Extract from the European Directive 2009/18/EC

(26) Since the aim of the technical safety investigation is the prevention of marine casualties and incidents, the conclusions and the safety recommendations should under no circumstances determine liability or apportion blame.

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## 4. Glossary of abbreviations and acronyms

AM	Ante Meridiem
BFA	Barrier fail analyses
IMO	International Maritime Organisation
LDBF	Line Design Break Force
M	Metres
Mtons	metric tons
Mts	Motor tank ship
Mv	Motor vessel
UTC	Universal Time Coordinated
VHF	Very High Frequency

VTS Vessel Traffic Services  
CCTV Closed-circuit television

## 5. Marine casualty information

### 5.1 Resume

**Note: All times in this report are in local ship's time, UTC<sup>1</sup> +2, unless otherwise specified. All times of the events are synchronised with local ship's time which may explain minor differences compared to recordings.**

The mts MAGNIFICA was moored at the port of Antwerp on 26 July 2022. At 2:00 that morning the vessel was being prepared to leave the port, outward bound via the ZANDVLIET lock. At 02:33 the vessel left the berth. The Master was assisted by a dock pilot, who had commissioned a harbour tug mv 20. The tug had made fast aft.

At 3:28 the same morning, during manoeuvring in the ZANDVLIET lock, the rear spring line snapped thereby hitting a crewmember that was positioned near the Panama lead, through which the aft spring line passed, frontally. The crewmember immediately thereafter was found lying motionless on the vessel's deck, in the snapback zone of the rear spring line. An emergency medical team was called for but all help was to no avail and the crewmember was declared deceased thereupon.

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<sup>1</sup> Coordinated Universal Time (UTC) is the global time standard used to regulate clocks and time. Serving as the reference point for current time, UTC underpins civil time and time zones. It is crucial for international communication, navigation, scientific research, and commerce. UTC has been widely adopted by most countries, effectively replacing Greenwich Mean Time (GMT) in everyday usage and common applications.

## 5.2 Classification of Accident

According to Resolution A.849(20) of the IMO Assembly of 27 November 1997, Code for the investigation of Marine Casualties and Incidents, a marine casualty means an event that has resulted in, amongst others, the death of, or serious injury to, a person that is caused by, or in connection with, the operations of a ship.

Accordinging this definition, the accident was classified as

### **Very Serious Marine Accident**

### 5.3 Accident details

*Incident number:* 2022/017548

*Incident date:* 7/26/2022 3:24:00 AM

*Incident location:* ZANDVLIET lock at the Port of Antwerp

*Incident category:* Very Serious Casualty

*What happened:* Crewmember was fatally injured during manoeuvring

*Geographical location:*

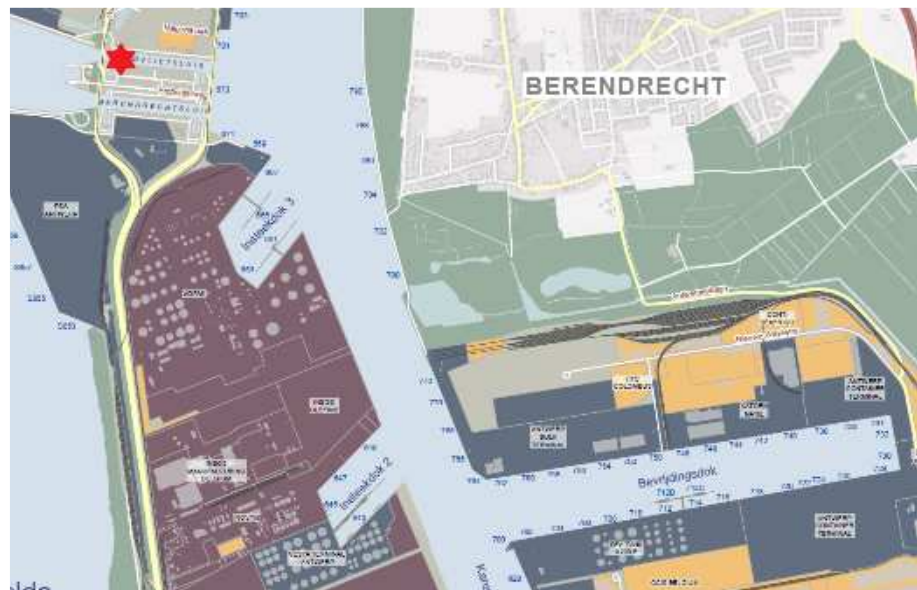


Figure 1 - Location of mts MAGNIFICA when accident happened

*Description:* Death of a crewmember on board the mts MAGNIFICA during manoeuvring in the ZANDVLIET lock in the Port of Antwerp on 26th of July 2022



## 6. Synopsis

### 6.1 Narrative

The mts MAGNIFICA was well moored at the port of Antwerp at quay 702 on 26 July 2022. the vessel was outward bound via the ZANDVLIET lock. The Master was assisted by a dock pilot that commissioned a harbour tug, mv 20.

At 2:00 in the morning the ship's main engine was blown through<sup>2</sup>. The bridge was being prepared for manoeuvring.

After the VHF radios<sup>3</sup> were switched on and set to the appropriate channels, the harbour's traffic operators were heard speaking Dutch and German with several vessels in the port and in the vicinity of the port.

At 2:15, while the Master was already in the wheelhouse, the dock pilot entered the wheelhouse and introduced himself. During the subsequent Master <-> Pilot exchange the manoeuvring particulars of the vessel were not treated, only presence of a functioning bowthruster was mentioned.

At 2:16, after being in touch via VHF with the Port Coordination Center in Dutch language, the pilot conformed that the vessel would leave the Port of Antwerp via the ZANDVLIET lock, with a draught of 5,8 metres forward and 7,2 metres aft.

Subsequently the pilot hailed the port ZANDVLIET lock centre, that assigned the mts MAGNIFICA to position number 1 portside in the ZANDVLIET lock. The pilot relayed the position in the ZANDVLIET lock to the Master. Thereupon the pilot hailed the port's VTS confirming that the vessel was ready to proceed to the ZANDVLIET lock.

The vessel's main engine was tested at 02:21 and at 02:33 the Voight-Scheider<sup>4</sup> propelled tug mv 20 with a bollard pul of 55 mtons<sup>5</sup>, was made fast aft and the vessel's crew started the unmooring of the vessel. Subsequently the vessel was manoeuvred free of the quay and proceeded towards the ZANDLVLIET lock.

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<sup>2</sup> Before starting the ship's main engine, it is blown through with air to expel any residual exhaust gases or other combustion products trapped inside the cylinder after the engine was shut down. Additionally, this process helps identify if any jacket cooling water from the cylinder head, turbocharger, or other sources has leaked and collected on top of the piston while the engine was off.

<sup>3</sup> Marine VHF radio is a global system of two-way radio transceivers used on ships and watercraft for bidirectional voice communication. It facilitates communication from ship-to-ship, ship-to-shore (such as with harbormasters), and occasionally ship-to-aircraft. This system operates on FM channels within the very high frequency (VHF) radio band, specifically between 156 and 174 MHz, as designated by the International Telecommunication Union for the VHF maritime mobile band.

<sup>4</sup> The Voith Schneider Propeller (VSP) combines propulsion and steering in one unit. This vessel propulsion solution was developed by Austrian engineer Ernst Schneider. Voith Schneider Propellers are in use wherever precise, safe and efficient maneuvering is of the essence.

<sup>5</sup> Bollard pull refers to the tugboat's pulling power at zero speed. It serves as an indicator of the tugboat's effectiveness and capability.

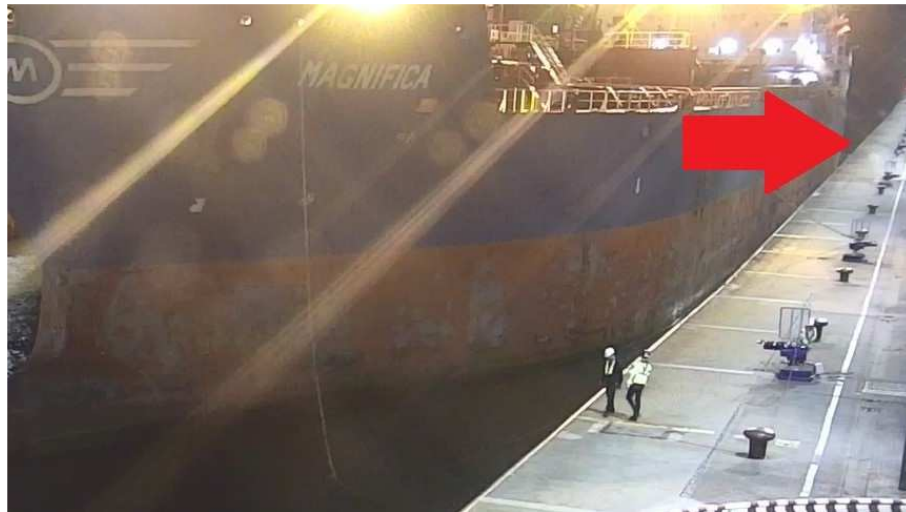


*Figure 2 - Tug mv 20*

During the transit from the quay to the lock, several crewmembers of the mts MAGNIFICA communicated via handheld radio in one or more of the Filipino languages.

At 03:13 the same morning the mts MAGNIFICA started entering the ZANDVLIET lock. Minutes later, the pilot was informed about the distance to go whereupon the vessel's engine was stopped. Thereafter the pilot was informed on several occasions about the distance to go before the vessel would be in position. The vessel was in position at 03:24 and the pilot was informed accordingly. The crew was informed and a first line was cast ashore and made fast at 03:25.

The vessel's engine was subsequently put in dead slow ahead for a short time. Thereupon the pilot instructed the tug mv 20 to start pulling astern and to stop pulling very soon thereafter, at the same time the Master had instructed the vessel's crew to hold the position of the vessel, whereupon the crewmember entrusted with manipulating the rear spring, tightened the rear spring. Immediately thereafter the rear spring, with a minimum breaking load of 61,7 mtons as seen in Annex 2 on page 29, snapped.



*Figure 3 –Arrow indicates the snapping rear spring (extract from cctv images)*

The broken spring line swung back and hit the crewmember, positioned near the Panama lead wherethrough the rear spring was put ashore as seen in Figure 4 on page 12, frontally.

Said crewmember immediately fell onto the deck and remained motionless. The sound of the snapping of the spring line was heard in the wheelhouse and immediately triggered the Master, who ran onto the wheelhouse wing and saw the regretful crewmember lying on deck. Some panic arose and subsequently the pilot reported the accident to the lockmaster via radio.

The vessel was instructed by the pilot to make fast in the position where it was. Subsequently, the pilot assessed the severeness of the accident and requested the lockmaster to summon a doctor, and instructed the Master the have the gangway put ashore. At 03:26 the vessel made fast in the ZANDVLIET lock and some 10 minutes later the tug mv 20 was cast off.

At 03:43 the emergency medical team arrived on scene and immediately started cardio pulmonal resuscitation. Sometime thereafter, at 04:05 the cardio pulmonal resuscitation was stopped and the regretful crewmember was declared deceased.

The vessel left the vessel at 05:54 and returned to the berth in the port of Antwerp.



*Figure 4 - Broken spring line through Panama lead*

## 7. Factual information

### 7.1 Particulars of mts MAGNIFICA



Figure 5 – mts MAGNIFICA

Ship's Name	mts MAGNIFICA
IMO Number	9374234
Call Sign	ICFV
Flag	Italian
Ship type	Oil and Chemical tanker
Gross Tonnage	25385
Date keel laid	13 Januari 2009
Operators	Millenia Maritime INC – IMO 5230682
Owners	Morfini SPA – IMO 251407
Maximum engine power	11640 Bhp
Length over all	175,98 m
Length between perpendiculars	168,00
Breath	31 m
Draught	11,065
Hull Material	Steel

## 8. Analysis

### 8.1 Incident timeline

Date and Time	Action	Description
26-jul-2022 02:00:00	Main engine blown through	Main engine was blown through and ready to be tested
26-jul-2022 02:15:55	Pilot entered wheelhouse	Pilot entered wheelhouse and no manoeuvring details of the vessel between pilot and Master were exchanged
26-jul-2022 02:16:56	Pilot confirmed ZANDVLIETLOCK	After being in touch with the Port Coordination Center the pilot conformed that the vessel was to leave the Port of Antwerp via the ZANDVLIET lock with draught 5,8 metres forward and 7,2 metres aft.
26-jul-2022 02:17:56	Pilot hailed ZANDVLIET lock	Pilot hailed the ZANDVLIET lock centre, that assigned the mts MAGNIFICA to position number 1 portside in the lock
26-jul-2022 02:18:52	Pilot confirmed position number 1 portside in ZANDVLIETLOCK	Pilot confirmed position number 1 portside in ZANDVLIETLOCK to the Master of mts MAGNIFICA
26-jul-2022 02:19:44	Pilot confirmed to VTS that mts MAGNIFICA is ready to go	Pilot confirmed to VTS sector POLDER that mts MAGNIFICA is ready to go
26-jul-2022 02:21:30	Engine was tested	The engine was tested ahead and astern
26-jul-2022 02:33:48	Tug 20 made fast and started unmooring	Crew made Tug 20 fast aft and started unmooring the vessel.
26-jul-2022 02:37:00	Started manoeuvring	All hawsers were clear and the mts MAGNIFICA started manoeuvring
26-jul-2022 02:44:17	Left BEVRIJDINGSDOEK	The mts MAGNIFICA left the BEVRIJDINGSDOEK and started swinging to portside
26-jul-2022 02:49:10	Swing to portside completed	The swing to portside was completed and the vessel proceeded towards the ZANDVLIETLOCK
26-jul-2022 03:07:00	Started swinging towards the ZANDVLIETLOCK	The mts MAGNIFICA started swinging towards the ZANDVLIETLOCK over portside
26-jul-2022 03:12:56	mts MAGNIFICA is given the exact mooring position	mts MAGNIFICA is given the exact mooring position, portside 50 metres from the door
26-jul-2022 03:13:06	Started entering lock	The mts MAGNIFICA started entering the ZANDVLIETLOCK
26-jul-2022 03:21:18	mts MAGNIFICA is informed about distance to go	mts MAGNIFICA is informed that the distance to the mooring position is 100 metres
26-jul-2022 03:21:45	Stopped engine	The engine of the mts MAGNIFICA was stopped when the vessel was 80 metres from its assigned position
26-jul-2022 03:22:12	mts MAGNIFICA is informed about distance to go	mts MAGNIFICA is informed about distance to go which was 60 metres
26-jul-2022 03:22:42	mts MAGNIFICA is informed about distance to go	mts MAGNIFICA is informed about distance to go which was 40 metres
26-jul-2022 03:23:23	mts MAGNIFICA is informed about distance to go	mts MAGNIFICA is informed about distance to go which was 20 metres
26-jul-2022 03:23:46	mts MAGNIFICA is informed about distance to go	mts MAGNIFICA is informed about distance to go which was 10 metres
26-jul-2022 03:24:24	Mts MAGNIFICA was informed	

	that ship was in position	
26-jul-2022 03:25:31	First line ashore	The first mooring line of the mts MAGNIFICA was put ashore
26-jul-2022 03:26:20	Dead slow ahead	Engine was put in dead slow ahead
26-jul-2022 03:26:40	Stop engine	The engine of the mts MAGNIFICA was stopped
26-jul-2022 03:27:50	Tug 20 started pulling	Tug 20 was instructed by the pilot to start pulling in order to slow down and stop the vessel
26-jul-2022 03:27:55	Hold position	Crew of the mts MAGNIFICA was instructed to hold position with the mooring lines
26-jul-2022 03:27:59	Tug 20 stopped pulling	Tug 20 was instructed by the pilot to stop pulling
26-jul-2022 03:28:02	Portside aft spring line snapped	The portside aft spring line snapped and the part that swung back hit a crew member frontally
26-jul-2022 03:28:04	Panic arose	The crew that witnessed the accident was in panic and started shouting in their respective native languages
26-jul-2022 03:28:36	Pilot reported accident	The pilot reported the accident to the lock Master and asked for an ambulance to come on scene
26-jul-2022 03:28:37	Slack in towline	Pilot and tugboat captain agreed to keep the towing line slack
26-jul-2022 03:29:29	Ship in position	Pilot and tugboat captain agreed to make the vessel fast in her current position
26-jul-2022 03:29:40	Doctor requested	Pilot assessed the situation and requested a doctor on scene
26-jul-2022 03:31:05	Gangway ashore	Pilot instructed Master to put the gangway ashore as quickly as possible
26-jul-2022 03:31:26	Vessel made fast	Pilot informed tugboat captain that the vessel made fast in her current position
26-jul-2022 03:36:00	Casted off tug	The pilot instructed the Master of the mts MAGNIFICA to cast off tug 20
26-jul-2022 03:43:00	Medics on scene	The ambulance arrived on scene and subsequently the medics went on board and started applying cardio vascular resuscitation
26-jul-2022 04:05:00	Stop CPR	The cardio vascular resuscitation was stopped and the crew member injured by the hawser that snapped earlier was declared dead
26-jul-2022 05:54:00	Left lock	Tugs FAIRPLAY and MULTRATUG 28 made fast and the mts MAGNIFICA subsequently left the lock

*Figure 6 - incident timeline*

## 8.2 BFA Diagram

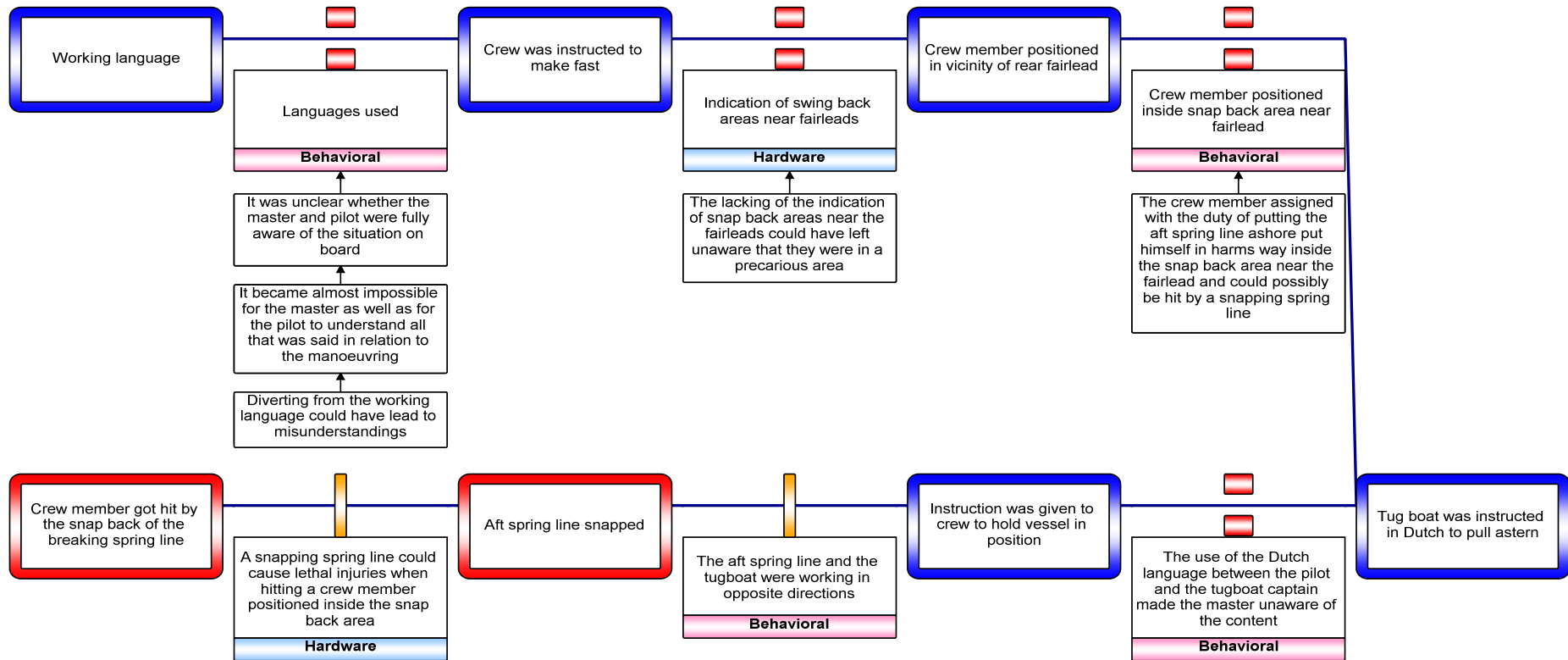


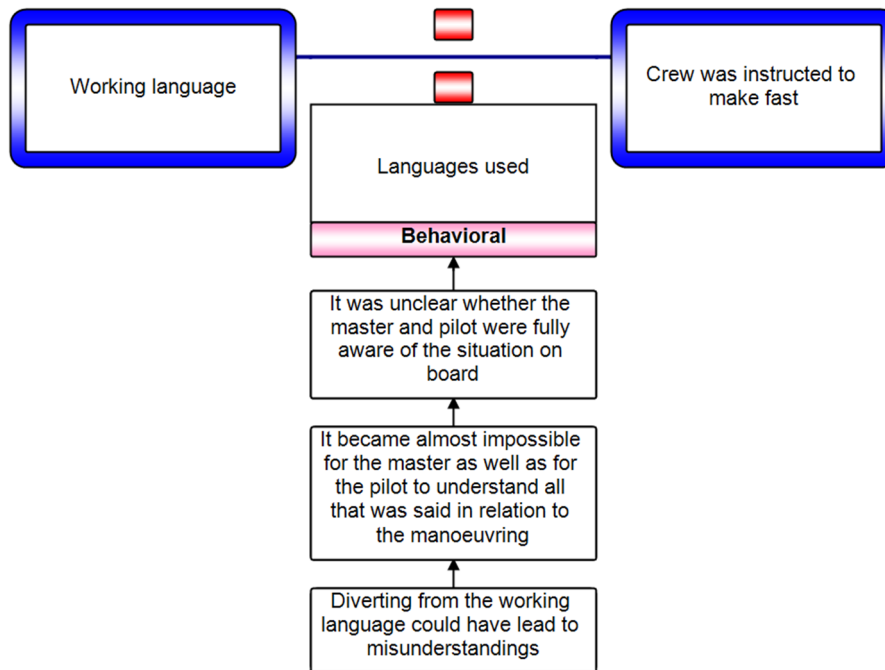
Figure 7 - barrier fail diagram



### 8.3 Incident tree cut-up

From: Threat Working language

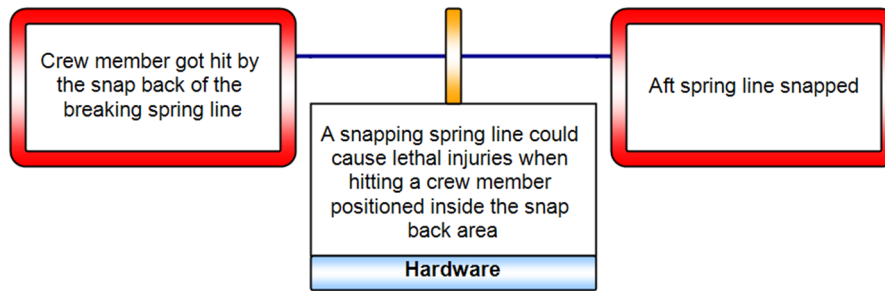
To: Event Crew was instructed to make fast



Incident Barrier	Performance / RC Categories	Barrier Challenge / Causes	Comments about performance
<b>Crew was instructed to make fast</b>			
Languages used	Failed		
	BFA Primary Causes		It was unclear whether the Master and pilot were fully aware of the situation on board
	BFA Secondary Causes		It became almost impossible for the Master as well as for the pilot to understand all that was said in relation to the manoeuvring
	BFA Tertiary Causes		Diverting from the working language could have led to misunderstandings

From: **Consequence Crew member got hit by the snap back of the breaking spring line**

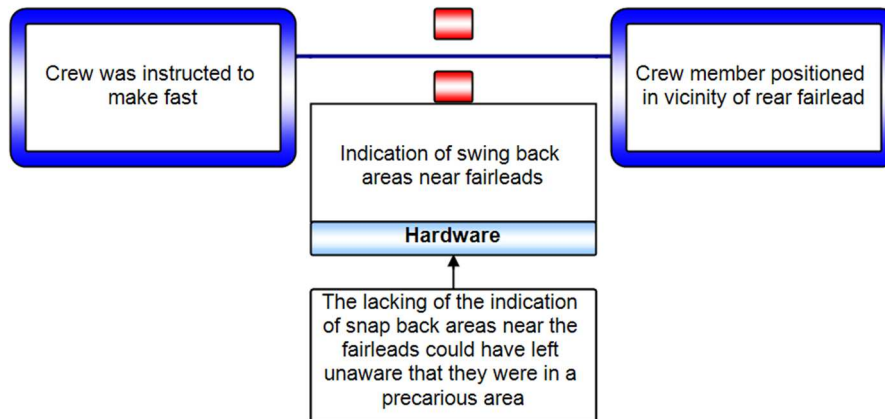
To: **Consequence Aft spring line snapped**



Incident Barrier	Performance / RC Categories	Barrier Challenge / Causes	Comments about performance
<b>Aft spring line snapped</b>			
A snapping spring line could cause lethal injuries when hitting a crew member positioned inside the snap back area	Unreliable		

From: **Event Crew was instructed to make fast**

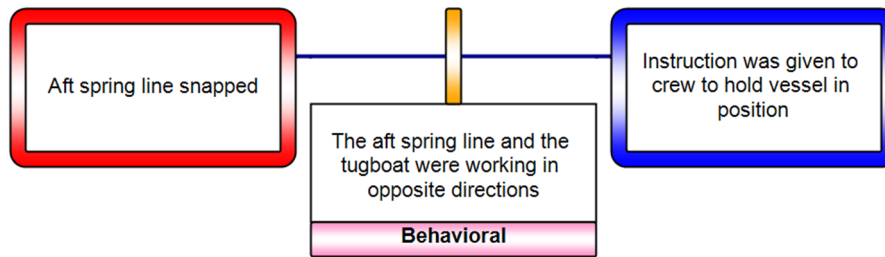
To: **Threat Crew member positioned in vicinity of rear fairlead**



Incident Barrier	Performance / RC Categories	Barrier Challenge / Causes	Comments about performance
<b>Crew member positioned in vicinity of rear fairlead</b>			
Indication of swing back areas near fairleads	Failed		
	BFA Primary Causes		The lacking of the indication of snap back areas near the fairleads could have left the crew unaware that they were in a precarious area

From: **Consequence Aft spring line snapped**

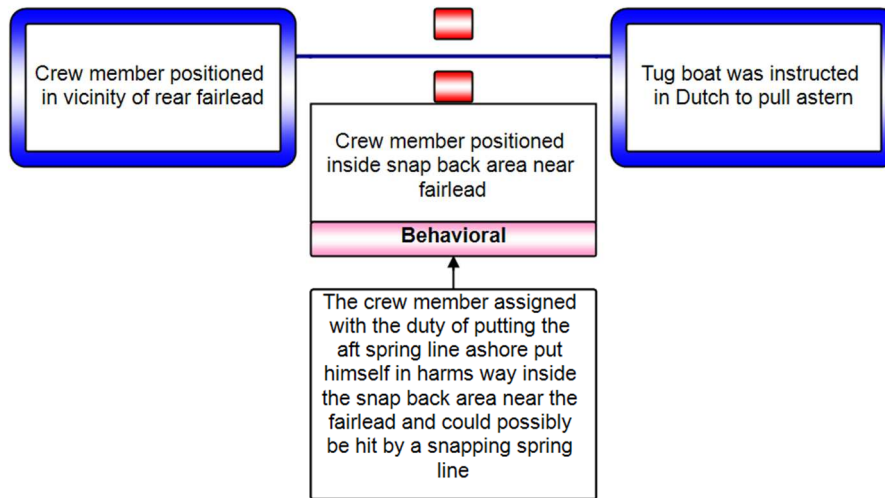
To: **Event Instruction was given to crew to hold vessel in position**



Incident Barrier	Performance / RC Categories	Barrier Challenge / Causes	Comments about performance
<b>Instruction was given to crew to hold vessel in position</b>			
The aft spring line and the tugboat were working in opposite directions	Unreliable		

From: Threat Crew member positioned in vicinity of rear fairlead

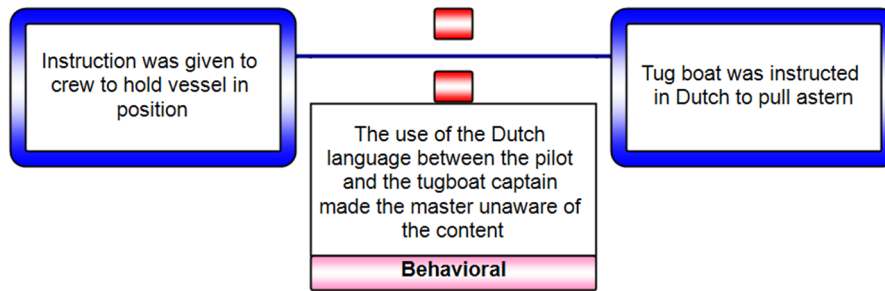
To: Event Tug boat was instructed in Dutch to pull astern



Incident Barrier	Performance / RC Categories	Barrier Challenge / Causes	Comments about performance
<b>Tug boat was instructed in Dutch to pull astern</b>			
Crew member positioned inside snap back area near fairlead	Failed		
	BFA Primary Causes		The crew member assigned with the duty of putting the aft spring line ashore put himself in harm's way inside the snap back area near the fairlead and could possibly be hit by a snapping spring line

From: **Event Instruction was given to crew to hold vessel in position**

To: **Event Tug boat was instructed in Dutch to pull astern**



Incident Barrier	Performance / RC Categories	Barrier Challenge / Causes	Comments about performance
<b>Tug boat was instructed in Dutch to pull astern</b>			
The use of the Dutch language between the pilot and the tugboat captain made the Master unaware of the content	Failed		

## 9. Cause of the accident

The snapping of the spring line and consequential lethal injuries to a crewmember of the mts MAGNIFICA were caused because the execution of the instructions given to the deck crew of the mts MAGNIFICA in English and the instructions given to tug mv 20 in Dutch counteracted and said spring line and the tugboat mv 20 were working in opposite directions as seen in Figure 8 on page 23 thereby exceeding the Line Design Break Force<sup>6</sup> of the spring line.

<sup>6</sup> Line Design Break Force or LDBF means the minimum force that a new, dry, spliced, mooring line will break at. This is for all synthetic cordage materials.

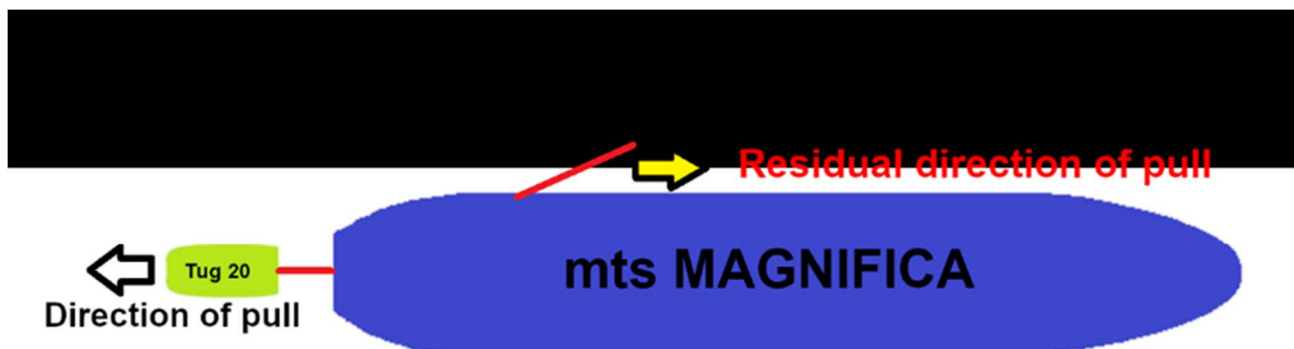


Figure 8 - Residual forces on spring line

## 9.1 Contributing factors

### 9.1.1 Use of different languages

The working language on board the mts MAGNIFICA was English. The Master communicated in English via handheld radio with the deck crew during manoeuvring. The pilot and Master communicated in English, whereas the pilot communicated with the lock Master and tug boat via handheld radio in Dutch. The use of a mix of languages on board the mts MAGNIFICA during the manoeuvring in the ZANDVLIET lock made it so that not all actors were fully aware of the situation and the instructions given.

## 10. Safety Issues

1. The spring traversed from the winching installation to the Panama lead via the shortest route, however, Panama leads offer no chafing protection to the lines passed through. Chafing may over time have affected the breaking load of the spring line to such extent that breaking force decreased considerably.
2. Changing the direction of mooring lines by means of leads not only reduces the breaking force by bend losses but also causes the introduction of complex snap-back areas. The snap back areas in way of the Panama leads were not indicated as seen in Figure 4 on page 12.
3. The Port of Antwerp regulations for the use of VHF radio communications in the port area impose the use of the English or Dutch language, however, without imposing one or the other.

## 11. Recommendations

1. The Port of Antwerp Bruges is recommended to let go of the choice between two languages, Dutch and English, for nautical communication between vessels, harbour tugs, lockmasters and VTS and to always have all aforementioned communication in English.
2. CVBA BRABO are recommended to impose their docking pilots to exclusively use English for all nautical communication, whether on board vessels or via VHF.
3. The operators of the vessel, Millenia Maritime INC – IMO 5230682, are recommended to have precarious zones near Panama Leads on board vessels operated by them marked as such, and to also inform the crew of the vessels operated by them that Panama Leads are not meant to have lines moving through them, by means of winching, but they are a towing fitting installed on the shipside to lead the mooring or towing rope from the ship's inboard to outboard when fixed to a bollard on deck.

## 12. Methodology

### 12.1 Incident Analysis Methodology

The method used to analyse the accident on board the mts Magnifica on 26 July 2022, is the Barrier Failure Analysis method or in short BFA. The Barrier Failure Analysis method is a pragmatic, unopinionated, general-purpose incident analysis method.

The Barrier Failure Analysis method is a way to structure incidents and to categorize certain parts of an incident taxonomy. The structure consists of events, barriers and causation paths. Events are used to describe a casual sequence of events that we want to prevent from cascading. This means that each event causes the occurrence of a next event. There can also be a parallel events that combined cause the next event to happen. The barriers in a Barrier Fail Analyses are designed to stop a chain of events.



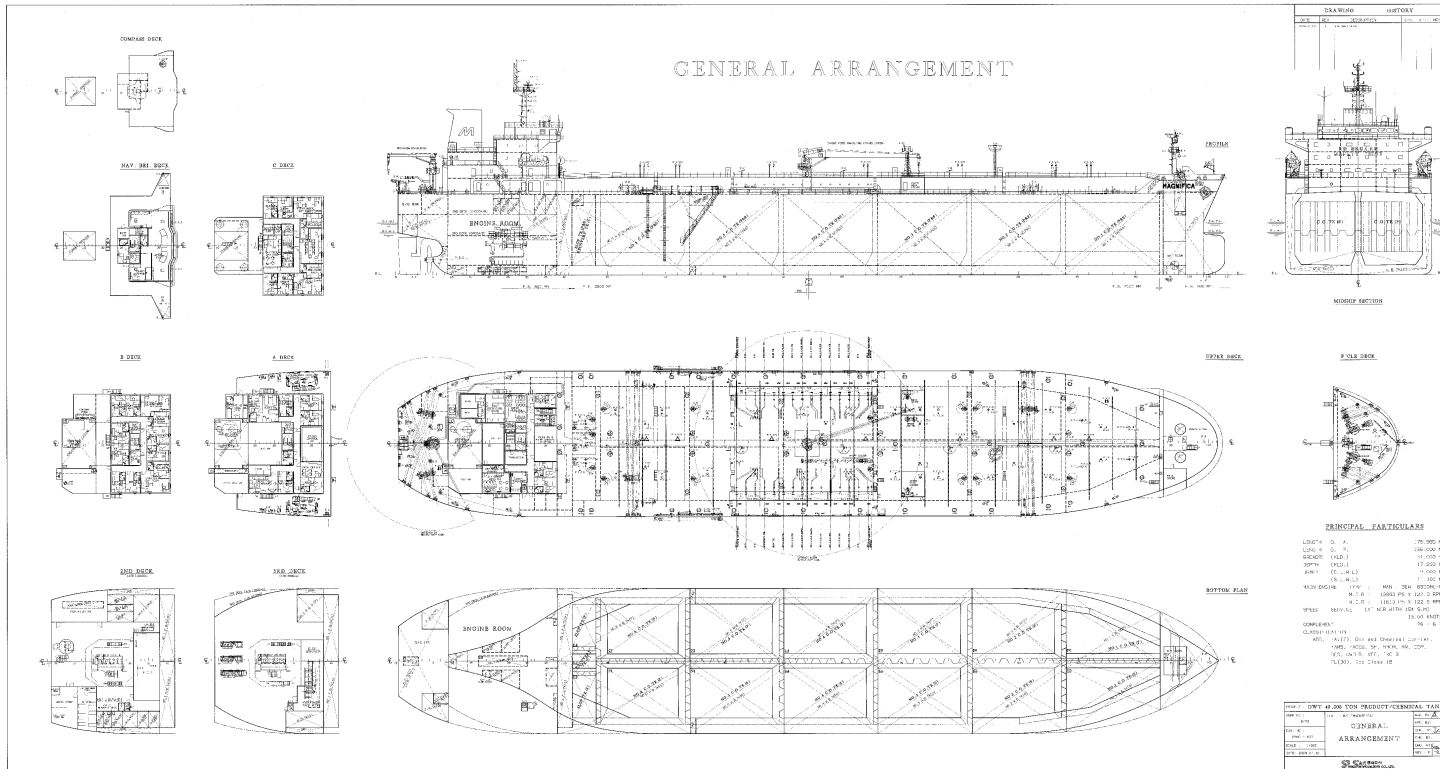
## 13. Investigation Team

The following accident investigation bodies were part of the investigation team:

Federal Bureau for the Investigation of Maritime Accidents	Belgium
Ufficio per le investigazioni ferroviarie e marittime	Italy

# 14. Annexes

## 14.1 General Arrangement Plan mts MAGNIFICA



Annex 1 - General arrangement plan of mts MAGNIFICA

## 14.2 Certificate of synthetic wire ropes

8 AFT SPRING/AFT



NOV 16 10:00 AM

### CERTIFICATE OF SYNTHETIC FIBER ROPES

**Customer:** MORFINI S.P.A.  
**Order No:** 479-R190005B

**Vessel :** VSL MAGNIFICA  
**Shipping Marks:**

We hereby certify that the rope as listed below supplied to your firm has been manufactured in order to meet the requirements of ISO 9554:2010 and OCIMF Mooring Equipment Guidelines:4<sup>th</sup> Edition 2018. All ropes have been inspected visually during the manufacturing process and before delivery. Sampling tests have been carried out according to the company's quality system in force and meet the requirements of EN ISO 2307:2010.

<b>CERTIFICATE No :</b>	<b>: 141733</b>
ID TAG No	: 141733
PRODUCTION LOT No.	: R37727-0
TYPE/ CONSTRUCTION/ COLOUR	: KAPA FLOAT 24/ 24-STRAND /
RAW MATERIAL	: 25% POLYESTER – 75% POLYSTEEL
UV PROTECTION	: YES
CIRC / DIAMETER	: 7 1/2" / 60MM
LENGTH- COILS	: 220 MTRS/1 COIL
	(Measured under reference tension as per ISO 2307)
WEIGHT	: 402 KGS
MINIMUM BREAKING LOAD	: 61,7 TONS
EXTRA WORK – FITTINGS	: KAPA WEB PROTECTION SLEEVE AT BOTH ENDS
REMARKS	: Mixed rope is manufactured acc. OCIMF regulations
<b>LLOYD'S TYPE APPROVAL</b>	<b>: 12/00004(E1) Mixed PES/ Polysteel ropes</b>

Our company is certified by ISO 9001:2015 (QUALITY MANAGEMENT SYSTEM )  
and ISO 14001: 2015 (ENVIRONMENTAL MANAGEMENT SYSTEM )

We hereby declare that above products are **ASBESTOS FREE** according to **SC249 Solas II-1, Regulation 3-5** and **MSC.1/Circ.1379**

All examinations and tests were carried out by competent personnel and are certified as correct.

**THE MANUFACTURERS**  
**D. KORONAKIS SA**

Piraeus, 13/2/2019

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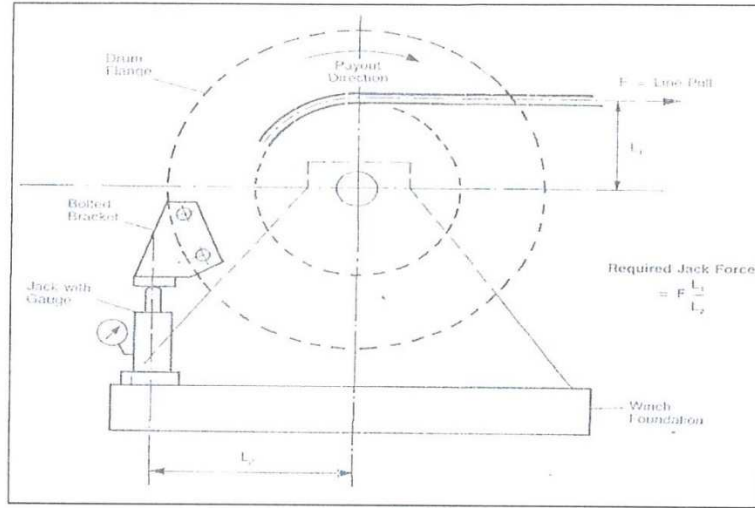
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	<b>WINCH BRAKE TEST REPORT</b>	TEC/043
Freq: 1Y	To Be Sent To The Office	

VESSEL: MAGNIFICA

DATE: 15th February 2022




Jack's piston Diameter (cm) d= 6  
 Jack's piston Area (cm<sup>2</sup>) A= 28.274

Winch ID #	Split type Y or N	Drum DIA (m)	Max brake capacity (MT)	Moorin g line DIAM (m)	Ship's Design MBL (Tons)	Min F (MT)	L <sub>1</sub> (m)	L <sub>2</sub> (m)	P (bar)	F (MT)	BRAKE TIGHTENING TORQUE (Nm)	Comments
1	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
2	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
3	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
4	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
5	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	90	
6	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
7	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
8	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
9	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
10	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
11	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	
12	Y	0.450	35.2	0.060	58.6	35.2	0.255	0.875	355	35.1	95	

The brake holding capacity should be 60% of Ship's Design MBL for split or non-split drums respectively

The minimum rendering force F should be slightly less than the brake holding capacity and it is the force where the winch will render

	<b>WINCH BRAKE TEST REPORT</b>		TEC/043
	Freq: <b>1Y</b>	TO BE SENT TO THE OFFICE	

**Guidelines:**

- 1) Increase the hydraulic pressure P on to jack gradually until the brake renders.
  
- 2) In case that the required brake capacity is not achieved then the brake tightening needs re-adjustment and the test is to be repeated until the brake rendering force F satisfies the above-mentioned requirement with a different hydraulic pressure level P on to jack.

**Colour Codes:**

- 1) Cells in blue to be filled by the user
- 2) All rest cells return calculated values without user's intervention.
- 3) Cells, returning calculated values of F, turn green if the resulting rendering force is satisfactory or turn orange if rendering force is not satisfactory and brake needs re-adjustment and repetition of the test till the F will be slightly less than BHC

PREPARED BY:  
NAME/RANK    SIGN:

TESTED BY:  
NAME/RANK

ACKNOWLEDGED BY:  
MASTER        SIGN:

*Annex 2 – Certificate of synthetic wire ropes*