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Marine Safety Investigation Unit

Transport Malta

SAFETY INVESTIGATION REPORT

202307/031 REPORT NO.: 09/2024 July 2024

This safety investigation has been conducted with the assistance and cooperation of *Państwowa Komisja Badania Wypadków Morskich* (PKBWM), Poland.

MV *PORT GDYNIA*
Fatal injuries to a crew member, during cargo operations in the port of Bata, Equatorial Guinea 21 July 2023

SUMMARY

On 21 July 2023, *Port Gdynia* was moored alongside in the port of Bata, Equatorial Guinea. Cargo loading operations were in progress when the electro-technical officer (ETO) was found lying on deck, with a severe head injury.

The crew members observed that the injured ETO did not show any signs of life and their attempts to revive him were unsuccessful. He was eventually transferred to a hospital, where his death was confirmed.

There were no witnesses to the occurrence, but the safety investigation considered it likely that the ETO may have tripped over an obstruction on deck and fallen, subsequently suffering a fatal head injury.

The MSIU has issued one recommendation to the Company, aimed at ensuring that the crew members always use the safety helmets' chin straps.

MV *Port Gdynia*

FACTUAL INFORMATION

Vessel

Port Gdynia was a 3,093 TEU[1] container vessel (**Figure 1**), of 34,642 gt, built in 2011 by Gryfia Repair Shipyard, Szczecin, Poland. The vessel was owned by C Aranda S.P. Z.O.O. and managed by Polskie Linie Oceaniczne S.A., Poland (the Company). Polish Register of Shipping (PRS) acted as the classification society as well as the recognized organization, in terms of the International Safety Management Code, for the vessel.

The vessel had a length overall of 220.00 m, a moulded breadth of 32.24 m, and a moulded depth of 18.70 m. *Port Gdynia* had a summer draught of 12.15 m and a corresponding deadweight of 41,956 metric tonnes.

Propulsive power was provided by a 7-cylinder HCP 7K80MC-C, two stroke, slow speed direct drive marine diesel engine, producing 26,270 kW at 104 rpm. This drove a right-handed, fixed-pitch propeller, enabling the vessel to reach a maximum speed of 22.0 knots.

Around the time of the occurrence, *Port Gdynia* was loaded with 27,711.57 mt (2,784 TEU) of general cargo in containers, drawing forward and aft draughts of 10.40 m and 9.40 m, respectively.

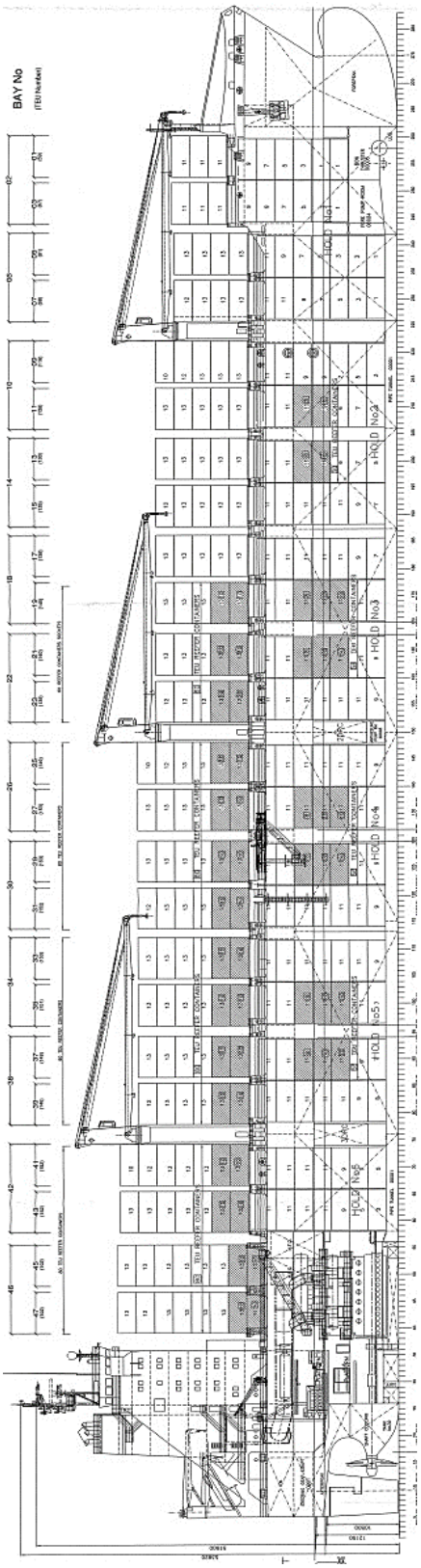

Figure 1: Extract of *Port Gdynia*'s General Arrangement (GA) plan

Copyright: Morska Stocznia Remontowa Gryfia S.A.

[1] Twenty-foot equivalent unit.

Crew

Port Gdynia's Minimum Safe Manning Certificate stipulated a crew of 15[2]. Around the time of the occurrence, the vessel was manned by 19 crew members. Except for the chief officer (Slovakian national), all crew members were Polish nationals. The official communication language was Polish.

The fatally injured ETO was 71 years old. He had about 33 years of seafaring experience, all of which were served in the rank of ETO. He had been employed with the Company for two years, prior to the occurrence. He held STCW[3] III/6 qualifications for an ETO, and his most recent certificate of competence was issued by the Polish Maritime Administration on 22 February 2022. He had joined the vessel on 15 May 2023, at the port of Valencia, Spain. This was his second employment term on board *Port Gdynia*, with his first being for five months in 2021.

Pre-joining medical examination

The ETO's pre-joining medical certificate, issued on 10 May 2023, certified him as fit for duty. His blood pressure was recorded as 130 / 80 and his pulse rate was recorded as 71.

The unaided visual acuity for his distant and near vision were found to be 0.7 and 0.6, respectively, in each eye[4]. His aided visual acuity was 1.0 (or 6/6 on the Snellen Scale). His visual fields for both eyes were normal, and so was his colour vision.

Environment

Around the time of the accident, the sky was clear, and the visibility was about six nautical miles (nm). A Beaufort Force 3 wind was blowing from the Southwest. The sea state was 'slight' with a low, West Southwesterly swell. The air and sea temperatures were recorded as 26 °C and 27 °C, respectively.

Narrative[5]

Port Gdynia was moored port side alongside, at the port of Bata, Equatorial Guinea, on the morning of 20 July 2023. The vessel had to unload 75 cargo containers and load 339 cargo containers at this port. Unloading operations were completed by midnight, with 220 cargo containers remaining to be loaded. Cargo operations were being carried out using the vessel's cranes operated shore personnel. The starboard side door, leading to the main deck from the accommodation, was locked as a security measure, while in port.

On 21 July, at around 0745, the chief engineer, ETO, and fitter[6] met in the vessel's office to plan for a task on the brake mechanism of the electrical motor for the mooring winch on the port quarter. At 0800, the ETO and the fitter commenced dismantling the brake mechanism. About 30 minutes later, the brake mechanism was dismantled, and the fitter took it to the engine-room workshop for temporary repairs.

At around 1010[7], during the coffee break, the chief engineer and the ETO met in the vessel's office to look for the winch's manual, to identify the relevant part number and order spares to replace a damaged part. At about 1030, the ETO left the vessel's office, while the chief engineer remained there, discussing

[2] Conditions applied.

[3] IMO. (2020). *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978* (Consolidated ed.). London: Author.

[4] 0.7 = 6/8.5, and 0.6 = 6/10, on the Snellen Scale.

[5] Unless otherwise stated, all times in this safety investigation report are local time (LT = UTC +1).

[6] The fitter was referred to as the 'storekeeper' on the crew list.

[7] None of the crew members were aware of the whereabouts of the ETO between 0830 and 1010.

other tasks with other crew members. Meanwhile, on deck, cargo loading was in progress in bay 38.

At 1055, the duty AB was proceeding aft, via the port side of the main deck, towards the accommodation to refill his bottle of water. Along his way, he noticed the ETO lying unconscious[8] on the cross deck between the aft of bay 46, where 20 and 40-foot containers were stowed, and the accommodation superstructure (**Figure 2**).

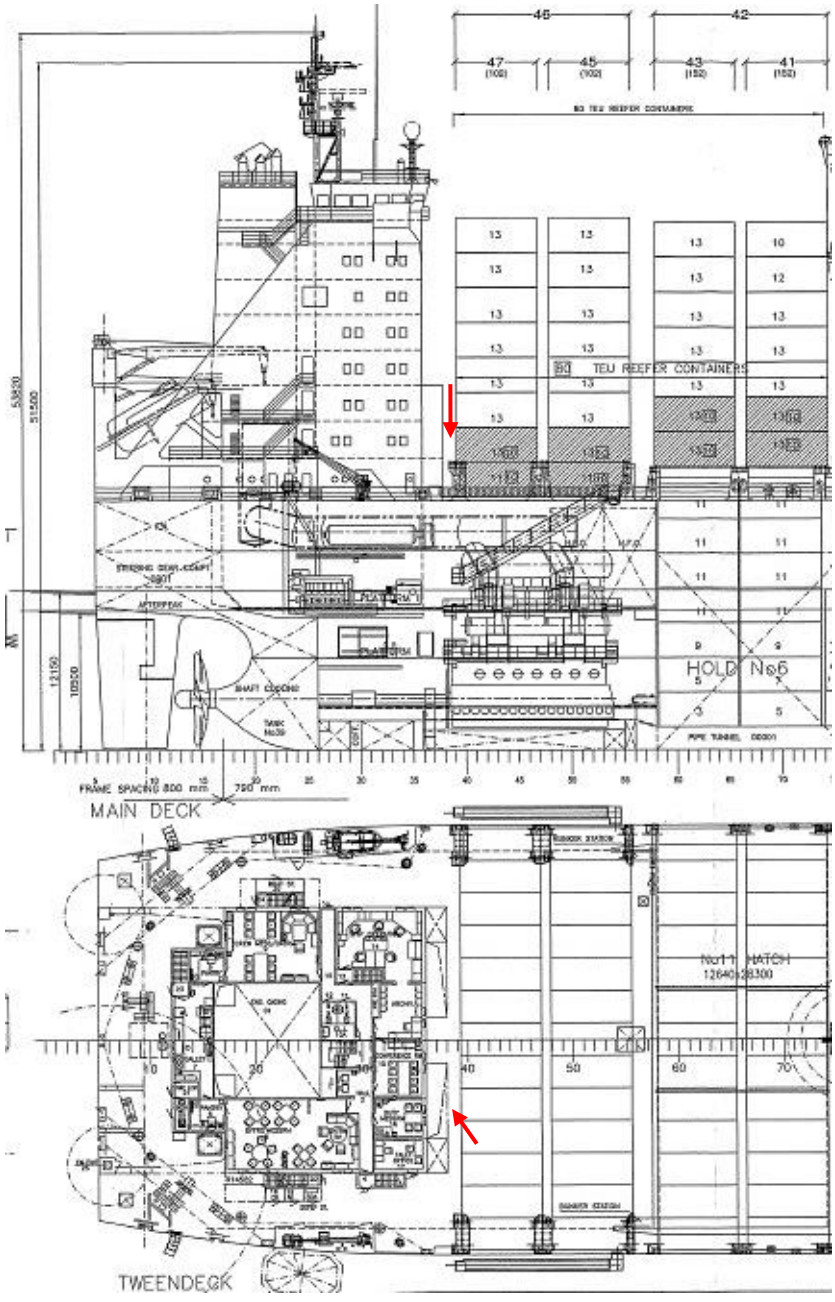

Figure 2: The approximate location (red arrows) where the ETO was found

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[8] The ETO was found lying on his left side, with his head towards the vessel's starboard side and his feet towards the port side.

Moving closer, the duty AB also observed a little blood on the deck, around the ETO's head. He immediately made a general call over his portable, very high frequency (VHF) radio, informing other crew members about his finding. Soon after, the master and other crew members arrived at the site.

Turning the ETO onto his back, the crew members observed a deep wound on his forehead, but with minimal bleeding. When the master was unable to detect a pulse, he instructed the crew members to prepare to administer first-aid to the ETO and advised the chief officer to request for medical assistance from the terminal.

The chief officer rushed to the pier and notified the cargo foreman of the matter. The cargo foreman suspended cargo operations and requested the terminal for an ambulance. Meanwhile, the crew members bandaged the head wound and attempted to resuscitate the ETO.

At 1135, the shore ambulance arrived near the vessel's gangway. However, the crew members were advised that there were no medical personnel in the ambulance, and that they would have to transfer the ETO from the deck to the ambulance, themselves.

The crew members transferred the ETO on a stretcher to the ambulance. The second and third officers travelled along in the ambulance, to the shore hospital, where they reached in about 15 minutes. The ETO was declared dead on arrival at the hospital[9]. This was confirmed to the officers, by the vessel's local agent, at 1215.

The death certificate issued by the shore hospital in Bata, attributed the cause of the ETO's death to a *slippery and abrupt fall* [*sic*.] on the deck. An autopsy was not conducted.

Location of the occurrence

The cross deck between the accommodation superstructure and bay 46 was narrow, with additional cargo container sockets and pad eyes running along it[10] (**Figure 3**). In addition, cargo securing gear (lashing rods, turnbuckles, twist locks, *etc*.) were also stored in the cross deck.

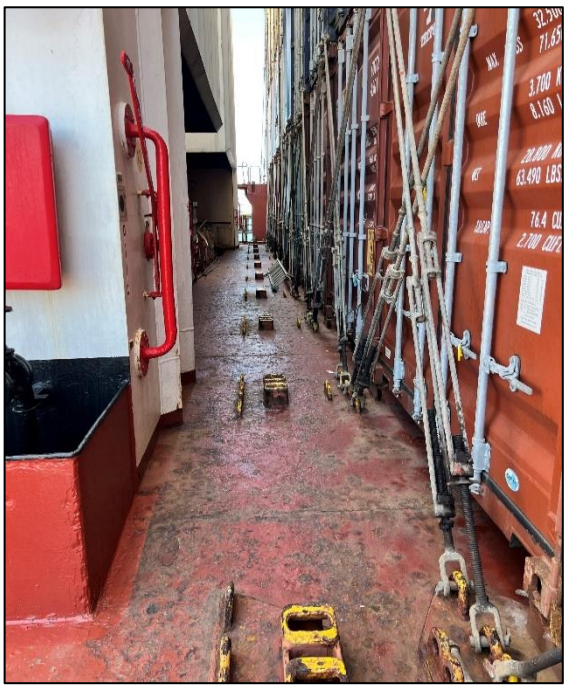

Figure 3: The cross deck (as seen from the starboard side), when the cargo containers are secured, and no reefers are stowed

The width of the cross deck, *i.e*., the distance between the sockets for 20 / 40-foot containers and the boxes for the cargo securing gear, was measured at approximately 1.9 m. The additional sockets and pad eyes for 45-foot containers lay between 0.6 m to 1.0 m (approx.) from the 20 / 40-foot container sockets (**Figure 4**).

[9] The second and third officers stated that the hospital staff declared the ETO as dead, without an examination.

[10] The additional container sockets and pad eyes were fitted to allow 45-foot containers to be stowed in this bay.

Figure 5: The measured width of the cross deck between the accommodation superstructure and bay 46

When reefer containers were stowed in bays 46 / 47, their electric power cables had to pass across the space to the power sockets on the accommodation front. During cargo operations in these bays, the space to walk through the cross deck would be further restricted by the loose lashing rods and turnbuckles lying on the deck (**Figure 5**).

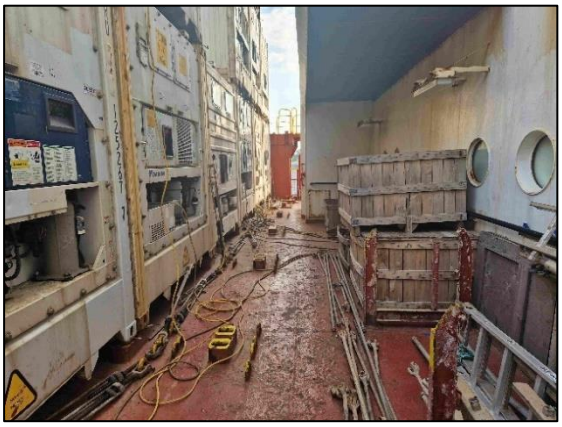

Figure 5: The cross deck (as seen from the port side), during cargo operations in the bay and when the reefer containers are plugged in

Around the time of the occurrence, no cargo operations were going on in bay 46 and all the stowed containers were secured. Several loose cargo securing gear were on the cross deck, with a number of reefer container cables passing across the cross deck.

Personal protective equipment (PPE)

The ETO was found wearing coveralls, cotton gloves and safety shoes. The safety shoes, including their soles, appeared to be in good condition. The crew members stated that a safety helmet (without a chin strap) was also found in the vicinity. However, it could not be determined whether the ETO was wearing it at the time of the occurrence.

A pocket diary, a pen, and a small, unlabelled bottle of eyedrops[11] were found in the pockets of the ETO's coveralls, after the occurrence.

The ETO's visual aids

When the ETO was found lying on the cross deck, no spectacles were found[12]. However, the safety investigation was unable to confirm whether he was wearing contact lenses, and if so, whether the contact lenses were to aid his distant vision or near vision.

The ETO's usual tasks in port

On the day of the occurrence, when the ETO left the vessel's office, he had not informed the chief engineer where he was proceeding to. As the last discussed task that was being carried out, was on the mooring winch on the port quarter, he assumed that the ETO would have either gone to the engine-room workshop or to that mooring winch. The chief engineer explained that he, therefore, had no clue why the ETO had gone towards the front of the accommodation superstructure.

He also stated that whenever the ETO proceeded on deck for any tasks, he would carry a bucket of tools (**Figures 6** and **7**) with him. However, when the ETO was found lying on deck, neither the bucket nor any of his tools / equipment were found in the vicinity.

[11] The Company informed the safety investigation that the eye drops were to treat dry eyes. Dry eyes are a condition where not enough tears are produced to keep the eyes moist and comfortable. It can be caused by various reasons, including aging, a dry, indoor environment or by looking at a computer screen for long periods of time.

[12] When packing the ETO's personal belongings after he was taken to the shore hospital, the crew members found several spectacles with their cases, in his cabin. A case for contact lenses was also found, but without contact lenses inside them.

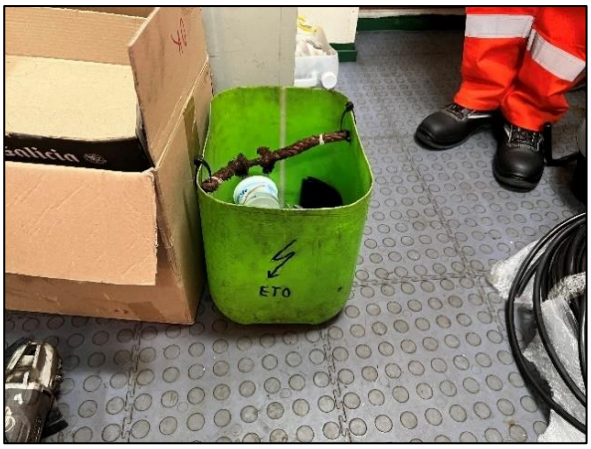

Figure 6: The ETO's tool bucket

Figure 7: The tools in the bucket

The chief engineer further explained that the ETO's usual task in port was to attend to the reefer containers, *i.e.*, plugging, unplugging and relevant checks, if required. The daily reefer container checks were assigned to an ordinary seafarer (OS). If any problems were observed, these would be brought to the attention of the ETO, who would then proceed to check that reefer container. The chief engineer was not aware of any such information being communicated to the ETO, on the day of the occurrence.

The OS clarified that only major problems would be brought to the attention of the ETO and that in the three months prior to the occurrence, such major problems were experienced only about five times. He further explained that whenever the ETO needed to use a ladder to check reefer containers stowed above the bottom tier, he would always request for the assistance of another crew member. If required, a scaffolding would be rigged up.

The OS informed the safety investigation that during his checks on the day of the occurrence, there were no alarms on any of the reefer containers.

The ETO's pocket diary

The pocket diary, found in a pocket of the ETO's coveralls, contained information on various tasks, either carried out or being planned by the ETO[13]. The last date of entry was 20 July 2023, with the last entry referring to a disc brake of the windlass / mooring winch on the starboard bow.

Records of hours of work / rest

The ETO's records of hours of work / rest indicated that he had worked from 0600 to 1800, on 20 July 2023, with a break of one hour in between. As stated by the chief engineer, the ETO reported for duty at 0745, on 21 July.

[13] The crew members were unable to clarify which was the case.

ANALYSIS

Aim

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

Cooperation

During this safety investigation, MSIU received assistance and cooperation from the *Państwowa Komisja Badania Wypadków Morskich* (PKBWM), Poland.

Cause of death

Since an autopsy was not carried out, the cause of death was not determined. However, the death certificate attributed the cause of death to a fall and considering the severity of the head wound, the safety investigation considered it likely that the ETO may have suffered a fatal injury after falling on deck.

Probable cause of the fatal injury

The ETO's head injury suggested that it had been caused by a strike against a hard object / fitting. Since there were no indications which would suggest that the ETO had checked or was checking any reefer container in the vicinity, the MSIU considered it highly unlikely that the ETO had fallen from a height.

As mentioned earlier in this safety investigation report, the cross deck where the ETO was found, was narrow with various obstructions along it. Of the measured 1.9 m, about 1.0 m of the cross deck was taken up by the fixed deck fittings (container sockets and pad eyes), leaving just about 0.9 m of space for a person to pass through.

However, around the time of the occurrence, this 0.9 m of space was also not free of obstructions, with loose cargo securing gear lying around and reefer container cables running across it. It was therefore likely that the ETO may have tripped over an obstruction (either some cargo securing gear, reefer cable, or a fixed deck fitting) and fallen, face-first on the deck, with his forehead directly striking either the deck, or another fixed deck fitting.

Although he was not known to have been suffering from any illnesses prior to the occurrence, bearing in mind the age of the ETO, the safety investigation was also unable to completely rule out the possibility of the ETO collapsing on deck due to a natural cause and then suffering the fatal injury.

Probable cause of the ETO tripping

While noting that the numerous obstructions on the cross deck presented tripping hazards, the safety investigation also considered that since the ETO had been on board for more than two months, he would have passed through that cross deck on several occasions and would have been aware of the tripping hazards present there.

It could not be confirmed whether the ETO was wearing contact lenses around the time of the occurrence. However, since only the case for the contact lenses was found amongst his personal belongings, the safety investigation considered it likely that he may have been wearing them. But then again, the safety investigation could not determine whether these contact lenses were meant to aid distant vision or near vision. Due to the lack of information on this matter, the safety investigation was unable to consider low vision as a contributory factor to the ETO tripping over an obstruction.

In view of the above, the safety investigation considered the possibility that the ETO may have been distracted while passing through the space, at the time. Consequently, he may have not noticed an obstruction in his path and possibly tripped over it.

Furthermore, the safety investigation did not rule out that either the ETO's vision may have

been slightly blurry due to dry eyes, or the ETO may have applied the eye drops while passing through the cross deck, resulting in the momentary blurring of his vision while his eyes settled.

Possible reason for the ETO to walk through the cross deck

The reason for the ETO to pass through the cross deck could not be established. There were no indications that any of the reefer containers or electrical sockets there, had to be checked.

The safety investigation, therefore, hypothesized that the ETO may have intended to proceed towards the forward part of the vessel and check some other electrical equipment (cargo cranes, mooring winches on the bow, *etc*.). As the cargo operations were taking place from the port side, in bay 38, it would have been safer to pass from the starboard side. Since the accommodation's starboard side door was locked, the ETO may not have seen an option, other than to pass through the cross deck aft of bay 46.

Furthermore, the chief officer also stated that this cross deck was commonly used to cross over to the starboard side, to avoid passing over the mooring lines.

PPE

The crew members stated that the ETO's safety helmet was found in his vicinity. In view of the wound seen on the ETO's forehead, the safety investigation believes that if the safety helmet was on, the ETO would not have suffered such a wound.

It was considered possible that if the ETO had tripped over an obstruction, the safety helmet may have slipped off his head, especially since a chin strap was not fitted to the helmet. Data suggested that none of the crew members' safety helmets had chin straps attached to them. The crew members were unable to explain why this was the case.

Shore medical assistance

The crew members informed the safety investigation that the shore ambulance that had arrived, lacked medical equipment and medical personnel. The second and third officers had to travel with the ETO in the ambulance, to the shore hospital. This suggested a lack of preparedness in the port, at that time, to deal with medical emergencies.

However, when the MSIU approached local authorities / marine accident investigation body of Equatorial Guinea for further data relating to the occurrence, no response was received. Therefore, the safety investigation was unable to verify the extent of the port's preparedness.

Fatigue / Drugs & Alcohol

The ETO's hours of work / rest met the relevant requirements of the MLC, 2006[14]. However, no data on the ETO's quality of rest was available to the safety investigation. Neither was a toxicology carried out to confirm, or otherwise, the presence of illicit / medical drugs and / or alcohol.

Therefore, in the absence of data which would suggest that the ETO's behaviour and / or actions were symptomatic of fatigue or intoxication, the safety investigation did not consider accumulated fatigue and drug / alcohol consumption as contributory factors to this occurrence.

Age of the ETO

The ETO was 71 years old. His pre-joining medical examination had certified him fit for duty and he was not known to have been suffering from an illnesses. The crew

[14] ILO. (2020). *Maritime Labour Convention, 2006*, as amended. Genève: Author.

members stated that the ETO, although slow due to his age, was a good worker; neither did he turn down any task that was within his area of expertise, nor did the crew members have any complaints against his performance.

Literature suggests that with increasing age, comes a progressive decline in the function of most physiological systems[15], including gross motor skills[16]. Across the age range of 65 to 89, even healthy men and women were found to have differences in strength, implying losses of 1 % to 2 % of a 77-year-old's value) per year. Another study found that the strength of lower limb muscles is usually reduced by about 10% per decade, beginning at the age of about 40-50 years, with accelerated declines in older age[17].

Moreover, deficits in power tend to be even greater than deficits in strength. For instance, the maximal plantar flexor[18] power of a 70-year-old man may be about 20% less than that of a young man, when developed against a 10 Newton-metre (Nm) torque. The same power, however, would be about 90% less than that of a young man, when developed against a 70 Nm torque, which would thus have implications on gait[19].

However, studies have also confirmed that progressive resistance training (PRT) can result in improvements in strength[20].

In view of the aforementioned, and since the safety investigation did not have any information on the ETO's exercise routine, if any, it could not be determined whether the age of the ETO may have been a contributing factor to his fall or not.

CONCLUSIONS

1. The death certificate attributed the cause of the ETO's death to a *slippery and abrupt fall* [*sic*.] on the deck. An autopsy was not carried out.
2. The head injury suggested that it had been caused by a hard strike against a blunt metal object / fitting. The safety investigation considered it likely that the ETO may have suffered a fatal injury when his forehead directly struck either the deck or another fixed deck fitting, after he fell on deck.
3. In view of the ETO's age and in the absence of an autopsy examination, the safety investigation was unable to completely rule out the possibility of the ETO collapsing on deck due to a natural cause, after which he suffered the fatal injury.
4. It was possible that the ETO may have been distracted while passing through the narrow cross deck and consequently, he may have not noticed an obstruction in his path and probably tripped over it.

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[15] Young, A. (1997). Ageing and physiological functions. *Philosophical transactions of the Royal Society of London. Series B, Biological sciences. 352*, 1837-1843. London: The Royal Society Publishing. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1692134/

[16] Niksirat, K.S., Silpasuwanchai, C., Wang, Z., Fan, J., Ren, X. (2016). Age-related Differences in Gross Motor Skills. (Conference paper). *ITAP '16: Proceedings of the International Symposium on Interactive Technology and Ageing Populations*, 109-118. Author. Retrieved from: https://www.researchgate.net/publication/311491597_Age-Related_Differences_in_Gross_Motor_Skills

[17] Hunter S.K., Pereira, H.M., Keenan, K.G. (2016). The ageing neuromuscular system and motor performance. *Journal of Applied Physiology. Vol 121, Issue 4*, 982-995. American Physiological Society. Retrieved from: https://journals.physiology.org/doi/epdf/10.1152/japplphysiol.00475.2016

[18] Plantar flexion is the movement that occurs at the ankle when the foot is pointed downwards.

[19] *Vide* footnote 15.

[20] *Vide* footnotes 15 and 17.

5. The safety investigation did not exclude the possibility that the ETO's vision may have either been slightly blurry due to dry eyes, or he may have applied his eye drops while passing through the cross deck, which may have resulted in the momentary blurring of his vision while his eyes settled.
6. The safety investigation hypothesized that the ETO had intended to proceed towards the forward part of the vessel, to check some other electrical equipment. Since cargo operations were in progress from the port side, the only option he may have seen was to pass through the cross deck to the starboard side.
7. The safety investigation considered it possible that the ETO had intended to proceed to the starboard side and since the accommodation's starboard side door was locked, he used the cross deck.
8. The wound seen on the ETO's forehead suggested that his safety helmet was not on. Probably, if the ETO had tripped over an obstruction, the safety helmet may have slipped off his head, especially since a chin strap was not fitted to the helmet.
9. Information relayed to the safety investigation suggested lack of preparedness in the port, at that time, to deal with medical emergencies. However, the safety investigation was unable to verify the extent of such preparedness.

RECOMMENDATIONS[21]

Polskie Linie Oceaniczne S.A. is recommended to:

09/2024_R1 ensure that all safety helmets on board its fleet are fitted with chin straps and that the crew members always use the chin straps.

[21] **Recommendations shall not create a presumption of blame and / or liability.**

SHIP PARTICULARS

Vessel Name:	*Port Gdynia*
Flag:	Malta
Classification Society:	Polish Register of Shipping (PRS)
IMO Number:	9334387
Type:	Container vessel
Registered Owner:	Aranda S.P. Z.O.O.
Managers:	Polskie Linie Oceaniczne S.A.
Construction:	Steel
Length Overall:	220.00 m
Registered Length:	220.23 m
Gross Tonnage:	34,642
Minimum Safe Manning:	15
Authorised Cargo:	General cargo in containers

VOYAGE PARTICULARS

Port of Departure:	Cotonou, Benin
Port of Arrival:	Bata, Equatorial Guinea
Type of Voyage:	Short international voyage
Cargo Information:	General cargo in containers
Manning:	19

MARINE OCCURRENCE INFORMATION

Date and Time:	21 July 2023, at around 1055 LT
Classification of Occurrence:	Very Serious Marine Casualty
Location of Occurrence:	Bata, Equatorial Guinea
Place on Board	Main deck
Injuries / Fatalities:	One fatality
Damage / Environmental Impact:	None reported
Ship Operation:	Moored; Cargo loading – shore-to-ship
Voyage Segment:	Alongside
External & Internal Environment:	Daylight, clear sky, with good visibility and a Southwesterly gentle breeze. Sea state: ‘slight’, with low swell. Air and sea temperatures were recorded at 26 °C and 27 °C, respectively.
Persons on board:	19 crew members and an undetermined number of stevedores