



HELLENIC REPUBLIC



HELLENIC BUREAU FOR MARINE CASUALTIES INVESTIGATION

**MARINE CASUALTY SAFETY INVESTIGATION REPORT
05/2018**

**Death of Security Guard
during embarkation on M/T ZEFYROS**



September 2023

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Foreword

The Hellenic Bureau of Marine Casualties Investigation (HBMCI) established by Law 4033/2011 (Government Gazette 264 A/ 22 December 2011), within the scope of enforcement of the European Directive 2009/18/EC.

HBMCI conducts safety 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 prepared 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.

Its purpose is to comprehend and present the sequence of the events that occurred on 24th of December, 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 purposes other than those for which it has been produced, may lead to misleading conclusions.

The investigation report has been prepared in accordance with the format in Annex I of the relevant law and references to times refer to local time (UTC +2).

Under the above framework HBMCI has examined the events, circumstances and contributing factors that led to the death of a Security Guard during the boarding procedure on M/T ZEFYROS, Panama Flag and IMO No: 9515917 underway in the Red Sea.

Glossary of abbreviations and acronyms

1	AB	Able Seaman
2	Bfrs	Force of wind in Beauport scale
3	CoC	Certificate of Competency
4	CPR	Cardiopulmonary resuscitation
5	DOC	Document of Compliance
6	IMO	International Maritime Organization
7	ISM	International Management Code for the safe operation of ships and for pollution prevention
8	Knots	Unit of speed equal to one nautical mile (1.852 km) per hour
9	LT	Local time
10	MEPC	The IMO Maritime Environmental Protection Committee
11	MSC	The IMO Maritime Safety Committee
12	MT	Metric tones
13	M/T	Motor Tanker
14	OS	Ordinary Seaman
15	SG	Security Guard
16	SMC	Safety management Certificate
17	SMS	Safety management System
18	SOLAS	Convention for the Safety of Life at Sea 1974, as amended
19	STCW	International Convention on Standards of Training, Certification and Watchkeeping for seafarers
20	UAE	United Arab Emirates
21	UTC	Universal coordinated time

1. Executive summary

On the 24th of December, 2018 M/T ZEFYROS (figure 1) was underway in the Red Sea and was heading to the port of Fujairah (UAE). She was planned to navigate through the Gulf of Aden and due to piracy risks her Managing Company had arranged to board a Team of three Security Guards (SG).



Figure 1: M/T ZEFYROS

At about 11.00 ZEFYROS was underway with low speed at the meeting position. At 11:04 a service boat was alongside and the leader of the Security Team boarded safely via the pilot ladder. At 11:06 the second member of the Team started to step onto the pilot ladder. However, before reaching the main deck he stopped. Then he tried to continue but he felt faint; he was breathing

heavily and his face was turning pale. He was caught to step down the pilot ladder in order to return to the service boat.

As he was stepping down, he lost his grip from the ladder's ropes and fell down from a height of approximately 6.5 m. He hit with his hip onto the service boat's fender and fell into the sea in position Lat: 16° 51'.1 N and Long: 040° 08'.3 E.

Immediately after, the service boat's crew tried to recover him, however without result. At the same time the Chief Officer of ZEFYROS reported the emergency "man overboard" situation to the Master on the bridge. The Master ordered to stop the engine; set the rudder hard to port and a lifebuoy was thrown by the deck crew. During the rescue actions the SG was seen to be conscious and calling for rescue by waving his hands.

At approximately 11:10 he was recovered from the sea by the service boat's crew. The service boat headed immediately to the offshore Supply Ship TRINITY LONDON, in order to transfer the casualty and be provided with First Aid. Nevertheless, it was reported that during the transfer the SG had no vital signs and was considered dead.

The safety investigation identified that the immediate cause of the marine casualty was that the SG lost his grip whilst climbing the pilot's ladder probably due to his sudden unwellness.

It was further immersed that contributing factors leading to his fall and eventually to the loss of his life namely included:

- Not following the measures provided by the respective Risk Assessment form and the Company's procedures for the task assigned.
- not using a safety harness during the embarkation procedure;

On the above grounds one safety recommendation was addressed to the Managing Company to amend the Safety Management Manual.

2. Factual Information

2.1 Ship's particulars

Name of Vessel	ZEFYROS
Call Sign	3FFL3
Company (ISM Code A 1.1.2)	BENETECH SHIPPING S.A.
Ownership	ZEFYROS TRADING S.A.
Flag State	PANAMA
Port of Registry	Panama
IMO Number	9515917
Type of Vessel	Oil/Chemical Tanker
Classification Society	Bureau Veritas
Year built	2003
Material	Steel
LOA (Length Over All)	183,0 m
BOA (Breadth Over All)	32.20 m
Deadweight	49.999
Gross Tonnage	29.924
Net Tonnage	13.429
Main Engine	MAN B&W 6S50MC-C
Engine Power	12800 BHP
Document of Compliance	Issued by BV on 10 December 2018
Safety Management Certificate	Issued by BV on 10 December 2018

2.2 Weather data

Wind – direction	2bf - NE
Wave height	Calm
Visibility	Clear
Light/dark	Light
Atmospheric temperature	28°

2.3 Voyage particulars

Port of origin	Rabich, Saudi Arabia
Port of call	Fujairah, U.A.E.
Type of voyage	International
Cargo information	35.688,20 MT reformat
Crew on board	20
Minimum safe manning	14

2.4 Marine casualty information

Type of marine incident	Very serious marine casualty
Date, time	24 th of December 2018 at 11:10 LT
Location	Red Sea
Position	Lat:16° 51',1 N, Long: 040° 08',03 E
Ship's operation, voyage segment	Underway
Place on board	Pilot's ladder
Consequences to individuals	Yes / Security Guard lost his life
Consequences to environment	No
Consequences to property	No

3. Narrative

It is noted that information of ZEFYROS Master and crew members involved in the boarding operation was sought; nonetheless it was not possible to obtain it from the involved parties. Due to the fact that the marine casualty occurred while ZEFYROS was at sea and her trading schedule, the investigation team could not attend her after the casualty and for this reason the investigation activities were conducted at the port of Gent in Belgium.

3.1 M/T ZEFYROS underway in the Red Sea

On 24th of December 2018, M/T ZEFYROS under Panama flag laden with 35.688,20 MT of reformate departed from the port of Rabigh (Saudi Arabia) heading to the port of Fujairah (UAE). As ZEFYROS was going to pass through the Gulf of Aden, a high-risk piracy and armed robbery against ships area, on 23th of December 2018 her Managing Company contracted with a security company and hired three Security Guards to board the vessel.

According to the arrangements made, two SGs who were based on the offshore Supply Ship TRINITY LONDON (Fig. 2), operating as base ship for accommodating Security Guards, were to be transferred on board ZEFYROS by a service boat. The embarkation point had been agreed through correspondence in position Lat: 16° 51,1' N and Long: 040° 08,3' E, that is about 50 n.m east of Eritrea coastline, in the Red Sea.



Figure 2: Supply Ship TRINITY LONDON

At 10:30 LT the service boat “OW267” (fig. 3) left TRINITY LONDON with two SGs and picked up another one from another service ship named ALADIN at around 10:40 and headed to towards the meeting position with ZEFYROS.



Figure 3: The service boat “OW267” (photo taken from M/T ZEFYROS)

By that time the crew of ZEFYROS was preparing the embarkation equipment and arrangement. More specifically the Bosun, the OS and the Cadet were assigned by the Chief Officer to rig the pilot ladder on the port side. The total freeboard was reported to be approximately 8.2 m. The pilot ladder was rigged 1.5 m over the sea level taking into account the service boat freeboard.

3.2 The Security Guards boarding

At 10:58 LT M/T ZEFYROS was sailing at approximately 3 Knots with dead slow ahead. By that time the service boat OW267 was approaching ZEFYROS with her starboard side in order to reach the pilot ladder first steps and facilitate the stepping on the ladder and boarding of the Security Team.

The pilot's ladder (fig. 4) was rigged on to the ship's port side almost 1.5 meters above the waterline and was securely fixed on the main deck. Additionally, two-man ropes were fitted on each side and were securely fixed on ship's rails. An indicative sketch of the arrangement is shown in fig. 5.



Figure 4. The pilot ladder that was used for the embarkation of the Security Guards.

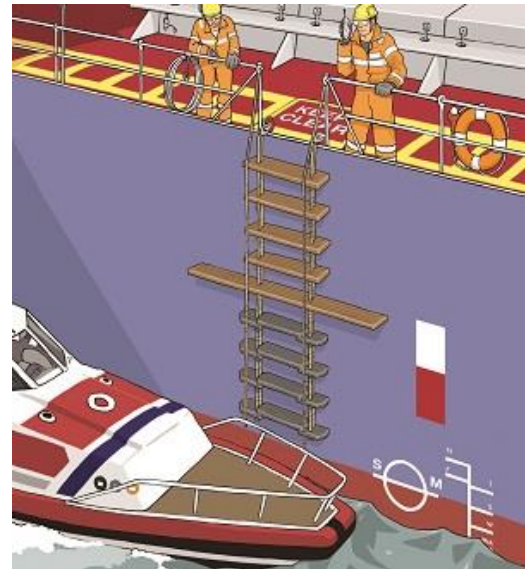


Figure 5. Indicative sketch of the pilot's ladder arrangement

The Chief Officer that was supervising the boarding procedure was carrying a portable VHF to communicate with the bridge. The Bosun, the OS and the Cadet were on spot.

Figure 6, was sourced through the web and it depicts indicatively the pilot ladder arrangement on Zefyros port side. It does not represent the actual pilot ladder rigging on the day of the marine casualty.

As ZEFYROS was underway making 3 knots, the Service boat came alongside ZEFYROS and contacted her with its starboard side and its foredeck beneath the pilot ladder.



Fig. 6: Pilot's ladder arrangement

As ZEFYROS was underway making 3 knots, the Service boat came alongside ZEFYROS and contacted her with its starboard side and its foredeck beneath the pilot ladder.

3.3 The occurrence

At approximately 11:04 LT, while the Service boat was underway alongside ZEFYROS port side beneath the pilot ladder, the team leader of the SGs, wearing a life jacket, step on to the ladder and started climbing. He completed ascending the pilot ladder and safely boarded on the vessel.

At 11:06 LT the second member of the Team stepped on the pilot ladder's rung, wearing a lifejacket and moved up to the deck. However, 2-3 meters before reaching the deck, he stopped. According to statements he looked tired and had stopped to take a breath.

Shortly after, at approximately 11:08 he tried to continue but he was seen not to be able to do so probably due to the fact that the 7m climb exhausted him to the point that he could no longer advance the ascending.

According to information gathered during the safety investigation he was breathing heavily and his face was looking pale. Based on his following action, he had decided to return to the service boat and started to stepping down the pilot ladder.

At that time the third SG who was on the service boat bow, realized that his colleague was not well and he immediately asked the skipper to move the service boat away from the vessel's side. However, the skipper did not perceive or pay any attention to his request and kept the service boat underway alongside ZEFYROS port quarter.

Seconds after the SG lost his grip and fell down from a height of about 6.5 meters. He hit with his hip onto the boat's deck and then fell into the sea between the vessel's port side and the service boat in position Lat: 16° 51', 1 N and Long: 040° 08', 3 E.

3.4 Emergency response actions

Directly after, the Chief Officer reported to the Master the "Man Overboard" emergency situation and ordered the OS to throw the lifebuoy, that was placed on spot for the embarkation operation.

At the same time, the Master ordered the helmsman to set the rudder hard to port; stopped the engine and ordered an AB to keep a sharp look out and to watch the "man over board" position.

According to information collected during the investigation process, the Security Guard overboard was seen to be conscious and was asking for help by waving his hands. Soon after, the service boat maneuvered towards the "man over board" and approached him (figures 7 & 8).



Figure 7: The service boat is proceeding towards the "man over board".



Figure 8: The service boat is approaching the “man over board”.

The first attempt to recover him from the sea was not successful. Finally, at approximately 11:20, almost ten minutes after the occurrence, the SG overboard was recovered from the sea by his colleague and the crew of the service boat. The Skipper of the service boat immediately headed to TRINITY LONDON that was about 20 minutes of sailing away in order to seek for First Aid and Medical Assistance.

The SG on board the service boat, requested from the skipper an oxygen resuscitator in order to provide first aid to the recovered from the sea SG that was breathing heavily yet first aid equipment was not available on board. The SG administered CPR to the casualty however it was reported that by that time he had lost consciousness and was not responding to CPR. Approximately 10 minutes before approaching the Supply Ship TRINITY LONDON, no vital signs could be detected.

Based on the information collected, the service boat came along side TRINITY LONDON, almost 15 minutes following the recovery of the casualty from the sea, at approximately 11:35. The SG on board the service boat having realized that the emergency had not been reported to TRINITY LONDON by the Skipper, alerted the crew on board and urged for medical treatment.

It was reported that 20 minutes following the service boat mooring alongside TRINITY LONDON, the oxygen resuscitator was provided, however by that time the casualty had no vital signs.

After the casualty was transferred on board TRINITY LONDON, the service boat returned to ZEFYROS in order to board the 3rd SG onto the vessel.

3.5 Cause of Death

Based on the reported information gathered during the investigation process the Security Guard is considered to have suffered of malaise symptoms and weakness that caused his fall from a height of about 5 m and hit on the service boat fender.

According to the autopsy carried out in Greece his death is attributed to severe injuries on abdomen and thoracic cavity that caused traumatic subarachnoid hemorrhage. Moreover, the toxicology examination report did not show that the victim was alcohol or drugs intoxicated.

3.6 The Security Guard

The Security Guard was 51 years of age. He was a holder of a certificate for “Ship’s designated Security Duties” issued by Belize Marine Training Center SA on 14 September, 2017.

He had also attended a Basic training for personal survival techniques and fire prevention and firefighting and was holding an adequate certificate issued on 13 March 2017 by the Belize Marine Training Center SA. His certificates were recognized by the Flag Administration of ZEFYROS and the Company he was working with was authorized by the same Administration to provide security services on board ships flying her Flag.

On 03 September 2018, he had successfully passed a set of medical examinations and had a medical certificate valid for 2 years. He was found fit to carry out his duties and to carry weapons. On the same date he had also underwent alcohol and drug tests that were found negative.

3.7 The crew of Zefyros

ZEFYROS’s Minimum Safe Manning certificate, pursuant to SOLAS Regulation V/14 as applied, stipulated a crew of 14 seafarers. At the time of the marine casualty, the vessel had a crew complement of 20 seafarers (see table 1) of the same nationality and the working language on board was Georgian.

Master	01	Chief Engineer	01
Chief Officer	01	Second Engineer	01
Second Officer	01	Third Engineer	01
Third Officer	01	Electrician	01
Deck cadet	01	Apprentice Electrician	01
Bosun	01	Pumpman	01
Able Seamen	03	Fitter	01
O.S.	01	Oilers	02
		Wiper	01

Table 1. ZEFYROS crew complement.

According to the vessel’s Safety Management Manual records, sufficient training and familiarization had been carried out on board and the crew was aware of the safety and emergency procedures.

4. Analysis

The purpose of the analysis of the examined marine casualty is to determine the causal and contributing factors and circumstances that led to the Security Guard’s fatal injury, taking into account the sequence of events and the collection of evidence and information focusing on specific points of their temporal evolution, as well as to their root causes in order to draw useful conclusions leading to safety recommendations with the aim to prevent similar marine casualties in the future.

4.1 Piracy and armed robbery against Ships at the Coast of Somalia & Gulf of Aden

The International Maritime Organization has rigorously addressed the important matter of piracy and armed robbery off the coast of Somalia, in the Gulf of Aden and the wider Indian Ocean. The Organization, with support and cooperation from States involved or concerned on the matter and the shipping industry, has through the years developed and adopted a number of antipiracy measures in order to mitigate the negative impact caused by illicit acts.

In 2009, IMO organized the Djibouti Meeting¹ during which the following implementing measures were agreed:

Resolution 1: titled as “The Code of Conduct concerning the repression of Piracy and Armed Robbery against ships in the Western Indian Ocean and the Gulf of Aden (The Djibouti Code of Conduct);

Resolution 2: on Technical co-operation and assistance;

Resolution 3: on Enhancing Training in the Region; and

Resolution 4: on Expressions of Appreciation. The “Djibouti Code” was revised in 2017 and it is known as the «Jeddah Amendment to Djibouti Code of Conduct 2017».

4.2 Privately Contracted Armed Security Personnel (PCASP) - legal framework

Privately Contracted Armed Security Personnel (PCASP) legitimate basis to board ships in order to provide additional protection against piracy when they navigate in high risk areas² such as the Western Indian Ocean and the Gulf of Aden falls within the Flag States’ policy and their respected legal framework as well as Port States’ and Coastal States’ national legislation.

The issue has been addressed through guidance to Flag States, port States and Coastal States; to shipowners, ship operators and shipmasters as well as through guidance to private maritime security companies.

The aforementioned matters have been examined and elaborated by IMO Maritime Safety Committee and suitable guidance and best practices have been stipulated namely with the following Circulars listed in following table (2):

Table 2: MSC Circulars for Piracy and Armed Robbery

MSC.1/Circ.1332 issued in June 2009	<i>“Piracy and armed robbery against ships - Recommendations to Governments for preventing and suppressing piracy and armed robbery against ships”;</i>
MSC.1/Circ.1334, issued in June 2009	<i>“Piracy and armed robbery against ships - Guidance to shipowners and ship operators, shipmasters and crews on preventing and suppressing acts of piracy and armed robbery against ships”</i>
Guidance for Shipowners, ship operators, and shipmasters	
MSC.1/Circ.1405 issued in May 2011 revoked by	<i>“Interim guidance to shipowners, ship operators, and shipmasters on the use of Privately Contracted Armed Security Personnel on board ships in the high risk area”;</i>
MSC.1/Circ.1405/Rev.1 issued in September 2011, revoked by	<i>“Revised interim guidance to shipowners, ship operators, and shipmasters on the use of Privately Contracted Armed Security Personnel on board ships in the high risk area”;</i>
MSC.1/Circ.1405/Rev.2 issued in May 2012	<i>“Revised interim guidance to shipowners, ship operators and shipmasters on the use of Privately Contracted Armed Security Personnel on board ships in the high risk area”;</i>
Guidance for Flag States	
MSC.1/Circ.1406 issued in May 2011	<i>“Interim recommendations for Flag States regarding the use of Privately Contracted Armed Security Personnel on board ships in the high risk area”</i>

¹ Attended by State delegations: Comoros, Djibouti, Egypt, Ethiopia, France, Jordan, Kenya, Madagascar, Maldives, Oman, Saudi Arabia, Seychelles, Somalia, South Africa, Sudan, United Republic of Tanzania, Yemen.

Observers: Canada, Iran, India, Indonesia, Italy, Japan, Nigeria, Norway, Philippines, Singapore, United Kingdom, United States, United Nations bodies, European Commission, INTERPOL, NATO, Baltic and International Maritime Council (BIMCO), International Association of Independent Tanker Owners (INTERTANKO) and others.

² High Risk Area: an area as defined in the “Best Management Practices for Protection against Somalia Based Piracy” introduced by MSC.1/Circ.1339, unless otherwise defined by the flag State.

MSC.1/Circ.1406/Rev.1 *“Revised interim recommendations for Flag States regarding the use of Privately Contracted Armed Security Personnel on board ships in the high risk area”* issued in September 2011, revoked by

MSC.1/Circ.1406/Rev.2 *“Revised interim recommendations for Flag States regarding the use of Privately Contracted Armed Security Personnel on board ships in the high risk area”* issued in May 2012, revoked by

MSC.1/Circ.1406/Rev.3 *“Revised interim recommendations for Flag States regarding the use of Privately Contracted Armed Security Personnel on board ships in the high risk area”* issued in June 2015

Guidance for Port and Coastal States

MSC.1/Circ.1408 *“Interim recommendations for port and coastal states regarding the use of privately contracted armed security personnel on board ships in the high risk area”* issued in September 2011 revoked by

MSC.1/Circ.1408/Rev.1 revised interim recommendations for port and coastal states regarding the use of privately contracted armed security personnel on board ships in the high risk area issued in May 2012

Under the aforementioned legitimate framework applied, the Managing Company of M/T ZEFYROS had contracted a Private Maritime Security Company in order to deploy three-armed Security Guards to board ZEFYROS prior to her passage through the Gulf of Aden.

The Private Maritime Security Company was authorized by the Flag State of ZEFYROS to provide Armed Security Personnel services as onboard ships its flagged vessels when transiting High Risk Areas.

4.3 International legislation for boarding arrangements

Persons’ embarkation or disembarkation from vessels while underway is considered as a procedure that is regulated under the respective provisions for “Pilot embarkation”.

1. Safety of Life at Sea Convention (SOLAS), Chapter V “Safety of Navigation”, Regulation 23 as amended in 2010 by IMO Resolution MSC.308(88), set outs the minimum standards for the “Pilot transfer arrangements”.

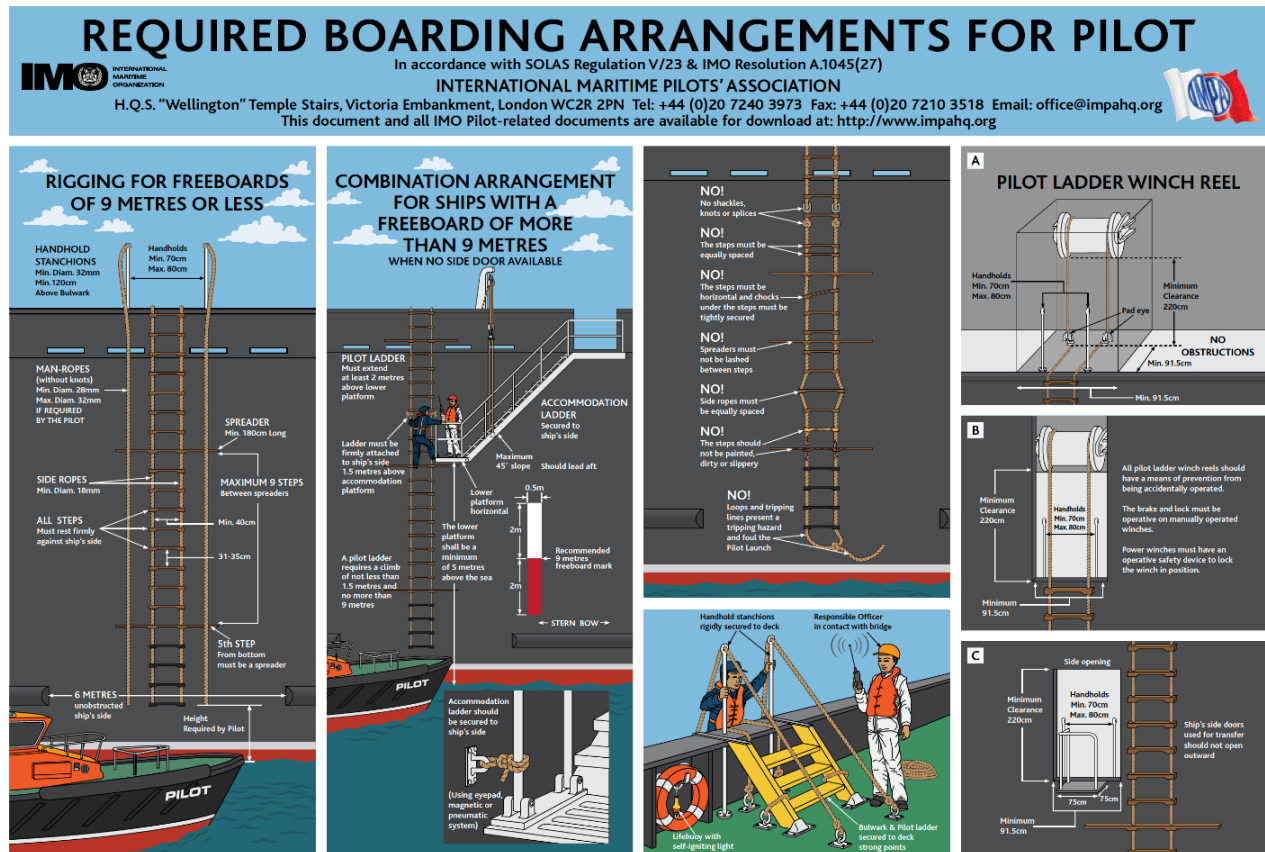


Figure 9. Poster of the pilot’s ladder arrangement of less and more than 9m, in accordance with SOLAS Regulation V/23 and IMO Resolution A.1045 (27).

More specifically the aforementioned principal framework elaborates safety aspects to be observed and followed such as:

- proper maintenance, storage, inspection, record keeping and manufacturers’ certification for the equipment/arrangements;
 - arrangements to be used solely for the embarkation and disembarkation of personnel;
 - transfer arrangements equipment to be used for each side of a vessel;
 - safe and convenient access;
 - pilot ladder to be used when a climb of not less than 1.5 m and not more than 9 m above the surface of the water is required;
 - a combination arrangement of a pilot ladder and an accommodation ladder to be used when the distance from the surface of the water to the point of access to the ship is more than 9 m (fig. 9);
 - safe access to ship’s decks;
 - associated equipment ready for immediate use when persons are being transferred: two man-ropes; a lifebuoy equipped with a self-igniting light; a heaving line;
2. Adequate lighting to illuminate the transfer arrangements overside and the position on deck when a person embarks or disembarks.
 3. IMO Resolution A.1045 (27)³, adopted in 2011, as partially amended by IMO Res. 1108 (29) in 2015, foresees detailed specifications⁴ on “Pilot transfer arrangements” and stipulates requirements such as pilot ladders position and construction, steps, side ropes, handrails and handgrips, securing points, point of access, combination arrangement (pilot ladder and accommodation ladder) etc.

³ Revoked Res.A.889 (21) adopted on 25 November 1999 on PILOT TRANSFER ARRANGEMENTS.

⁴ Referring to the recommendations by the International Organization for Standardization, in particular publication ISO 799:2004, Ships and marine technology - Pilot ladders.

4. Aforementioned technical requirements are supplemented by MSC Circulars, as quoted in below table (3) which refer to issues that are not covered by the applied legal framework or needed interpretation.

Table 3: MSC Circulars on Pilot Transfer Arrangements

MSC.1/Circ.1402 June 2011	Safety of Pilot Transfer Arrangements	encourage Member States to formally include pilot transfer arrangement as part of the safety equipment to be inspected by Port State control
MSC.1/Circ.1375/ Rev.1 May 2012	Unified interpretation of SOLAS Regulation V/23	a revised unified interpretation of SOLAS regulation V/23 concerning the installation date of pilot transfer equipment and arrangements
MSC.1/Circ.1428 May 2012	Pilot Transfer Arrangements	amendments to the poster "Required Boarding Arrangements for Pilots" previously circulated under MSC/Circ.568/Rev.1
MSC.1/Circ.1495/ Rev.1 November 2016	Revised unified interpretation of SOLAS Regulation V/23.3.3	unified interpretation of SOLAS regulation V/23.3.3 on Pilot transfer arrangements

The aforementioned context, as already stated, elaborates mainly technical requirements and specifications for the pilot ladders and combination pilot ladders arrangements, hence the safe boarding and embarkation operation of a pilot, crew or person at sea falls within the scope of the International Safety Management Code and more specifically under Chapter 7 "Shipboard Operations".

4.4 International Safety Management Code

The International Safety Management Code, as applies, is mandatory under SOLAS Chapter IX. The Code lays down the principal standards for the safe operation and management of ships and the prevention of pollution.

The ISM Code sets up the obligations for a safety management system and policy to be developed; established and implemented by the Company and its operating vessels in order to meet the requirements of the Code in compliance with the International Instruments, Rules and Regulations as well as to make sure that applicable codes; guidelines and standards recommended by the International Maritime Organization, Maritime Administrations, Classification Societies and maritime industry Organizations are taken into account.

The Safety Management System to be implemented by the Managing Companies and their managing ships, falls under the respective provisions for approval and certification by the competent Maritime Administrations and Recognized Organizations so as to be verified that the safety system to be implemented complies with the Code.

Under the above principals, the Code objectives aim amongst others to prevent human injury and loss of life.

Human life is one of the key objectives of the Code and thus many provisions⁵ are incorporated as obligations to be developed and implemented by the Company and its managing vessels.

⁵ **ISM Code references to safety of life and safe working practices:**

1.2 Objectives

1.2.1 *The objectives of the Code are to ensure safety at sea, prevention of human injury or loss of life, and avoidance of damage to the environment, in particular to the marine environment, and to property.*

1.2.2 *Safety-management objectives of the Company should, inter alia:*

.1 *provide for safe practices in ship operation and a safe working environment;*

In view of the aforesaid framework, M/T ZEFYROS was operating under her Company's «Safety Management Manual» system and thereupon she was provided with a Safety Management Certificate (SMC) issued by her Flag.

The implemented safety system was set to organize and control aspects of her safe operation.

4.4.1 ISM Code Chapter 7 “Shipboard Operations”

Chapter 7 of the Code stipulates that *“The Company should establish procedures, plans and instructions, including checklist as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.”*

In this context and under the principal requirements of aforesaid Chapter 7, the Managing Company of ZEFYROS had developed an integrated system of procedures for key shipboard operations to be followed by Master and crew.

The boarding (embarkation) procedures via launches were comprehensively stipulated in ZEFYROS's Integrated Management System Manual with specific instructions that were encompassing SOLAS requirements and the associated provisions for the “Pilot transfer arrangements”.

4.4.2 ZEFYROS boarding (embarkation) procedure via launches

(1) The Company's Integrated Management System Manual, under the principal requirements of Chapter 7 of ISM Code, in chapter 7 *“Plans and instructions for key shipboard operations”*, par. (9) *“Procedures for safe work performance”*, sub. (10) was incorporating specific instructions for the safe boarding operations via launches under the title “Embarkation via launches”.

The recorded instructions were integrating the respective fundamental SOLAS provisions and were further providing detailed directions to be observed and followed by the Master; the responsible Officer and the involved in the operation crewmembers.

More specifically, as stated in the Manual, the “embarkation via launches” operation was drawn up with the purpose to ensure the safe transfer of pilots, crewmembers and visitors between vessels and launches and to allocate the responsibilities to the personnel involved in planning and executing the operation, namely the Master responsible for establishing the suitability of the launch for personnel transfer and for ensuring, to the extent possible, that transferees are in fit condition and the Designated Deck Officer afforded with the duties to supervise and control the rigging of gear and the embarkation/disembarkation operation.

.2 assess all identified risks to its ships, personnel and the environment and establish appropriate safeguards;

...

1.4 Functional requirements for a safety-management system.

Every Company should develop, implement and maintain a Safety Management System (SMS) which includes the following functional requirements:

.1 a safety and environmental-protection policy;

.2 instructions and procedures to ensure safe operation of ships and protection of the environment in compliance with relevant international and flag State legislation;

...

7. Shipboard Operations:

The Company should establish procedures, plans and instructions, including checklist as appropriate, for key shipboard operations concerning the safety of the personnel, ship and protection of the environment. The various tasks should be defined and assigned to qualified personnel.

(2) The *“Embarkation via launches”* operation in par. 7.9.10.3 under the title *“Procedure”* was stipulating a set of preconditions, measures and safeguards as well as actions to be taken and followed that were establishing a safe operation system.

More specifically, the personnel involved in planning and executing the embarkation via launches operation shall be aware of the following:

Personnel may embark/disembark vessel by use of:

1. *Accommodation ladders of sufficient length to provide a good landing base for the launch.*
2. *Pilot ladders, when the vessel’s freeboard is 9 meters or less.*
3. *Combination of pilot and accommodation ladders, when vessel’s freeboard exceeds 9m.*
4. *The pilot ladder must be maintained in a good and clean condition:*
 - *In one length, two or more lengths shackled or lashed together is not acceptable.*
 - *Fitted with spreaders not more than 3 m apart to prevent twisting.*
 - *Rigged so that each step rests firmly against the side of the ship.*
 - *Rigged well clear of all discharges and water outlets.*
 - *Rigged at a place where a good lee can be given.*
5. *The combination ladder must be rigged as follows:*
 - *Lower accommodation ladder to within 4.5-6 m above sea level, with the pilot ladder positioned immediately abaft the accommodation ladder and lowered to a height as requested by the launch.*
 - *Person should climb from launch to pilot ladder and from pilot ladder to accommodation ladder.*
 - *Consideration shall be given to any swell that may prevail to ensure that movements by launch are clear of accommodation ladder and kept to a minimum.*
6. *When combination of pilot ladder and accommodation ladder is used, pilot ladder shall extend at least 2 m below the accommodation ladder’s lower platform.*

1. Rigging and Testing

Once the accommodation and/or pilot ladder has been rigged, it shall be inspected by a designated responsible Deck Officer to ensure that the apparatus is correctly assembled, rigged and tested prior to use.

The following conditions must be complied with when using a launch service for the conveyance of personnel between ship/shore:

1. *Master should be satisfied about the suitability of the launch for personnel transfer.*
2. *Determine that local weather conditions are suitable for transfer.*
3. *The lee must be adequate to ensure safe transfer of personnel.*
4. *Ladder must be clean and in good order.*
5. *The accommodation / pilot ladder must be rigged as specified.*
6. *Crewmembers assigned to assist personnel outside of the ship's side rails must wear a crew saver or a self inflating buoyancy aid at all times.*
7. *Personnel about to (dis)embark via the accommodation or pilot ladder are to be instructed to use the launch off-side walkway when making their way to/from the launch boarding point.*
8. *Two man ropes and a heaving line should be provided with the pilot ladder.*
9. *Area around should be adequately illuminated.*
10. *A life buoy with a self-igniting light and 27 m of buoyant line must be always at hand at the top of the ladder.*

When making way through water or at all times when (dis)embarking pilots, a briefed responsible Officer equipped with a radio must be in attendance at (dis)embarkation point.

While (dis)embarking personnel when making way through water an entry is to be made in the Bridge logbook stating that "LAUNCH OPERATIONS CONDUCTED AS PER RELEVANT IMS PROCEDURE". When at anchor or along side, a rating equipped with radio must be in attendance at the (dis)embarkation point. Before (dis)embarkation, compliance with following is essential:

- a. Where practicable, establish communications with the launch.*
- b. The Master/responsible Officer must ensure so far as is possible that transferees are in fit condition.*
- c. A safety harness with attached line must be readily available and offered to all transferees.*
- d. In certain circumstances, the Master may insist on the use of safety harness.*
- e. The boarding area must be well lit.*
- f. The entire operation must be properly planned before transfer commence.*
- g. Baggage handling facilities and other items (e.g. heaving line) are to be provided to ensure that all transferees can (dis)embark with both hands free.*

(3) In view of the above it is considered that sound and safe procedures were established through the Integrated Management System Manual for the embarkation/disembarkation of individuals via launches.

4.4.3 Safety harness safeguard

The offering of safety harness for use during boarding of persons via launches at sea was incorporated in the "embarkation via launches" operation in ZEFYROS Integrated Management System Manual. This instruction is perceived as one of the key barriers to prevent unsafe conditions that may lead to transferees' injuries or fatal accidents.

Such unsafe conditions could be an accidental fall from height due to pilot ladder's defect or a person's sudden deterioration of physical condition or/and health, essentially as a result of sudden dizziness or weakness that could impair one's ability to climb up the ladder or could cause his fall.

Taking into account that despite the fact that a safety harness with attached line, had to be furnished at the boarding area during the preparations of the pilot ladder's operation in order to be available and offered to the transferees, howbeit it could not be established that it was offered for the embarkation of the Security Guards.

It is presumed that had a safety harness been used for the embarkation of the Security Guard he would not have fallen from the pilot ladder, sustained the severe injuries that caused his loss of life.

It is reasonably deduced that the Officer in charge of the embarkation operation of the SGs did not follow in full the procedures of ZEFYROS Integrated Management System Manual and more specifically to offer the use of a safety harness by the casualty SG during climbing the ladder.

Conclusively, the failure to follow the procedures is considered a contributing factor in the examined marine accident.

4.4.4 The Officer's in Charge performance

Based on the events recorded in par. 3.3, it is inferred that while the SG was climbing the pilot ladder his physical condition was unexpectedly deteriorated and his ability to continue ascending was impaired. As stated, he stopped for a short period of 2 to 3 minutes in order to regain his strength and advance to the boarding area.

Although, any conversation or communication that is likely to have taken place during that time period between the individuals on scene could not be established, the time lapse that the SG had stopped is considered enough for the Officer in Charge of the operation to realize that he was in a difficult situation that required immediate actions to be taken.

It is therefore arising that based on the procedures stipulated in ZEFYROS Integrated Management System Manual par. 7.9.10.3 and more specifically under the instruction that: *«The Master/responsible Officer must ensure so far as is possible that transferees are in fit condition»*, the Officer in Charge, should have recognized the SG's physical deterioration and responded accordingly, due to the fact that he had stopped ascending, was encountering breathing difficulties and his face turned pale.

In those circumstances that indicated a sudden change of the routine boarding procedure that was apparently altering to an emergency⁶ situation and thus required immediate response and actions, the Officer in Charge could have taken immediate actions and instructed or ordered the skipper verbally or through VHF to maneuver away from ZEFYROS port side, as a precautionary measure in order to avoid a potential injury if the SG could not continue climbing and fall.

It is emphasized that falling from the pilot ladder was identified as one of the serious hazards that could result to serious injuries to personnel or to a "man overboard" emergency situation, as analyzed in following paragraphs (4.4.6 & 4.4.7).

The Officer's in Charge poor performance regarding immediate response actions to the evolving emergency situation under the Manual's instructions is identified as a contributing factor into the marine casualty.

4.4.5 ISM Code "Risk Assessment"

The ISM Code in Part A, section 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».

ISM Code does not provide any further explicit reference apart from the above general requirement, nevertheless risk assessment or risk analysis is fundamental for the compliance with most of the Code's requirements and notably Chapter 7 "Shipboard Operations".

The risks⁷ concerned are those that are reasonably expected and are related to shipborne procedures or operations in respect to:

⁶ An emergency is an urgent, sudden, and serious event or an unforeseen change in circumstances that necessitates immediate action to remedy harm or avert imminent danger to life, health, or property; an exigency. (Definition by Legal Information Institute of Cornell Law School).

⁷ IMO defines risk as: «The combination of the frequency and the severity of the consequence». (ref. to MSC/Circ.1023 - MEPC/Circ.392).

- the health and safety of all those who are directly or indirectly involved in the activity, or who may be otherwise affected;
- the property of the company and others;
- the environment.

A hazard could be defined as a situation or practice that has the potential to threaten or to cause harm to human life, health, property or the environment (ref. to MSC/Circ.1023 - MEPC/Circ.392).

Hence a risk analysis process⁸ could concisely include the following phases:

- ✓ the identification of hazards;
- ✓ the assessment of the risks associated with those hazards;
- ✓ the application of controls to reduce the risks that are deemed intolerable. The controls may be applied either to reduce the likelihood of occurrence of an adverse event, or to reduce the severity of the consequences;
- ✓ the monitoring of the effectiveness of the controls.

The ISM Code does not lay down any particular venue models to the management of risk and therefore the company has to compile a system and methods under its organizational structure and ships' operations. The methods should be systematic, if assessment and response are to be complete and effective and the procedures should be documented so as to provide evidence for the decision-making process as well as for inspections and audits by the Managing Company, the Competent Authorities and interested parties.

4.4.6 ZEFYROS's Risk Assessment (R/A)

Shipboard operations of ZEFYROS were conducted under the control measures identified by the Risk Assessment procedure for the purpose to reduce risks to human life; the environment or property.

The R/A process was prepared by the Company and was described in the Integrated Management System under a standard form to be supplemented and signed by the Risk Management Team, consisting of the Officers and crew members participating in the operation and approved and reviewed by the Master.

(1) The Embarkation/Disembarkation via launches Risk Assessment form in short was featuring two tables:

- The first table was recording the identified hazards, the potential hazardous events and the existing control measures resulting from the risk analysis and established by the Company in the Integrated Management System in order to be observed and implemented on board by the Master, Officers and crew for avoiding the associated risks.
- The second table was elaborating the risk treatment logging additional risk control measures, the responsible Officer for their implementation and the time to be executed, that is prior or during the operation.

The following table is indicatively presenting the first table's recordings and the deriving process:

⁸ Risk management may be defined as: « *The process whereby decisions are made to accept a known or assessed risk 1and/or the implementation of actions to reduce the consequences or probability of occurrence*». (ref. to ISO 8402:1995/BS 4778).

Table 4: Risk assessment process

Risk identification		Risk analysis	
	Hazards	Potential hazardous event	Existing control measures <i>(The following drop-down list is numbered for reference purposes)</i>
1	<ul style="list-style-type: none"> ✓ Slipping / Trips ✓ Falling 	<ul style="list-style-type: none"> • Mechanical Injury / Burns (Serious injury) • Man overboard • Gangway damage 	Company's established procedures and safety practices within IMS: <ol style="list-style-type: none"> 1.1 Lines of communication must be established between ship and launch 1.2 Embarkation/Disembarkation means and Equipment must be checked/inspected before use 1.3 Lifebuoys, heaving lines, messengers must be ready available and must be deployed near the embarkation position 1.4 <u>If Pilot Ladder or combination will be used, procedures recorded in relative Poster must be followed and Working Aloft/Overside check list must be completed</u> 1.5 Personnel involved must be trained in relevant task. 1.6 Appropriate PPE must be used. 1.7 Supervising of the embarkation area must be executed by one Responsible Officer. 1.8 Weather condition and vessel's rolling must be taken into consideration. 1.9 Rest hours of all involved personnel are always taken into account
2	Falling injury due to carriage of baggage or inappropriate shoes, during passage from ship to launch or vice versa.	Serious injury to personnel	<ol style="list-style-type: none"> 2.1 Integrated Management System Reference. 2.2 C.O.S.W.P. (M.C.A)⁹ Reference Section 6, 18.
3	Falling injury due to lack of maneuvering communication with launch boat	Serious injury to personnel	<ol style="list-style-type: none"> 3.1 Integrated Management System Reference. 3.2 C.O.S.W.P. (M.C.A) Reference Section 6, 18.

(2) According to the Risk Assessment form «Frequency & Consequence» criteria¹⁰, the identified hazards were initially evaluated and ranked in «Frequency Category 4: Possibility of isolated incidents, once per year» with «Consequence Category 3: serious injury to

⁹ Reference to the UK Maritime and Coast Guard Agency's (MCA) «Code of Safe Working for Merchant Seafarers (COSWP)». The COSWP provides guidance on safe working practices for situations that commonly arise on ships during standard operations as well as the basic principles that can be applied to many other work situations on board ships that are not specifically covered. However, it should not be considered as a comprehensive guide to safety: the advice it contains should always be considered in conjunction with the findings of the Company's or employer's risk assessment, and any information, procedures or working instructions provided by the manufacturer, supplier or any other source should be followed.

The Code is addressed to everyone on a ship regardless of rank or rating, and to those ashore responsible for safety, because the recommendations can be effective only if they are understood by all and if everyone cooperates in their implementation. Those not actually engaged in a job in hand should be aware of what is being done, so that they may avoid putting themselves at risk or causing risk to others by impeding or needlessly interfering with the conduct of their work.

¹⁰ (ref. to MSC/Circ.1023 - MEPC/Circ.392)

Frequency: The number of occurrences per unit time (e.g. per year).

Consequence: The outcome of an accident.

personnel”. Both aforementioned indicators were resulting to «high and intolerable risk» on the Risk Matrix¹¹ Index¹².

(3) Having scrutinized the aforementioned and the existing controls measures, it is deduced that the risk of “falling” was recognized and recorded as a high-risk situation that could result to the potential hazardous event of serious injury and/or “man overboard” emergency situation.

The consequences of “falling” could be controlled by a set of measures already incorporated in ZEFYROS Integrated Management System, as listed in the risk analysis column (see table 4) and already reported in par. 4.4.2 (2).

One of the critical control measures to minimize or eliminate the consequences of the risk of falling was recorded in point 1.4 of the existing control measures drop-down list.

The listed item was defining specific instructions to be followed by the Master and the involved in the operation crew, as resulting from the Poster (see reference in par. 4.3 and fig. 9) and as deriving from the “Working Aloft/Overside”¹³ work requirements due to the fact that the corresponding “Working Aloft/Overside” check list had to be completed.

It is reasonably understood that one of the main hazards when working at height is falling that may occur due to factors such as inappropriate work process, deterioration of a person’s physical status etc.

The use of harness is considered the most critical fall arrest equipment and, on these grounds, it is the most important protective measure and safeguard to eliminate the consequences of falling such as serious or fatal injuries.

(4) Taking into account the information and evidence collected and the fact that a safety harness was neither included in the preparation procedure for the embarkation via the

¹¹ (ref. to MSC/Circ.1023 - MEPC/Circ.392) The frequency and consequence of the scenario outcome requires assessment.. A risk matrix table correlates the defined frequency and consequence categories ranking that is evaluated using available data, supported by judgement, on the possible risks. The combination of a frequency and a consequence category represents a risk level.

¹² The Frequency, Consequence and Risk indexes as illustrated in the “risk assessment form” for the embarkation/disembarkation via launches working activity.

FREQUENCY CATEGORY			CONSEQUENCE CATEGORY				RISK MATRIX					
5	Frequent - Possibility of repeated incidents	More often than once per voyage	4	Human losses / fatalities	Major pollution / Full scale response	Excessive/ high cost damage >\$1000000	Major national & international impact					
4	Probable - Possibility of isolated incidents	Once per year	3	Serious injury to personnel	Moderate pollution/ Significant resources commitment	Moderate cost or damage (100000 – 1000000\$)	Considerable impact					
3	Occasional - Possibility of occurring sometime	Once per 5 years	2	Number of minor injuries / Medical treatment for personnel	Little pollution / Limited response of short duration	Little cost or damage (\$10000 – \$100000)	Slight impact					
2	Remote - Not likely to occur	Once per 10 years	1	Few minor injuries	Minimum pollution / Little or no response needed	Minimum cost / damage < \$10000	Zero impact					
1	Very unlikely - Practically impossible	Once per 30 years or more										

		FREQUENCY				
		1	2	3	4	5
CONSEQUENCE	1	L(1)	L(2)	L(3)	M(4)	M(5)
	2	L(2)	M(4)	M(6)	M(8)	H(10)
	3	L(3)	M(6)	M(9)	H(12)	H(15)
	4	M(4)	M(8)	H(12)	H(16)	H(20)

High=Intolerable Risk Medium=Tolerable Risk Low=Acceptable Risk

¹³ **Working aloft or Oversight** means a work being performed at a height and involving risk of falling, resulting in an injury or fatal injury.

The “Working aloft/Overside” working operation is falling within the relevant provisions of Chapter 7 of ISM Code (reference in par. 4.4 & 4.4.1 of this report).

On the Working aloft/Overside safe working practices matter, reference is made “for information only” to:

- the ILO’s «Code of Practice for accident prevention on board ship at sea and in port» and in particular to Chapter 15 «Working aloft and over the side»;
- the UK Maritime and Coast Guard Agency’s (MCA) «Code of Safe Working for Merchant Seafarers (COSWP)» and in particular Chapter 17 «Work at height».

service boat operation, nor it was used during the SGs boarding, it is deduced that the risk assessment form was not observed and completed by the Master, the Officer in charge and the involved crew members.

Accordingly, point 1.4 of the “existing control measures” was not followed and consequently the “Working Aloft/Overside” check list was not completed either.

It is considered that had the risk assessment form been followed and completed, a safety harness would have been provided to the SG for his safe embarkation in order to prevent injury or a man overboard emergency due to a potential fall.

In this respect Master’s and Chief Officer’s disregard to follow the preparation and documentation procedures of the risk assessment process defined in ZEFYROS’ Integrated Management System is recognized as a contributing factor into the examined marine casualty.

4.4.7 Accident analysis under International Safety Management Code (ISM)

The International Safety Management Code in Chapter 9 under the title «Reports and analysis of non-conformities, accidents and hazardous occurrences» foresees that:

- 9.1 The SMS should include procedures ensuring that non-conformities, accidents and hazardous situations are reported to the Company, investigated and analysed with the objective of improving safety and pollution prevention.*
- 9.2 The Company should establish procedures for the implementation of corrective action, including measures intended to prevent recurrence.*

The abovementioned generated obligations are supplemented by guidelines¹⁴ addressed to Companies aiming at assisting them in effective operational implementation of the Code and at enhancing the efficiency of the its requirements.

In particular, par. 6 of MSC-MEPC Circ. 8 under the title “Reporting and analyzing of non-conformities, observations, accidents and hazardous occurrences” defines and clarifies that:

- “6.1 The SMS should contain procedures to ensure that non-conformities, observations and hazardous occurrences are reported to the responsible person of the management. The Company should have a system in place for recording, investigating, evaluating, reviewing and analysing such reports, and to take action as appropriate.*
- 6.2 The system should ensure such reports are reviewed and evaluated by the responsible person(s) in order to determine appropriate corrective action and to ensure that recurrences are avoided. The evaluation of reports may result in:
 - .1 appropriate corrective actions;*
 - .2 amendments to existing procedures and instructions; and*
 - .3 development of new procedures and instructions.**
- 6.3 The responsible person should properly monitor the follow-up and closing-out of the non-conformities/deficiency reports. The receipt of reports should be acknowledged to those persons who have raised the reports. This should include the status of the report and any decisions made.*

¹⁴ MSC-MEPC.7/Circ.8 adopted on 28 June 2013

Revised guidelines for the operational implementation of the International Safety Management (ISM) Code by Companies.

6.4 *The Company should encourage the reporting of near-misses to maintain and improve safety awareness. The reporting and analysis of such incidents are essential for an effective risk assessment by the Company, especially where accident information is not available.*"

4.4.8 The marine casualty analysis by the Company

In light of the aforesaid and pursuant to Chapter 9 of ZEFYROS' Integrated Management System Manual procedures, the Managing Company's investigation team composed of four investigators, including ZEFYROS' Master, carried out the marine casualty analysis that was documented on to the standard form "NCR 003 - Incident Investigation Report" with reference no: ZF_INC02.18.

The standard "Incident Investigation Report" form was amongst others recording contributing factors¹⁵ that may contribute and cause a marine casualty or worsened its consequence. The Contributing factors were quoted in two tables:

- the "Immediate cause" table, subdivided into "Substandard Acts" drop down check list and "Substandard Conditions" drop down check list.
- the "Basic/Root Causes" table, subdivided into "Personal Factors" drop down check list and "Job Factors" drop down list check list.

It was further citing "Control areas for improvement" table and was leading to the "Corrective / preventive / remedial actions to avoid re-occurrence" and "Lessons learnt disseminated to the fleet" indexes.

The marine casualty investigation conducted as recorded in the "NCR 003 - Incident Investigation Report" in relation to the immediate cause's grouped factors did not identify any "Substandard Acts" and/or "Substandard Conditions".

In relation to the "Basic/Root cause" analysis on to the "Personal factor" index the option "other" was ticked and the recording "*PHYSICAL CONDITION*" was added, referring to the casualty's physical condition.

The "Corrective/preventive/remedial actions to avoid re-occurrence" index recorded that Private Maritime Security Company, the Flag and the Fleet were informed about the accident; the "Lessons learnt disseminated to the fleet" index was logging the following instructions to be disseminated fleetwide:

- 1) *Never compromise your or anybody else's health and safety onboard.*
- 2) *Any time you observe an "at-risk" behavior, implement immediately the Stop Work Authority.*
- 3) *The implementation of a Behavior Based Safety program can eliminate "at-risk" behaviors and minimize the near misses and accidents onboard.*

Taking into account the events that led to the marine casualty, the contributing factors identified in the report analysis (ref. to par. 4.4.2, 4.4.3, 4.4.4, 4.4.5 & 4.4.7) as well as the examination of the "Incident Investigation Report" prepared by the Company it is considered that it was neither exhaustive nor comprehensive due to the fact it did not ascertain underlined conditions which have been present in the whole operational process of the

¹⁵ IMO Resolution A.1075(28), par. 2 "Definitions".

Contributing Factor: A condition that may have contributed to an accident event or worsened its consequence.

embarkation and the only root cause recognized was attributed to the SG's physical condition that was rapidly deteriorated while climbing up the pilot ladder.

Nevertheless, item 2 of the lessons learnt findings referring to the "Stop Work Authority" is acknowledged as an equivalent action or measure to the immediate response actions highlighted in par. 4.4.5 analysis.

4.5 The Service boat operation

The type and size of the involved in the marine accident service boat is not falling within the scope of International Conventions, Codes and deriving Rules and Regulations. In general, the operation and certification of launches and service boats is regulated by national legislation laid down by their flying Flag registry.

During the investigation it was sourced that the service boat was providing the transfer services of Security Teams from the Supply Ship TRINITY LONDON to vessels that were to navigate through the high-risk piracy area of Gulf of Aden. Due to the fact that she was operating in international waters, any communication with her Skipper and/or Owner proved to be unfeasible.

Consequently, any documentation regarding her registry and operational certifications could not be obtained and no interview was conducted in order to collect information regarding the service boat operation and the marine casualty.

Taking into consideration the lack of information for the service boat's operation and the Skipper's certification and performance, the following analysis is being unfolded pursuant to par. 4.3 of Commission Regulation¹⁶. In this context, under the evolvement of the events that led to the marine casualty, logical extrapolations and reasonable assumptions are accepted and advocated.

4.5.1 The Skipper's performance

(1) As already stated in par. 3.2 & 3.3 at the time the service boat was approaching ZEFYROS port side, she was underway navigating at approximately 3 knots with dead slow ahead. Following skipper's maneuvering the Service boat came alongside ZEFYROS with its starboard side and its foredeck beneath the pilot ladder.

In view of the above mentioned it is presumed that during the SGs embarkation on ZEFYROS, the Skipper was continuing conning and maneuvering the service boat in order to keep the same speed and maintain its position alongside her.

(2) It is further understood that the Skipper, although his certificates and seagoing service could not be obtained, was at least proficient and enough experienced, due to the fact that the he was transferring Security Teams from TRINITY LONDON to nearby ships and vice versa.

Nevertheless, considering that facts in relation to the SG boarding and the SG's physical condition deterioration that forced him to stop ascending and stay on the ladder almost

¹⁶ Commission Regulation (EU) No 1286/2011 of 9 December 2011 "adopting a common methodology for investigating marine casualties and incidents developed pursuant to Article 5(4) of Directive 2009/18/EC of the European Parliament and of the Council"

"4.3. If a gap of information cannot be resolved and is filled in by logical extrapolation and reasonable assumptions, such extrapolation and assumptions shall be made clear in the wording of the report. A useful tool in this process can be the identification of all options and their analytical reduction to reach the most likely hypotheses."

motionless for a period of 2 to 3 minutes, it is deduced that he was not monitoring the situation and the embarkation process.

In those circumstances that were signaling a sudden change of the routine boarding that was obviously altering to an emergency situation and thus required immediate actions, the Skipper based on his experience and good seamanship should have been alerted and should have maneuvered away from ZEFYROS port side.

(3) The Skipper's lack of monitoring the evolving situation, is also supported by the fact that he did not observe the urge calls of the 3rd SG to move away from the pilot ladder, as he had realized the imminent danger of his colleague falling from the ladder and landing on the service boat.

It is concluded that had the skipper closely monitored the situation as well as listened and paid attention to the SG calls, he would have maneuvered away from ZEFYROS port side and resultantly the casualty would not have hit on the service boat deck and have been fatally injured.

(4) Aforementioned behavior is appraised as the Skipper's loss of situational awareness that is the loss of his perception to factors and conditions that were affecting the safety of the procedure and the SG's safety that was ascending the pilot ladder.

The Skipper's poor performance in relation to lack of monitoring, situational awareness and to respond actions is considered a contributing factor in the examined marine casualty.

4.6 Condition of the pilot ladder

The investigation process did not consider the pilot ladder's condition to have been a contributing factor to the marine casualty.

4.7 Environmental Conditions

On the day of the marine casualty, the prevailing weather conditions at the Red Sea were reported to be very good with Light Breeze wind of 2 Bfrs; Smooth wavelets as sea state; daylight; temperature at 28°C; and visibility very good.

Environmental conditions are not considered to have been a contributing factor to the marine casualty.

**The following conclusions, safety issues and safety recommendations should not be taken as a presumption of blame or liability under any circumstances.
The juxtaposition of these should not be considered with any order of priority or importance.
Conclusions and safety issues derive from specific paragraphs of the analysis.**

5. Conclusions

5.1 Conclusions leading to safety recommendations

- 5.1.1 A safety harness with attached line was not used/offered by the Chief Officer who was in charge of the boarding operation (par. 4.4.2.).
- 5.1.2 The procedures of ZEFYROS IMS Manual for the embarkation of the Security Guards were not followed (par. 4.4.3, 4.4.4).
- 5.1.3 The control measures provided by the respective Risk Assessment form and a "Working Aloft/Overside" check list were not followed (par. 4.4.6).

6. Actions taken

No further data was provided during the investigation process other than the analyzed at par. 4.4.9.

7. Safety recommendations

The Managing Company of M/T ZEFYROS is recommended to:

03/2018 Add to the Integrated Management System Manual specific instruction for the Officer in charge in order to establish communication with the launch's skipper prior to the (dis)embarkation and request to maneuver the launch away from the ladder when a person is climbing.

When such communication cannot sufficiently be established, or when it is not assured that the skipper will maneuver the launch away, the Officer in charge should request the mandatory use of a safety harness for the (dis)embarkation procedure through the combination ladder or when the Pilot ladder is used and the distance from the water surface to the point of access is more than 5m.