REPUBLIC OF THE MARSHALL ISLANDS

Maritime Administrator

SHAMAN WISDOM MARINE SAFETY INVESTIGATION REPORT

Occupational Fatality

North Pacific Ocean | 5 June 2024

Official Number: 9284

IMO Number: 9563407

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AUTHORITY

An investigation, under the authority of the Republic of the Marshall Islands laws and regulations, including all international instruments to which the Republic of the Marshall Islands is a Party, was conducted to determine the cause of the casualty.

Maritime Administrator

TABLE OF CONTENTS

LIST OF ABBREVIATIONS AND ACRONYMS

3/E	Third Engineer
°T	Degrees True
ASD	Able Seafarer Deck
C/O	Chief Officer
cm	Centimeters
EU-OSHA	European Agency for Safety and Health at Work
IACS	International Association of Classification Societies
ISM	International Safety Management
kg	Kilograms
m	Meter
NE	Northeast
No.	Number
N	North
OOW	Officer of the Watch
PPE	Personal Protective Equipment
RA	Risk Assessment
Rev.	Revision
SMS	Safety Management System
SOLAS	International Convention for the Safety of Life at Sea, 1974
UTC	Coordinated Universal Time
W	West

DOCUMENTS CITED

E-fact 14 . . . . . .Hazards and risks associated with manual handling in the workplace

ISM Code . . . . . International Safety Management Code for the Safe Operation of Ships and for Pollution Prevention

MLC, 2006 . . . . . .Maritime Labour Convention, 2006

MSA 06-24 . . . . . .Marine Safety Advisory No. 06-24, Incidents Involving the Storage and Handling of Steel Plates

PR37/Rev.3-Aug-2023-CLN-1 . . . . . .IACS Procedural Requirement for Confined Space Safe Entry

COSWP. . . . . .Code of Safe Working Practices for Merchant Seafarers

STCW Code . . . . . Seafarers' Training, Certification and Watchkeeping Code

ISM Form S27. . . . . ISM Form S27 – Checklist of Safety Precautions Prior to Work, as part of the Company's SMS on board

PART 1: EXECUTIVE SUMMARY

On 5 June 2024, at 0800,[1] the Bosun on board SHAMAN WISDOM instructed the ASD1 and ASD2 to select a suitable steel plate in the Forecastle Store to construct a step for one of the deck stairs. Both the ASD1 and ASD2 were wearing the standard PPE to work on deck, including a safety helmet, coveralls, and safety shoes.

Steel plates of different sizes and weights were vertically stowed against the bulkhead of the Forecastle Store. A retaining bar bolted onto two threaded rods kept the steel plates in position. The ASD2 was positioned at the entrance of the Forecastle Store, next to the steel plate storage location. The ASD1 was standing forward of the ASD2, in front of the steel plates. While the ASD2 was in the process of removing the nut from the threaded rod closest to the door, the retaining bar pushed the nut from the rod and some of the steel plates fell forward. The falling steel plates struck the ASD1 and subsequently pinned his head against steel plates which were resting against the opposite longitudinal bulkhead, resulting in severe head trauma. The ASD1 died instantly. The ASD1's safety helmet was found lying next to him and was not damaged.

The Republic of the Marshall Islands Maritime Administrator's (the "Administrator's") marine safety investigation determined that the provisions for the stowage of steel plates on board SHAMAN WISDOM were insufficient to prevent the steel plates from falling when the nut securing the retaining bar was loosened. The potential risk of falling steel plates had not been assessed during the stowage of the plates or prior to removal of the retaining bar. This resulted in the ASD1 being positioned in the impact zone of the falling steel plates, as any measures to prevent them from falling were absent. The investigation further determined that the ASD1 was likely not properly using the chin strap to secure the safety helmet in place.

The below lessons learned were identified.

- The location and design of storage racks for steel plates should eliminate the potential for steel plates to fall while being handled.
- Unsecured or partially unsecured objects have the potential to fall or move. Seafarers should maintain a safe position relative to the unsecured object.
- Safety helmets need to be properly sastened to prevent falling off during a fall or an abrupt movement.

1 Unless stated otherwise, all times are ship's local time (UTC -11).

PART 2: FACTUAL INFORMATION

The following Factual Information is based on the information obtained during the Administrator's marine safety investigation.

Ship particulars at the time of the incident: *see* chart to right.

Narrative

On 5 June 2024, the geared, five-hatch, general cargo vessel SHAMAN WISDOM *(see Figure 1)* was in position 31° 15.00' N, 165° 21.80' W and loaded with heavy machinery on a voyage from Lianyungang, People's Republic of China (hereinafter, "China") to Manzanillo, United Mexican States with an estimated arrival on 17 June 2024.

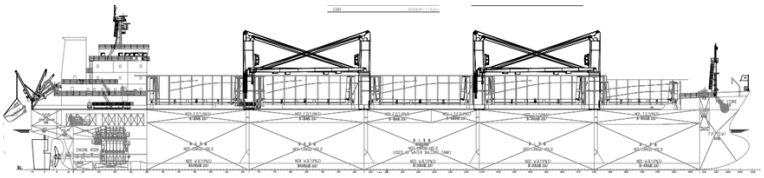

Figure 1: SHAMAN WISDOM General Arrangement.

The ASD1 was on duty from 0400 to 1200. He was assigned to the 0400 to 0800 bridge watch and after breakfast, around 0800, he joined the daily work meeting where the Bosun assigned the deck activities for that day. The ASD1 and ASD2 were assigned to select a suitable steel plate in the Forecastle Store to construct a step for one of the deck stairs.

During the daily work meeting, ISM Form S27, a general checklist with safety precautions, was completed by the C/O and signed by the deck crew before starting with the assigned activities. To select a steel plate, the standard PPE for work on deck was required, which included coveralls, a safety helmet, and safety shoes. No additional RA for the deck activities on 5 June 2024 was carried out.[2]

On 5 June 2024 at 0800, the OOW observed a northeasterly Beaufort Force 4 wind and a moderate sea. The vessel maintained a course of 103˚T. The wind and waves were coming from the port side and the ship was slightly rolling and pitching.

2 As stated in the Company's ISM Manual 9.6 Risk Analyse, Rev. No: 01 – 27.10.2014.

SHIP PARTICULARS

Vessel Name
SHAMAN WISDOM

Registered Owner
Wisdom Sea Service Ltd.

ISM Ship Management
Beyaz Denizcilik Ltd. Sti.

Flag State
Republic of the Marshall Islands

IMO No.	Official No.	Call Sign
9563407	9284	V7A4544

Year of Build	Gross Tonnage
2010	22,409

Net Tonnage	Deadweight Tonnage
12,013	35,083

Length x Breadth x Depth
172.81 x 28.40 x 15.00 m

Ship Type
General Cargo

Document of Compliance Recognized Organization
Nippon Kaiji Kyokai

Safety Management Certificate Recognized Organization
Nippon Kaiji Kyokai

Classification Society
American Bureau of Shipping

Persons on Board
22

Around 0820, crewmembers started with the assigned activities on deck. The ASD1 and ASD2 went to the entrance of the Forecastle Store where steel plates of different sizes and weights were vertically stowed against a heavy deck plate that was spot-welded to the port side longitudinal[1] bulkhead *(see Figure 2)*.

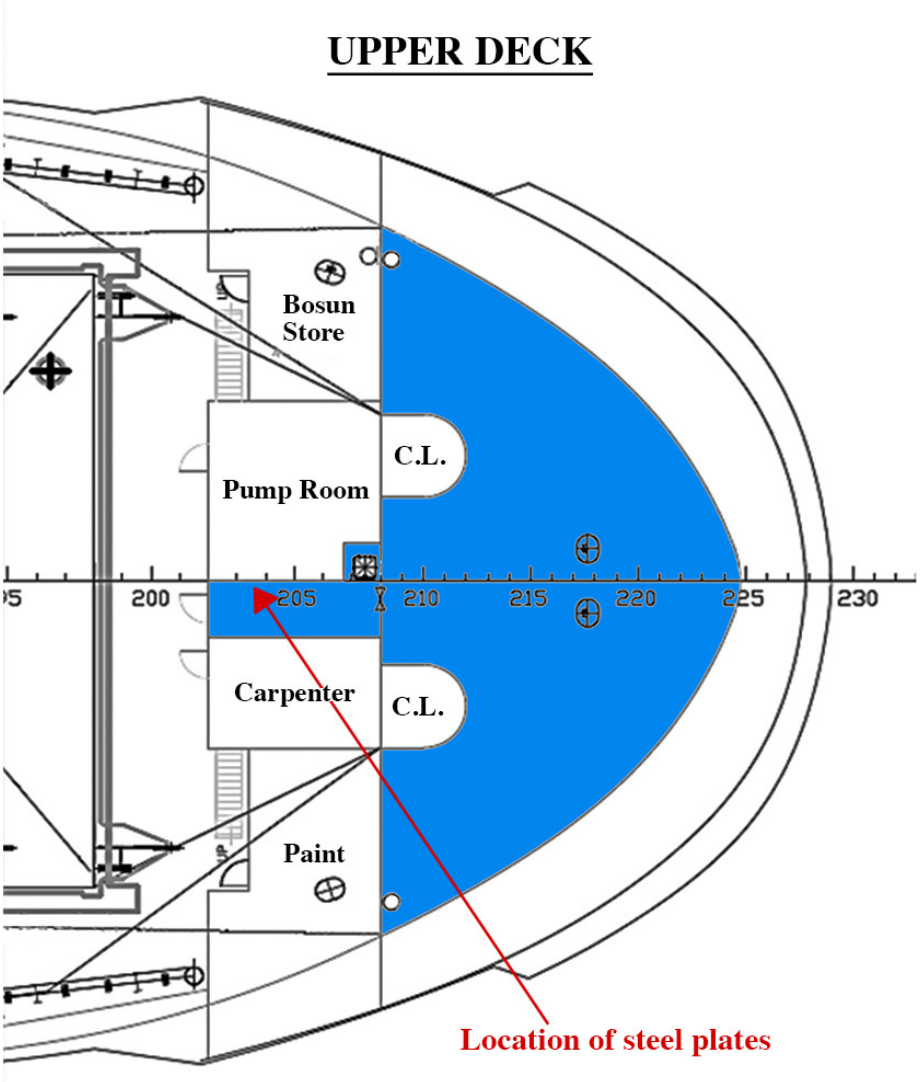

Figure 2: The perimeter of the Forecastle Store is indicated in blue. The arrow indicates the position of the steel plates near the entrance of the Forecastle Store.

The weight of the heaviest free-standing steel plates was between 50–80 kg each. A retaining bar bolted onto a threaded rod that was welded to the bulkhead, in front of and behind the steel plates, kept the steel plates in position. At the side of the entrance door, the retaining bar was tightened with a nut, requiring a spanner to loosen it. At the other end of the retaining bar, a wing nut with long wings was used. There was no mechanical means in place to prevent the steel plates from falling when the retaining bar was being removed *(see Figure 3)*.

1 Fore and aft direction of the ship.

Figure 3: Steel plates stored inside of the Forecastle Store. The ASD1's safety helmet is lying where it was found after the incident.

When the ASD1 and ASD2 entered the Forecastle Store entrance, the ASD1 positioned himself in front of the steel plates while the ASD2 prepared to loosen the nut that held the retaining bar onto the threaded rod closest to the entrance of the Forecastle Store.

As the ASD2 was loosening the nut, the retaining bar suddenly pushed the nut from the rod and the steel plates fell toward the opposite bulkhead. The falling steel plates struck the ASD1, pinning his head against the steel plates that were located against the opposite bulkhead.

The ASD2 was not struck by the falling steel plates and immediately alerted the Bosun who informed the Bridge. Next, the Bosun summoned two additional ASDs and two Oilers who were working nearby and together with the ASD2, they returned to the Forecastle Store where they lifted the fallen steel plates off the ASD1. Meanwhile, the C/O had arrived on scene and examined the ASD1. The C/O observed an open skull fracture and a deep cleft at the right upper side of his skull to the back of his neck. No breathing or pulse could be detected and at 0844, the ASD1 was declared deceased.

The ASD1's safety helmet was lying next to him and did not show any marks of a heavy impact by the steel plates. The chin strap was attached to the helmet and the clasp was closed when the helmet was found.

Storage of Steel Plates

The steel plates were stored vertically against the longitudinal bulkheads leading into the Forecastle Store. The storage rack consisted of a retaining bar that slid over two threaded rods that were welded to the bulkhead *(see Figure 3)*. The retaining bar, which was made of flat iron, was held in place on the threaded studs by a nut on either end. A standard nut was threaded onto the stud nearest the door leading to the Forecastle Store. A wing nut was turned onto the opposite stud.

The retaining bar was bent on the end closest to the entrance to the Forecastle Store and did not fit straight onto the threaded stud *(see Figure 4)*. No stopper was in place on the floor or bulkhead to prevent the steel plates from falling after the retaining bar was removed.

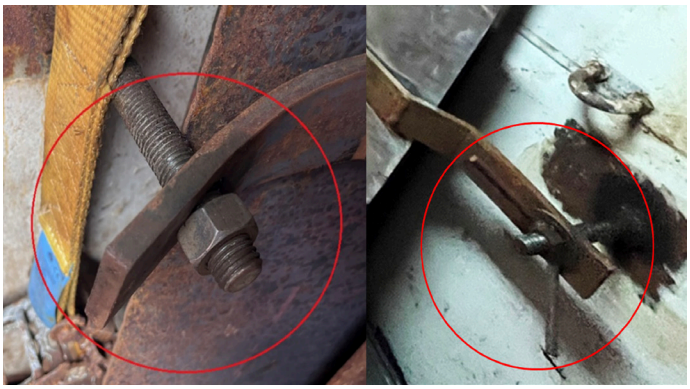

Figure 4: The standard nut was threaded onto the stud closest to the entrance of the Forecastle Store (left) and the wing nut was threaded on the opposite stud furthest from the entrance to the Forecastle Store (right). These threaded studs and nuts were used to secure the retaining bar in place.

The steel plates were brought on board on or around 4 May 2024 when SHAMAN WISDOM left dry dock at Dalian, China. One heavy steel plate was spot-welded against the longitudinal bulkhead. The other received steel plates, which measured approximately 150 x 155 cm and 150 x 200 cm, were stowed against the steel plate that was spot-welded to the longitudinal bulkhead. Smaller steel plates, that were of varying sizes, were then placed in front of the new steel plates. No wood or wedges were used to equally spread the tension of the retaining bar against the steel plates *(see Figure 3)*.

There was no RA, work instruction, or procedure available on board related to the stowage of steel plates.

The Forecastle Store

The Forecastle Store on board SHAMAN WISDOM was located under the Forecastle and accessible through an access hatch on the Forecastle and by means of a weathertight door at Crossdeck Section No. 1. The door gave access to the Forecastle Store through a corridor formed by two longitudinal bulkheads *(see Figure 2)*. At the end of the corridor adjacent to the Forecastle Store, there was an access hatch to Cargo Hold No. 1. The corridor, the forecastle storage area, and the access hatch were all located in the same space. Both entrances to the Forecastle Store were marked as a restricted area.[2]

Heavy machinery was loaded inside Cargo Hold No. 1. Due to the nature of the cargo, the Forecastle Store was entered on 5 June 2024 without an additional enclosed space entry work permit.

Crew

SHAMAN WISDOM had 22 crewmembers, six more than required by the Minimum Safe Manning Certificate issued by the Administrator.

2 A connected space as defined in PR37/Rev.3-Aug-2023-CLN-1.

On 19 June 2024, a flag State inspection was conducted where it was identified that two Oilers and two ASDs were not in possession of the required seafarer documentation issued by the Administrator for their respective positions on board.

The ASD1 was one of them. In addition, the Seafarers' Identification and Record Books of one Oiler and the 3/E had expired at the time of the incident. A total of six ISM Code and MLC, 2006 related seafarer documentation deficiencies were observed during that flag State inspection.

The Administrator did not find any indication that any crewmembers involved with this incident failed to receive the amount of rest mandated by the STCW Code, Section A-VIII/1, Paragraphs 2 and 3, and the MLC, 2006, Regulation 2.3.

The crewmembers involved had the following experience:

RANK	TIME ON BOARD SHAMAN WISDOM	TIME IN RANK	TIME WITH COMPANY	TOTAL TIME AT SEA
Bosun	2 years, 4 months	12 years	15 years	15 years
ASD1	1 year, 3 months	6 years	6 years	6 years
ASD2	1 year, 6 months	7 years	7 years	7 years

The ASD1 joined SHAMAN WISDOM on 11 March 2024 without valid RMI seafarer's documents.

The Familiarisation Checklist[3] was completed by the ASD1 on 12 March 2024. In addition, the On Board Training – Familiarisation Form[4] for the ASD1 was completed by the Master on 21 March 2024. This training included safe working procedures.

The ASD1's most recent medical examination was conducted on 2 March 2024. He was found medically fit for duty without restrictions.

Safe Working Procedures

The safe work procedures in the Company's SMS included ISM Form S27, for carrying out a risk evaluation as specified in the ship's SMS.[5] ISM Form S27 contains a list with generic safety precautions to remind crewmembers of safety precautions to be taken related to a planned job. ISM Form S27 does not specify planned jobs but identifies if the listed precautions are applicable or not during a stated period by means of tick boxes.[6] ISM Form S27 further specifies that an additional RA needs to be conducted if high risks are considered likely.

Selecting a steel plate in the Forecastle Store was not assessed as an activity with any associated high-risks.

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3 The Company's ISM Form P7 of the SMS, Familiarisation Checklist, was required to be completed upon sign-on to the ship in accordance with SOLAS III, Regulation 19.4.1.

4 The Company's ISM Form P8 of the SMS, On Board Training Familiarisation. The form indicated that it had to be completed within the first two weeks of the date of embarkation.

5 *See* Company's Shipboard ISM Manual Rev. 01-27.10.2014, Section 9.6 – Risk Analyse.

6 The checklist specifies the date and validity period. The checklist completed on 5 June 2024 was valid from 0800 to 1700.

PART 3: ANALYSIS

The following Analysis is based on the above Factual Information.

Storage of Steel Plates

Steel plates on board SHAMAN WISDOM were vertically stored in a longitudinal direction at the entrance of the Forecastle Store. The steel plates were kept in position by means of a retaining bar that was held in place by two nuts that were turned onto two threaded studs.

The location and the means to store and secure the steel plates had not been adapted to accommodate the additional amount and size of steel plates that were stored. The way the steel plates were stored on board SHAMAN WISDOM made them vulnerable to fall as soon as the retaining bar was released as:

1. steel plates that are stored in longitudinal direction are more susceptible to falling due to rolling motions. Depending on the initial inclination angle of the steel plates, even a minor force, such as a slight rolling movement of the ship, could be sufficient to cause the steel plates to fall;
2. the retaining bar pushed the steel plates against the bulkhead below the center of gravity of the larger plates. This force potentially brought straight vertically positioned steel plates out of balance resulting in the steel plates moving beyond the vertical plane; and
3. no stopper was in place on the floor or bulkhead to prevent the steel plates from falling after the retaining bar was removed.

It was reported that the retaining bar, which was made of flat iron and susceptible to bending, suddenly pushed the nut closest to the Forecastle Store entrance off the threaded stud, before it was completely removed by the ASD2. The way the steel plates were stored required that pressure be applied at both ends of the retaining bar to push the retaining bar onto the threaded studs. This pressure caused the retaining bar to bend around the area where the stack of steel plates was deepest *(see Figure 3)* and placed the retaining bar in tension when the nuts were screwed onto the studs to hold the steel plates in place. As the ASD2 loosened the nut, this pressure most probably caused the retaining bar to suddenly spring off the stud. Wood or wedges filling the gaps between the steel plates and the retaining bar could have equally spread the tension of the retaining bar against the steel plates and could have prevented the retaining bar to bend around the plates, provided that the studs were long enough.

It was observed that no lifting appliances were in place to safely transport heavy steel plates into the entrance of the Forecastle Store.[7]

Safe Working

Two crewmembers were assigned to select a suitable steel plate. They had done this task before and were familiar with the storage location of the steel plates. It was reportedly the first time, after adding additional steel plates in dry dock,

7 Based on guidance in COSWP, 20–25 kg is the maximum weight a seafarer can be expected to carry. The EU-OSHA has issued guidance indicating that for most people a weight of 20–25 kg is considered heavy to lift. *See* EU-OSHA E-fact 14.

that the retaining bar had to be loosened. During the investigation, it could not be determined whether or not the ASD1 and ASD2 were involved in securing the retaining bar after storing the additional steel plates on 4 May 2024.

The ISM Form S27 only verified if the listed safety precautions were applicable during a certain period or not and did not further assess if additional potential risks were present for certain activities. The list can be considered as a tool to check the presence of certain risks but does not invite consideration of all the risks related to the planned activities.

The experience and general safety awareness[8] of the crewmembers was the only precautionary measure in place for detecting any job-related risk for activities that were not identified as activities with high risks. General safety awareness was trained by familiarisation with safe working procedures and by regular attendance of drills, work permit meetings, toolbox talk meetings for risky activities, and daily safety briefings.

The potential risk of steel plates falling over had not been assessed either when the steel plates were stowed on or around 4 May 2024 or before the crewmembers started to remove the retaining bar on 5 June 2024. The situational awareness of crewmembers involved in the stowage of the steel plates and in the selection of a suitable plate was insufficient to identify the potential risk of falling steel plates when storing and retrieving them. No RA was in place to compensate for the lack of situational awareness and no pre-task RA[9] was in place to guide crewmembers to identify unsafe situations or potential risks before commencing any activity.

PPE

A safety helmet was required when working on deck on board SHAMAN WISDOM. Wearing a helmet was one of the safety precautions that was listed in ISM Form S27.

The ASD1's safety helmet was found lying on the deck next to him, after he was struck by the falling steel plates. The safety helmet did not show any marks of a heavy impact by steel plates. Most probably his helmet was not properly secured and fell off either before or just as his head contacted the steel plates that were stowed on the opposite longitudinal bulkhead.

PART 4: CONCLUSIONS

The following Conclusions are based on the above Factual Information and Analysis and shall in no way create a presumption of blame or apportion liability.

1. Causal factors that contributed to this very serious marine casualty include the:
   (a) steel plates falling suddenly onto the ASD1. As the nut holding the retaining bar was released, the force from the steel plates pushed the nut off knocking the ASD1 back against the opposite longitudinal bulkhead which resulted in fatal head trauma; and

8 "Safety awareness among seafarers plays a vital role in accident prevention. It encompasses the knowledge of risks, vigilance in operations, and the motivation to comply with safety regulations and procedures." (Source: Hetherington, C., Flin, R., & Mearns, K. (2006), Safety in shipping: The human element. Journal of Safety Research, 37(4), 401-411).

9 Sometimes also referred to as a last minute RA, dynamic RA or similar terms, to identify risks on the spot before starting the activity.

(b) design of the storage rack which:

(i) did not provide a mechanical means of preventing the steel plates from falling when the nut holding the retaining bar was released; and

(ii) required that the retaining bar be placed under tension when the nuts were tightened to secure the steel plates; and

(c) inadequate situational awareness to detect the potential risk of falling steel plates when storing and retrieving them in combination with the absence of a system to identify the potential risks.

2. Additional causal factors that may have contributed to this very serious marine casualty include the:

(a) sea state and the consequent rolling motion of the ship possibly contributing to the falling of the plates, as the storage location was in a longitudinal direction; and

(b) likelihood that the ASD1's safety helmet was not properly fastened.

3. Additional issues that were identified but did not contribute to this very serious marine casualty include that the:

(a) access hatch located in the bulkhead between Cargo Hold No. 1 and the Forecastle Store may create a potential hazard in case hazardous or oxygen depleting cargo is loaded within Cargo Hold No.1;

(b) storage location required the steel plates to be handled manually; and

(c) six seafarers on board did not possess valid Republic of the Marshall Islands seafarer documentation.

PART 5: PREVENTIVE ACTIONS

1. In response to this very serious marine casualty, the Company has taken the following Preventive Actions:

(a) Relocated the storage rack for steel plates to a safer position on board their entire fleet and secured them to prevent any risk of the plates falling *(see Figure 5)*.

Figure 5: New storage racks on board all Company managed vessels.

(b) When needed, steel plates will be divided into smaller, more manageable pieces for safer handling.

(c) New safety helmets were distributed to the crewmembers across the entire fleet together with instructions on how to properly secure them.

(d) Additional training sessions on heavy lifting and safety awareness were provided to crewmembers.

(e) A comprehensive review and enhancement of the ship's SMS was carried out, resulting in:

(i) the introduction of new forms, and the revision of existing forms, related to safe working practices, including Form S28 – Heavy Load Lifting Control Checklist, and a revision of ISM Forms S27 and S18 – Entering Enclosed Spaces and Rescue Checklist (Revised); and

(ii) thirty new procedures being added to the SMS to enhance safety and reduce operational risks, including procedures for a Company-Specific additional training policy and High-risk Tasks and Safety Procedures Onboard Ships, and a complete update of the Enclosed Space Entry Procedures.

(f) In response to the issue of expired or missing documents identified during the investigation, the Company has implemented a:

(i) centralized digital platform (NOZZLE) for real-time monitoring of all crew certificates and documentation;

(i) dual-stage verification process with an initial review at the office and final confirmation on board upon joining a Company-managed ship; and

(ii) required monthly compliance status report, submitted by the Master and C/O which is reviewed by the Personnel Manager and Assistant Personnel Manager.

2. The Administrator has taken the following Preventive Actions:

(a) Issued MSA 06-24 highlighting the urgent need for vessel managers and seafarers to ensure steel plates are properly secured and handled.

PART 6: RECOMMENDATION

The following Recommendation is based on the above Conclusions and in consideration of the Preventive Actions taken.

1. The Company ensures that the recommendations stipulated in MSA 06-24 are properly implemented on all Company-managed ships.

The Administrator's marine safety investigation is closed. It will be reopened if additional information is received that warrants further review.