

Marine Safety Investigation Report

File: EX-2020-54798228- -APN-JST#MTR

Type of accident: Very Serious Accident, one fatality

Accident: B/M Strategic Equity

Place: Servicios Portuarios S.A, Km 414,8 right bank of the Paraná River

Latitude: 32° 58,9 South; Longitude: 067° 37,03 West

Accident date: August 13, 2020

Date of notification to JST: August 19, 2020

Report date: September 23, 2021



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CONTENTS

NOTICE	5
INTRODUCTION	7
ABBREVIATIONS AND ACRONYMS	8
1 INTRODUCTION	10
2 FACTUAL INFORMATION	12
2.1 Operation Summary	12
2.2 Information on the Crew Members Involved in the Event	13
2.3 Assistance to Victims	16
2.4 Medical Information	16
2.5 Description of the Accident Site.....	16
2.6 Traffic Information	18
2.7 Hydrological and Meteorological Conditions at the Time of the Event	20
2.8 Information from Videos and Pictures	20
2.9 Information from Interviews	21
2.10 Safety Management System Information	24
2.11 Information from Previous Similar Events	24
2.12 Institutional Aspects.....	25



3. ANALYSIS.....	26
3.1 Triggering Factors	26
3.2 Operational Context	27
4. CONCLUSIONS	30
4.1 Conclusions of factors related to the accident.	30
4.2 Conclusions of other safety risk factors identified by the investigation.....	30
5. SAFETY RECOMMENDATIONS	31
6. APPENDIXES	33
6.1 TSIB. Safety Flyer 2017/01	33
6.2 Pictures.....	35

NOTICE

The mission of the Transport Safety Board is to contribute to transport safety through accident investigation and the issuance of safety recommendations by:

- (a) Determining the causes of transport accidents and incidents whose technical investigation is to be carried out.
- (b) Recommending effective actions aimed at preventing future transport accidents and incidents.

This report reflects the conclusions of the JST regarding the circumstances and conditions in which the event occurred. The analysis and conclusions of this report summarize the relevant information for safety management, presented in a simple and useful way for the marine transport community.

In accordance with the principles of the transport safety policy set forth in Article 2, Law 27514, the principle of "Technical Exclusivity" applies, whereby the investigation is limited to the identification of the factors that may have had an impact on the transport event, excluding the determination of administrative, civil or criminal liability, or the assignment of blame, the scope of which belongs to the judicial or administrative investigation, from which it is independent.

Pursuant to Law 27514:

The Transport Safety Board limits its jurisdiction to the investigation of the causes of accidents or incidents and the clarification of the circumstances in order to issue reports and/or recommendations aimed at increasing safety and fostering the prevention of accidents.

The results of this investigation do not condition or prejudice parallel administrative or judicial investigations that may be initiated.

The determination of civil or criminal liability or the assignment of blame to specific persons is prohibited.

Article 18. The purpose of the investigations carried out by the Transport Safety Board is the prevention of future transport accidents and incidents.



Article 19. In view of the purpose established in the preceding article, the use of the following is not admissible in judicial proceedings:

(a) Interviews within the framework of an investigation;

b) Tests or research. However, the Transport Safety Board may coordinate tests or research with the administrative or judicial authority in charge of the corresponding investigation when it plans to do so.

Article 20. The final reports of the Transport Safety Board do not aim at determining criminal guilt or fraude nor the civil liability of the accident and incident. They are independent of any other administrative or judicial investigation, not affecting any subjective interest; therefore, they are not subject to appeal or challenge, nor can they be admitted as evidence in any judicial proceeding.

INTRODUCTION

The Transport Safety Board (JST) adopted the systemic model for the analysis of accidents and incidents in the four modes of transport: aviation, road, rail and marine and inland waters.

The model has been widely adopted by leading institutions dedicated to the investigation of accidents and incidents in the four modes of transport at the global level.

The central premises of the systemic accident investigation model are as follows:

- ✓ The actions or omissions of front-line operational personnel and/or technical failures of equipment constitute the immediate or triggering factors of the event. These are the starting points of the investigation and are analyzed with reference to the defenses of the aeronautical system, as well as other factors, in many cases remote in time and space from the precise moment of the event.
- ✓ The system defenses have the goal of detecting, containing, and helping recover the consequences of the actions or omissions of front-line operational personnel and/or equipment failures. The defenses are grouped under three generic entities: technology, regulations (including procedures), and training.
- ✓ Finally, the factors that allow for an understanding of the front-line operational personnel's performance and/or technical failures, and for an explanation of the failure of the defenses are generally far away in time and space from the moment at which the event happened. They are denominated systemic factors and they are closely linked to elements such as the operational context, the rules and procedures, personnel training, safety management on behalf of the organization to which the operational personnel reports, and infrastructure.

The investigation included in this report is based upon the systemic model. It is directed towards identifying the factors related to the accident, as well as other safety risk factors that, although not causally related to the event under investigation, have a potential triggering effect under other operational circumstances. The aforementioned has the objective of formulating recommendations on viable, practical, and effective actions for the contribution of safety management.



ABBREVIATIONS AND ACRONYMS

AIS: Automatic Identification System

ETA: Estimated Time of Arrival

M/V: Motor Vessel

°C: Degrees Celsius

UTC: Coordinated Universal Time

JST: Transport Safety Board of the Argentine Republic

Km: Kilometer

M: Meters

MMSI: Maritime Mobile Service Identity

NNW: North-northwest

CPR: Cardiopulmonary resuscitation

SGS: Safety Management System

Tn: Register tons (volume) equal to 2,83 m³ (100 ft³)

Ton: Metric ton equal to 1000 kilograms

TSB: Transportation Safety Board of Canada

TSIB: Transport Safety Investigation Bureau of Singapore

VDR: Voyage Data Recorder (Registradora de datos de viaje)

VHF: Very High Frequency (30 y 300 Mhz)



VTs: Vessel Traffic Service



1 INTRODUCTION

On August 13, 2020, one of the crew of the Motor Vessel Strategic Equity IMO N° 9689902, was injured in the process of releasing the forward spring line which was had become trapped between the vessel and a wharf fender. During this attempt, the forward spring's tension from the fender was suddenly released and impacted on the face of a crew member who was performing the role of a signalman near cargo hold No. 1. The injuries sustained by the crewman resulted in death. The accident occurred at night, with artificial lighting and favorable weather conditions.

Motor Vessel Strategic Equity Information	
Name	Strategic Equity
IMO Number	9689902
Registration	398851
Call Sign	9V2290
Flag	Singapore
Port of Registry	Singapore
Ship type	Bulk carrier
Year of Build	2014
Ship Classification Society	Lloyd's Register
MMSI	565286000



Crew	21
Passengers	0
Length Overall	179,99 m.
Length between Perpendiculars	176,650 m.
Beam	30 m.
Depth	15 m.
Design Draught	10,5 m.
Arrival Draught	Bow = 4,60 m. Stern = 6,50 m.
Type of Hull	Steel
Displacement	48715.600 ton.
Gross Tonnage	24658 ton.
Net tonnage	13176 ton.
Deadweight	39839 ton.



Figure 1. Picture of the Motor Vessel Strategic Equity

2 FACTUAL INFORMATION

2.1 Operation Summary

The motor vessel Strategic Equity departed from Porto Alegre, Brazil to the port of Rosario, Argentina. On August 13, 2020, at 21:12¹, it began the berthing maneuver under Pilotage, at *Terminal Servicios Portuarios S.A.*, located at kilometer 414.8 on the right bank of the Parana River. At 22:42, the vessel completed the mooring maneuver port side alongside. One hour later, the chief officer gave the order to the crew to release the forward spring which, as he noticed, was trapped between the vessel and a wharf fender.

The boatswain went with two seamen to the forward station (Seaman A and Seaman B) to perform the maneuver. Seaman B positioned himself on the forecastle deck and took on the role of the signalman to signal the boatswain. The boatswain positioned himself at the winch, and Seaman A positioned himself at hold No. 1, next to where the mooring line was stuck. At 23:50, the loading

¹ The times in this report correspond to the Argentine Official Time (UTC -3).



operation began and, at 23:55, the maneuver to free the trapped mooring began. Three minutes after starting this maneuver, at 23:58, the mooring line suddenly broke free, straightened and violently discharged the accumulated energy impacting the chin of Seaman A. The watch officer immediately alerted the chief mate and the crew went to the location of Seaman A. At 00:20, an ambulance arrived at the accident site and provided medical assistance. At 00:50, the captain of the vessel was informed of Seaman A's death.

2.2 Information on the Crew Members Involved in the Event

Qualification and Role on Board the Strategic Equity	
Name of Certification	Post on board the Strategic Equity
Able Body Seaman	Boatswain
Able Body Seaman	Seaman A. (fatal victim)
Training Ordinary Seaman	Seaman B. Seaman in training. Signal-man.

Times on Board since Embarking the Strategic Equity	
Position	Days on Board
Boatswain	400 days
Seaman A	250 days
Seaman B	250 days



Position	Shifts between the Departure from Porto Alegre and the Arrival at the Roadstead of the Port of Rosario (prior to the day of the event).	Shifts on the Day of the Event 13 Aug 20
Boatswain	08:00 - 12:00 13:00 - 18:00	05:00 - 07:00 14:00 - 18:00 20:00 - 24:00
Seaman A	08:00 - 12:00 13:00 - 15:00 20:00 - 24:00	05:00 -07:00 (helmsman) 14:00 - 15:30 (anchoring) 20:00 – 24:00 (mooring maneuver and time on call)
Seaman B	08:00 - 12:00 13:00 - 15:00 20:00 - 24:00	06:00 - 12:00 20:00 - 24:00



Cargo	Hours on Call		Hours on Break
	13 Aug 20		13 Aug 20
	Work	Timeframe	Break
Seaman	8,5 hrs	05 - 08 14 - 1530 20 - 24	15,5 hrs
Boatswain	10 hrs	06 - 08 14 - 18 20 - 24	14 hrs
Seaman in training	5 hrs	13 - 16 21 - 23	19 hrs

Consequences	Crew	Other	Total
Fatalities	1	0	1
Missing	0	0	0
Others	20	0	20
Crew	21	0	21

2.3 Assistance to Victims

The injured crewmember was taken to the ship's hospital where he received first aid. Approximately 25 minutes after the accident, an ambulance arrived at the scene and 30 minutes later, the medical staff reported the death of seaman A. The Coast Guard reported the accident to the Federal Prosecutor's Office No. 3, which ordered certain procedures and authorized the transfer of the body to the judicial morgue.

2.4 Medical Information

The report of the medical personnel who assisted the crew member indicated that the victim presented cranial traumatism and cardiorespiratory arrest. He received CPR maneuvers, medical oxygen and adrenaline in the ambulance until 00:50 when death was declared. The coroner's report showed bilateral cranial traumatism with blunt cutting wounds and fracture.

Although the prosecutor in charge was requested a copy of the autopsy with a toxicological report, it has not been provided at the time of issuing this report.

On August 08, 2020, at 02:00, a breathalyzer test was performed on the first mate, the third mate, the boatswain and seaman B by the Master, in accordance with the Company's established procedures. They were all negative.

2.5 Description of the Accident Site

Terminals VI and VII of the Port of Rosario are composed of two berthing docks prepared for the loading of two vessels simultaneous and independently.

The terminal also has a coastal dock with an exclusive wharf of 9 meters or water depth and 280 meters long on which are mounted two 27 ton. Ganz cranes, with an independent grain transport system, to unload barges.



The berth is located approximately 100 meters from the main channel through which large vessels transit. This main channel has a navigable width of 200 meters in the dock sector of the port of Rosario located between Km 412.7 and 418.5 on the right bank of the Paraná River.

Traffic control in the area is under the jurisdiction of VTS Rosario (L6I) operated by the Rosario Coast Guard.

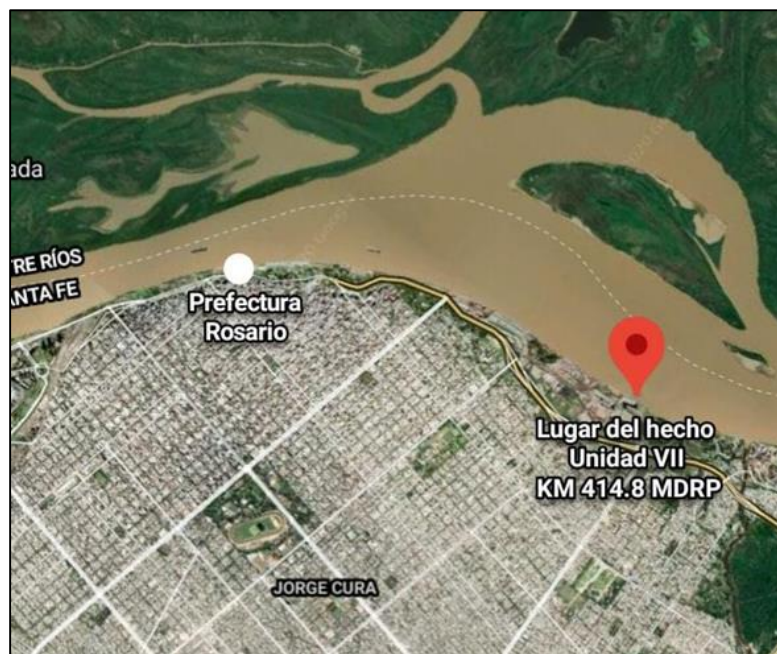


Figure 2. Unit VII, Rosario Coast Guard, wharf passage

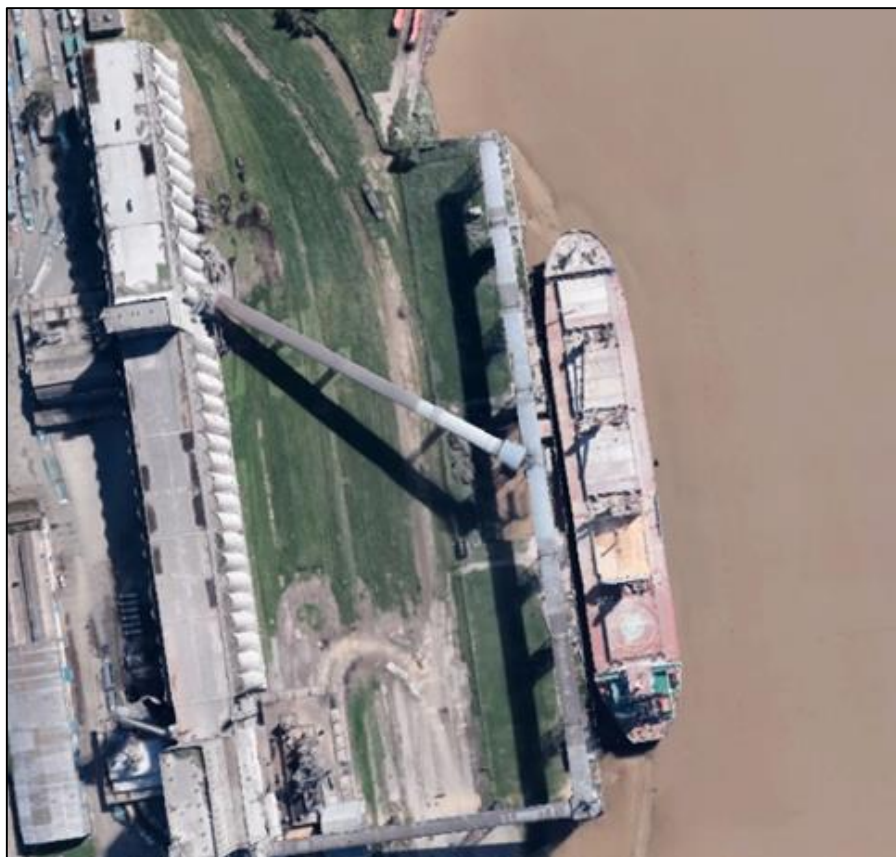


Figure 3. Port facilities. Unit VII

2.6 Traffic Information

The Strategic Equity's VDR recorded the communication with the ships "Bunga Lilac" and "Skyros". Both have ETA at Strategic Equity position close to the time of the accident.

Strategic Equity's VDR data	
Brand	FURUNO
Model	VR-3000
Manufacturer	FURUNO

The Rosario VTS logbook records confirmed the VDR communications detailed above.

The Coast Guard System of AIS National Server position log indicated the following:

- On August 13, 2020, the Motor Vessel Bunga Lilac twice passed Strategic Equity position approximately 200 meters from its berthing position. At 22:32, it did so in an upstream (North) direction. At 23:54, it did so downstream (South), at a speed of 8 knots, with a draught of 9.5 meters.
- On August 14, 2020, the Motor Vessel Skyros passed the M/V Strategic Equity at 00:17 upstream.

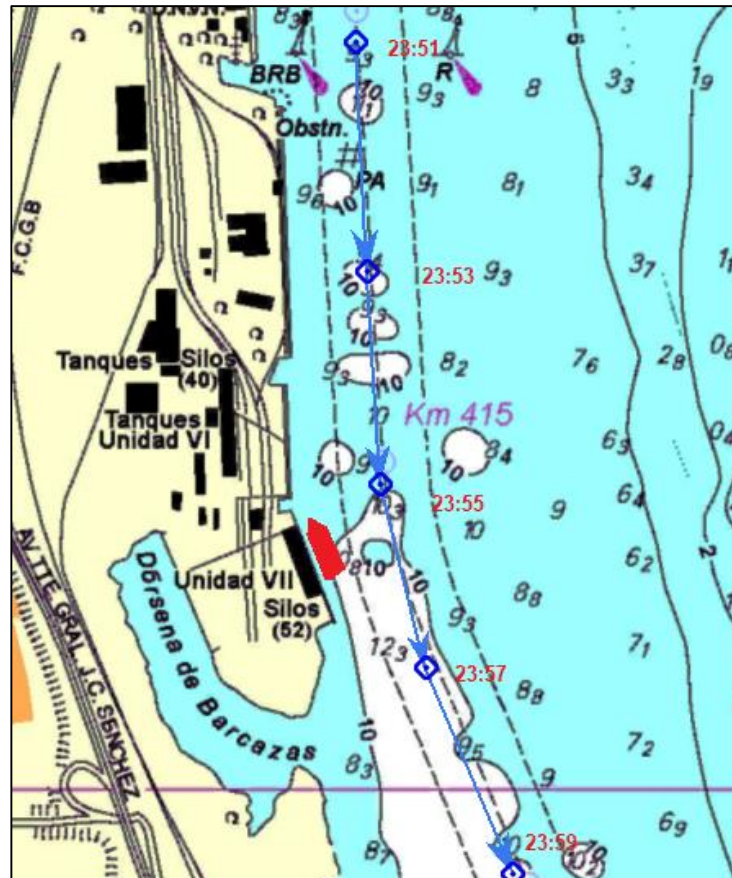


Figure 4- M/V Bunga Lilac's track



2.7 Hydrological and Meteorological Conditions at the Time of the Event

The meteorological conditions were favorable. The Paraná river registered an extraordinary low level.

Hydrological and Meteorological Information	
Wind	Direction: NNW Force: 2/3 Beaufort scale
Temperature	13°C / 14 °C
Hydrometric height	0.45 meters
Depth to Reference Level	9.80 meters
Actual Depth	10.25 meters
Visibility	Good
Lighting	Night condition. Artificial lighting provided by the port terminal and by the vessel.

2.8 Information from Videos and Pictures

The three crew members involved in the accident wore overalls, helmets and safety shoes.

2.9 Information from Interviews

As part of the investigation process, the personnel involved in the maneuver were interviewed.

They indicated that approximately at 23:40, prior to the start of the loading operation, the chief officer went down to the quay to read the draft and observed that a forward spring was trapped between the dock fender and the vessel's hull.

The Chief Officer contacted the boatswain by VHF radio and ordered him to free the trapped forward spring by slacking away the head lines.

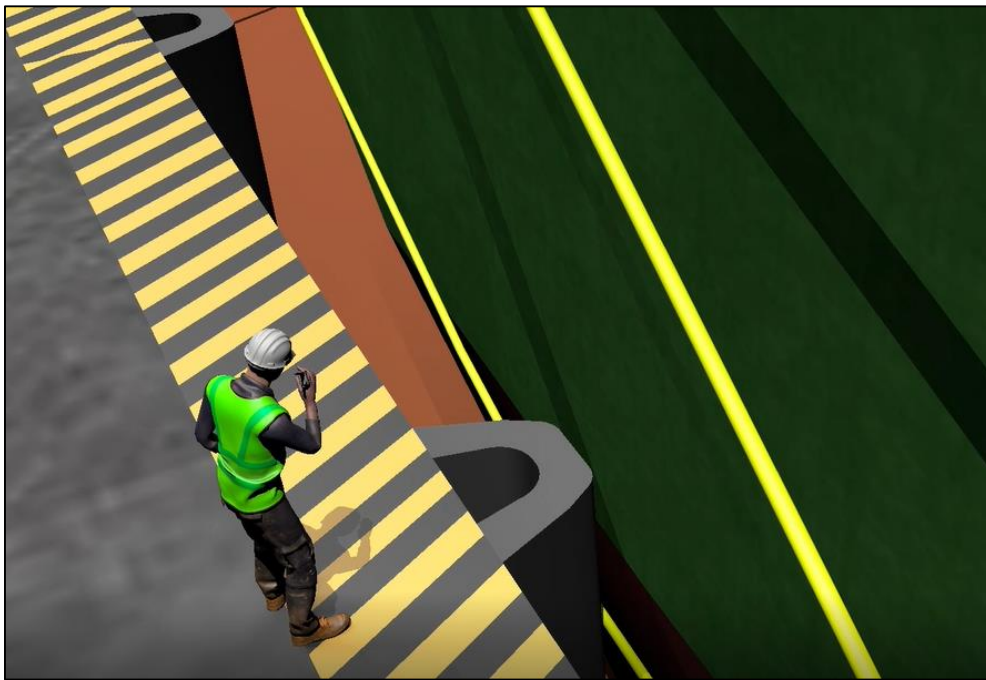


Figure 5-Sketch of the position of the mooring observed by the Chief Officer from the quay.

The boatswain stated that he went to the forecastle together with Seaman A and Seaman B, Seaman A was in charge of the signals, but he was out of the boatswain's line of sight. For this reason, Seaman A observed the state of the mooring and made the signals to Seaman B, who repeated the signals to the boatswain, who was in charge of operating the port winch.

Suddenly, the forward spring broke free from its trapped position, released energy abruptly and generated an elastic upward rectifying movement that caused the impact on Seaman A's chin.

Upon completion of the berthing, the moorings lines operated correctly, and after the mooring, the forward spring was not manipulated or repositioned, either on board or ashore.

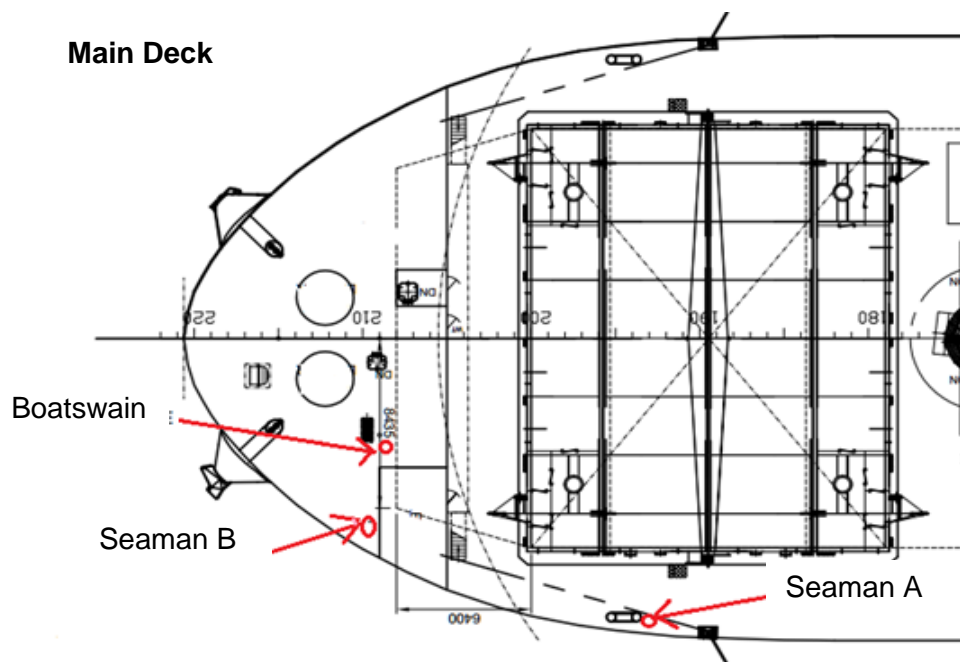


Figure 6- Location of the crewmembers

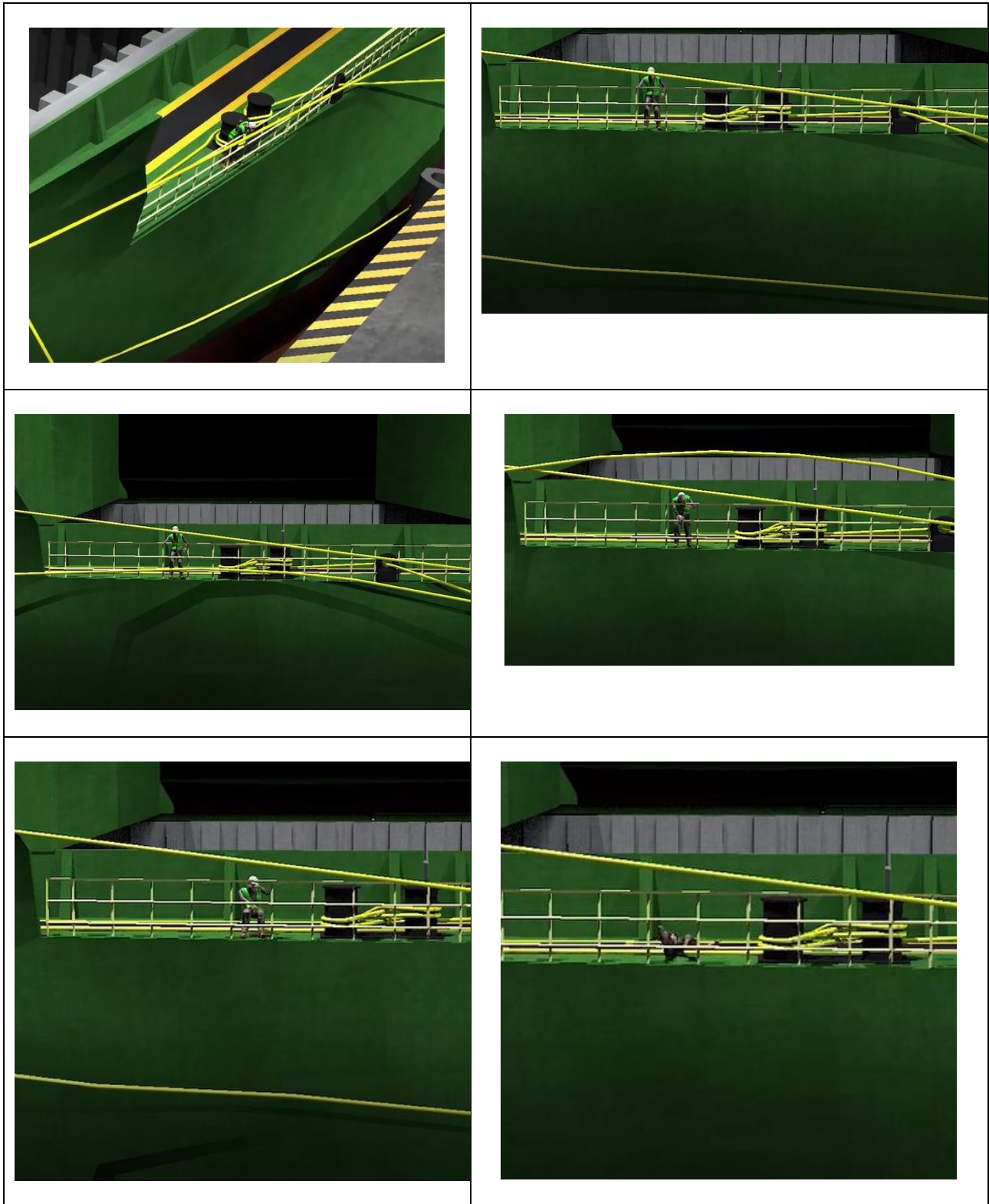


Figure 7- Mechanism of elastic release by energy accumulation



2.10 Safety Management System Information

It was found that procedure 0040 "Mooring Operations", in force at that time, categorized the handling of mooring lines as a high-risk activity and established operational guidelines related to mooring operations.

It was also determined that routine risk assessment activities should be carried out every three months, including the development of a list of risks associated with this task and the corresponding mitigation measures.

The latest risk assessment in force at that time did not include the risks and mitigation measures for the release of trapped moorings during the vessel's stay at dock.

The mooring operation procedure did not contemplate a specific section for mooring release maneuvers during the stay at port, and no section established the need to define a process to ensure that, during that stay, the close passage of other vessels did not occur simultaneously with the handling of moorings by the watchkeeping crew.

2.11 Information from Previous Similar Events

On May 22, 2017, in Port Trois-Rivières, Canada, on board the Singapore-flagged bulk carrier "Nord Quebec", the second mate was struck in the chin by a forward spring resulting in his subsequent death.

The investigation of the occurrence was conducted by Transportation Safety Board of Canada (TSB). The Marine Investigation Report M17C0060 and the Safety Flyer 2017/01, dated July 5, 2017, of TSIB of Singapore, were issued.

As a result of the investigation, the TSIB recommended incorporating mooring operations into the Safety Management System (SMS), including correct and incorrect actions to prevent accidents during maneuvers. The "Mooring Operations" procedure analyzed contemplates several precautions to be taken in the operation of mooring lines, although it does not have a specific section on the



release of mooring lines, nor the special precautions to be taken given the risk of sudden or unexpected release.

7. It is thus extremely important that mooring operations are recognised within the company's Safety Management Systems as operations that require a thorough risk assessment including the DO's and DON'Ts associated with such operations.

8. As a matter of good practice, personnel involved with mooring operations should be briefed and reminded before every operation to pay particular attention to the safety precautions to achieve a safe mooring operation and ensure proper communications at all times.

Figure 8- Recommendations made by TSIB in Safety Flyer 2017/01 dated July 5, 2017

2.12 Institutional Aspects

The vessel is owned by SBC EQUITY PTE. LTD. The commercial management was in charge of WORTHINGTON BULK LTD. The operational management was in charge of MTM SHIP MANAGEMENT, a company with extensive experience in the commercial maritime industry, with worldwide presence and responsible for the management of a large fleet of tankers and bulk carriers.



3. ANALYSIS

3.1 Triggering Factors

The analysis of the information gathered and the studies carried out during the investigation determined that the accident was triggered by a sudden release of the mooring when an attempt was made to free it from the trapped location at the fender. As a consequence, the spring impacted the chin of Seaman A, who was directly in the path of the release of the mooring rope when it released.

The purpose of the crew member's location was to observe the mooring and transmit the signals to a second signal man, who in turn had to repeat the signal to the winch operator, according to the activity plan.

It is likely that the interaction caused by the passage of another vessel (the 147 m long, 25 m beam Bunga Lilac) affected the moored vessel at the exact time of the mooring operation and contributed to its sudden and unexpected release.

It was also determined that the crew members involved in the maneuver were duly authorized to perform the tasks with mooring lines on deck, that they had complied with the regulatory rest period, and that the personal protection elements required for the maneuver were used.

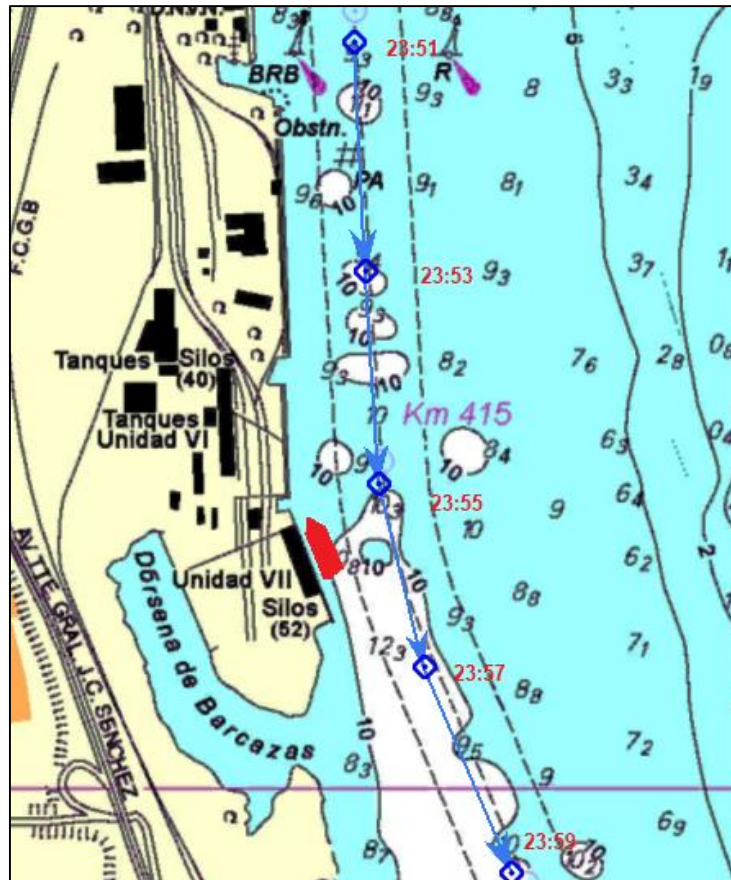


Figure 9- Moto Vessel Bunga Lilac's track

3.2 Operational Context

Understanding the performance of operating personnel is a necessary but not sufficient condition to determine the deeper factors linked to the occurrence of an event. Indeed, models describing the genesis of accidents and incidents maintain that the performance of front-line operators cannot be analyzed "in a vacuum", i.e. without a proper understanding of the operational context in which it occurs.

Thus, the description of elements such as processes, procedures and policies implemented for risk control is essential to identify the systemic factors involved in the accident and, therefore, to establish the most effective and appropriate recommendations capable of preventing its recurrence.



Operating procedures are a central piece for the adoption of safe practices and a fundamental defense to reduce the probability of deviations from the expected behavior during the execution of maneuvers. In these documents, the organization establishes the expected performance guidelines, according to the estimated risks for the different operations. The adequate design of procedures, the supervision of their application (or its counterpart, the so-called "practical drift") and the operational resources for front-line operators (such as checklists, procedure books, signage, etc.) are fundamental elements to control safety-related risks.

As indicated in section 2 of this report, the Strategy Equity vessel had, in accordance with the regulations in force, a set of procedures linked to the Safety Management System (SMS). Specifically, the practices related to mooring operations were covered by procedure 0040, called "Mooring operations".

Although the procedure established the precautions and provisions to be taken in a wide range of mooring operations, it did not define any concrete operational guidelines and precautions to be taken specifically linked to the release of moorings in a situation of entrapment during their stay in dock, such as the one that motivates the analysis of this accident. For example:

- ✓ No safety guidelines could be identified that would establish specific directives to ensure that the release maneuver of the trapped mooring was performed without the presence of nearby vessel traffic, in order to avoid interference by interaction due to the passing by of such vessels.
- ✓ The procedure did not include any guidelines for the evaluation (prior to performing the maneuver) of the potential displacement paths that an imprisoned mooring could experience in case of sudden release, with the objective of establishing non-traversable zones, or areas of safe positioning for the crew members during this task.
- ✓ Establishing a policy to avoid "line of fire" in these types of operations greatly decreases the likelihood of crew injury, even in the case of a sudden release of the mooring.
- ✓ In the quarterly risk assessment linked to the mooring operation, the risks related to the release of entangled moorings were not specifically addressed, nor were the mitigation measures to be taken in this regard.



- ✓ With respect to communications, the risk assessment for mooring operations established that signals should be made by the officer on watch and that he could, if necessary, use a second crew member to repeat his signals. However, this aspect was not indicated for the section of procedure 0040 where the obligation to keep the mooring lines taut at all times during the stay at the dock was established.
- ✓ Although the TSIB Safety Flyer 2017/01 recommends including the precautions to be taken in these types of operations within the Safety Management System (SMS) procedures, they were not included in the vessel's formal operating procedures.



4. CONCLUSIONS

4.1 Conclusions of factors related to the accident.

- ✓ There was a sudden release of the mooring that was pinned between the ship and the dock fender.
- ✓ With a high degree of probability, the sudden release of the mooring was favored by the interaction due to the passage of another vessel in the vicinity.
- ✓ Seaman A was located within the mooring movement risk zone due to the violent energy discharge effect of the mooring.
- ✓ No precautions were taken to ensure that the mooring release maneuver was performed in the absence of traffic movements.
- ✓ No specific section was defined in the "Mooring operations" procedure that establishes specific operational guidelines related to the mooring release maneuver in the event of an entrapment situation, such as the one that motivates the analysis of this accident.
- ✓ The recommendations of the TSIB Safety Flyer 2017/01 were not included in SMS operating procedures.

4.2 Conclusions of other safety risk factors identified by the investigation.

Does not apply.



5. SAFETY RECOMMENDATIONS

A: This Safety Recommendation (SR) is addressed to the following organizations:

1. Main national recipient: Argentina Coast Guard, as the competent authority for the implementation of the SMS onboard national vessels.
2. Main foreign recipient: The Company – MTM Shipmanagement.
3. Secondary recipients: Argentine Chamber of Owners of Fishing and Freezing Vessels (CAPECA); Argentine Chamber of Owners of Deep-sea Fishing Vessels (CAABPA); Argentine Chamber of Owners of Poleboats (CAPA), Navigation Center, as a group of maritime agencies representing ship owners operating in Argentine ports.

RSO N° 01-21

It is recommended to include specific processes within the SMS that include:

- ✓ The incorporation of a specific section on operating procedures for the release of moorings in a situation such as the one that motivates this report.
- ✓ The provision of a safe process of coordination among the crew members to prevent mooring maneuvers during the dock stay from being carried out during the passage of other vessels close to the mooring position.
- ✓ The obligation to carry out a risk assessment prior to the start of the mooring release task, including at least:
 - a definition of the possible displacement trajectory of the mooring in case of sudden release;



- the safe positioning zones to prevent a crew member from entering the line of fire, and
 - the establishment that this type of maneuver be carried out with an adequate number of duly qualified and trained personnel under the supervision of the officer on watch who, in turn, will be in charge of the signals, trying to avoid, whenever possible, the use of a second gangway.
-
- ✓ The definition of a clear and concrete training process on the safety measures incorporated in the SMS for the development of this task.
 - ✓ The definition of an operation supervision program to verify compliance with the defined standards.



6. APPENDIXES

6.1 TSIB. Safety Flyer 2017/01

**Transport Safety Investigation Bureau
Safety Flyer – 2017/1**

Accident involving mooring rope

Aim

1. This Safety Flyer¹ is issued with the intention of raising awareness of the known dangers involving mooring ropes and wires under strain².

Recent occurrences

2. On two separate accidents during berthing operations under pilotage, involving two distinctly different type of ships, one being a bulk carrier, and the other being an oil tanker, the forward spring rope got stuck at the shore fender in the course of being picked up after being secured to the shore mooring hook.

3. The matter was reported to the Bridge by the mooring crew of the respective vessels. To facilitate release of the mooring rope from its stuck position, the assist tug's power was eased off. At about the same time, the stuck mooring rope jumped upwards striking the ship's personnel in-charge of the mooring operation, who was standing next to the railing assessing the status of the rope. It is likely that the mooring rope's slack was picked up almost at the same time as the tug eased off its power to facilitate the released of the stuck rope.

4. While one of the occurrences resulted in serious injuries, the injured crew member fortunately subsequently recovered from his injuries.

5. However, the other occurrence resulted in an unfortunate event as the officer did not survive the injuries sustained. A safety investigation is underway into this occurrence with a view to identify lessons learned and prevent recurrence.

Precautions to be taken

6. It must be recognised that under strain, mooring ropes and wires are expected to have tremendous amount of energy stored in them which can, and will be released once the environment under which the strain occurs, changes. This may be as a result of failure of the ropes / wires parting or simply being catapulted as a rubber band. These changes may be sudden and not readily apparent to officers and crew.

¹ The contents contained in the flyer are based on prima-facie evidence available at the time of publishing and do not intend to undermine or bias the investigation findings that may be published at a later date.
² Code of Safe Working Practices (21) September 2015, introduced additional guidance on snap-back zones and advised that the entire area of a mooring deck should be considered a potential snap-back danger zone. Snap-back zones are typically spaces where it is anticipated a failed mooring line could recoil.

Date of Issue: 5 July 2017 Singapore

Figure 10. Safety Flyer 2017/01 page 1

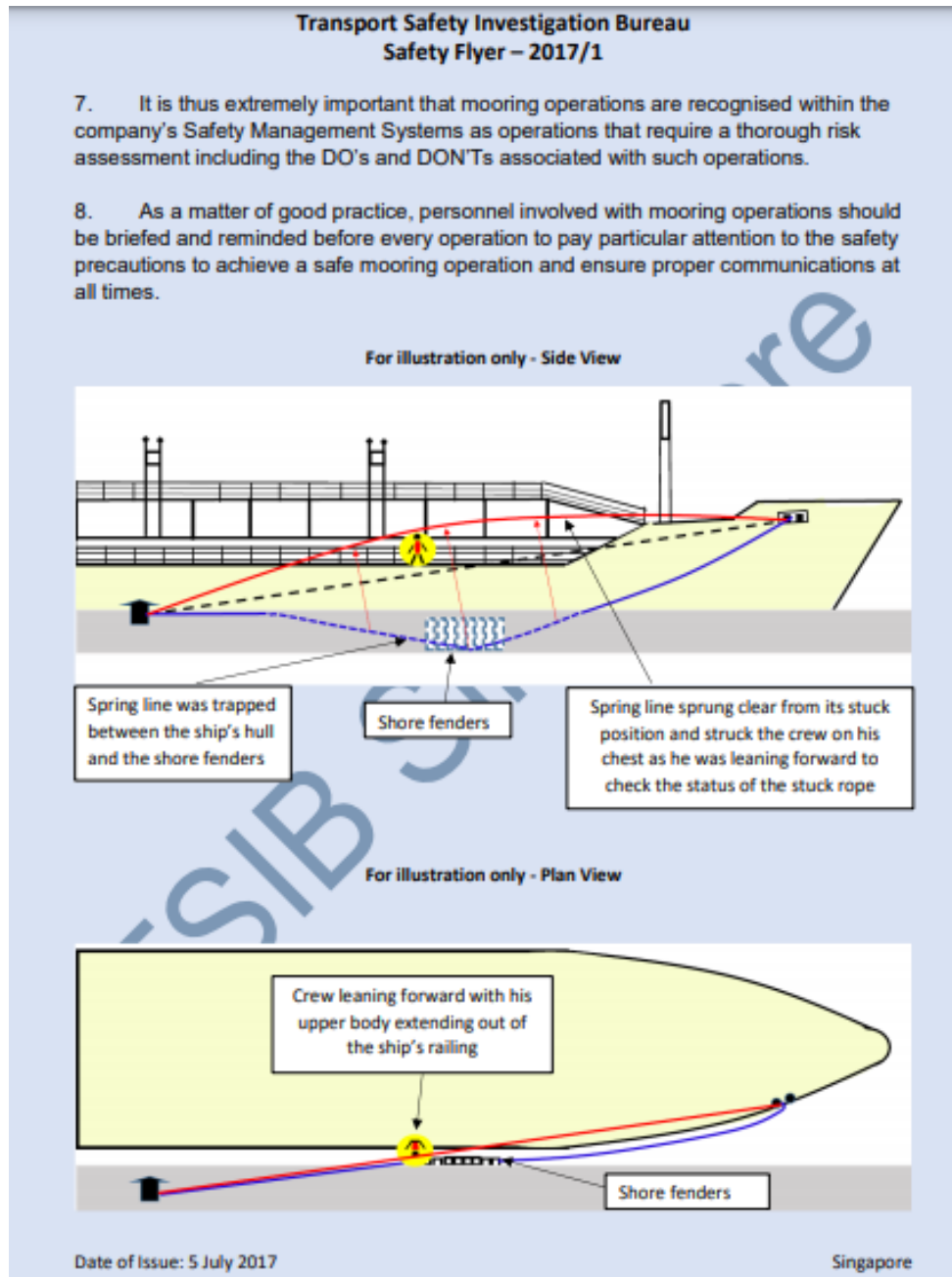


Figure 11. Safety Flyer 2017/01 page 2

6.2 Pictures

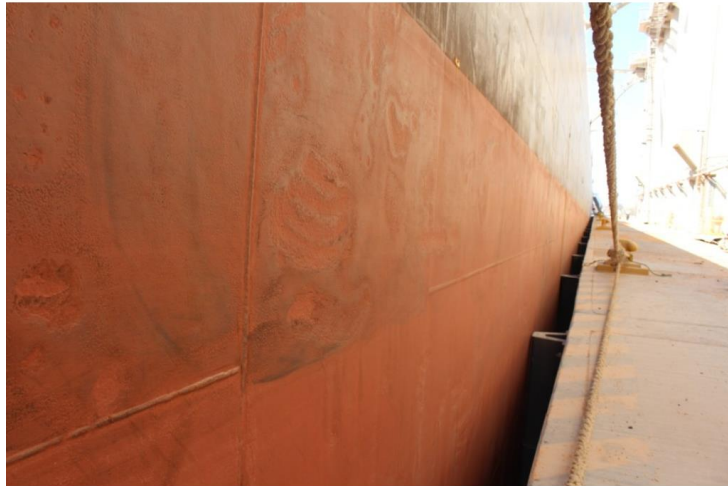


Figure 12. Photo of the bollard involved



Figure 13. Photo of the quay fender involved



República Argentina - Poder Ejecutivo Nacional
2021 - Año de Homenaje al Premio Nobel de Medicina Dr. César Milstein

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