

MA2019-2

**MARINE ACCIDENT
INVESTIGATION REPORT**

February 28, 2019



The objective of the investigation conducted by the Japan Transport Safety Board in accordance with the Act for Establishment of the Japan Transport Safety Board is to determine the causes of an accident and damage incidental to such an accident, thereby preventing future accidents and reducing damage. It is not the purpose of the investigation to apportion blame or liability.

Kazuhiro Nakahashi
Chairman
Japan Transport Safety Board

Note:

This report is a translation of the Japanese original investigation report. The text in Japanese shall prevail in the interpretation of the report.

MARINE ACCIDENT INVESTIGATION REPORT

January 30th, 2019

Adopted by the Japan Transport Safety Board

Chairman Kazuhiro NAKAHASHI

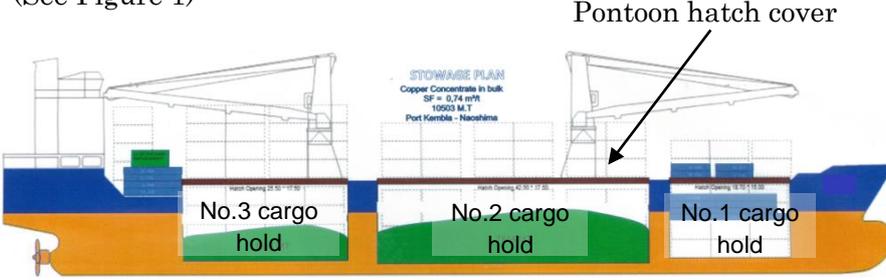
Member Yuji SATO

Member Kenkichi TAMURA

Member Toshiyuki ISHIKAWA

Member Makiko OKAMOTO

Accident type	Fatality of a crew member
Date and time	Around 17:26 on September 18, 2018 (local time, UTC+9 hours)
Location	Mitsubishi Naoshima wharf, Naoshima-cho, Kagawa Prefecture On a true bearing of approximately 236° and at a distance of 460 meters from Sanuki Terashima lighthouse (approximately 34° 28.7' N, 133° 58.1' E)
Summary of the Accident	At around 17:26 on September 18, 2018, while the cargo vessel ERIK was moored at the Mitsubishi Naoshima wharf, with the master and 14 crew members on board, 4 crew members were performing the cleaning work of the upper hatch coaming of the cargo holds after unloading cargo, and an able seaman fell from the upper deck to the bottom floor of the cargo hold. The able seaman was pronounced dead after being conveyed from the cargo hold.
Process and Progress of the Investigation	(1) Set up of the Investigation On September 19, 2018, the Japan Transport Safety Board appointed an investigator-in-charge and four other marine accident investigators to investigate this accident. (2) Collection of Evidence September 19 and 20: On-site investigations and interviews October 3: Collection of questionnaire (3) Comments from Parties Relevant to the Cause Comment on the draft report was invited from parties relevant to the cause of the accident. (4) Comments from the Flag State Comment on the draft report was invited from the Flag State of the ERIK.
Factual Information	
Vessel type and name	Cargo vessel ERIK (registered in Antigua and Barbuda)
Gross tonnage	9,618 tonnes
Vessel number	9435105 (IMO No.)
Owner, etc.	Krey Schiffahrts GmbH & Co MS "ERIK" KG
Management company	Krey Schiffahrts GmbH & Co. KG (hereinafter referred to as "Company A")
Ship's classification	DNV DL

<p>L×B×D, Hull material Engine, Output Date of launch, etc.</p>	<p>138.50m × 21.00m × 11.00m, steel Diesel engine, 5,400kW June 28, 2007 (See Photo 1)</p>  <p style="text-align: center;">Photo 1 ERIK</p>
<p>Information on the cargo hold, etc.</p>	<p>The ERIK (hereinafter referred to as “the vessel”) was a multi-purpose dry cargo vessel, which had three cargo holds numbered 1, 2 and 3 in order from the bow. Each cargo hold had pontoon hatch covers (hereinafter referred to as “hatch covers”), and was able to load containers on the hatch covers. (See Figure 1)</p>  <p style="text-align: center;">Figure 1 Cargo equipment arrangement</p>
<p>Crew Information</p>	<p>Master (Nationality: Russian Federation), male, 38 years old Endorsement attesting the recognition of certificate under STCW regulation I/10 Master (issued by Antigua and Barbuda) Date of issue: June 13, 2018 (valid until November 28, 2019) Able seaman (Nationality: Russian Federation), male, 59 years old Endorsement attesting the recognition of certificate under STCW regulation I/10 Able seaman (issued by Antigua and Barbuda)</p>
<p>Injuries to Persons</p>	<p>Fatality One person (Able seaman, hereinafter referred to as “Crew Member A”)</p>
<p>Damage to Vessel (or Other Facilities)</p>	<p>None</p>
<p>Weather and Sea Conditions</p>	<p>Weather: Weather – Clear; Atmospheric temperature – approximately 27.3 °C; Wind direction – south-southeast; Wind speed – approximately 1.5m/sec.; Sight – Clear Sea conditions: Sea – Calm; Sea level height – approximately 217cm (Uno port); Tide – final phase of flood tide Sunset time 18:06</p>
<p>Events Leading to the</p>	<p>The vessel moored at the Mitsubishi Naoshima wharf at around</p>

Accident

14:25 on September 15, with the master, Crew Member A and 13 crew members (master and 13 crew members from the Russian Federation and 1 crew member from Ukraine) on board, and subsequently unloading of copper concentrates from the No. 3 cargo hold and then the No. 2 cargo hold was carried out between around 08:00 on the 17th and around 17:20 on the 18th.

The four crew members (Crew Member A, the boatswain (hereinafter referred to as “Crew Member B”), the other able seaman (hereinafter referred to as “Crew Member C”) and the ordinary seaman (hereinafter referred to as “Crew Member D”)) started “the cleaning work of the upper hatch coaming of the cargo holds on the upper deck” (hereinafter referred to as “the cleaning work”) at around 17:23 in the arrangement as shown in Figure 3.

The master was in the crew accommodation area.

A management-level navigation officer (hereinafter referred to as “N. Officer A”) was also measuring the vessel’s forward draft on the wharf while commanding the cleaning work.

The other navigation officer (hereinafter referred to as “N. Officer B”) was keeping the watch duty at a position around the starboard gangway and saw the four crew members working.

(See Figure 2)

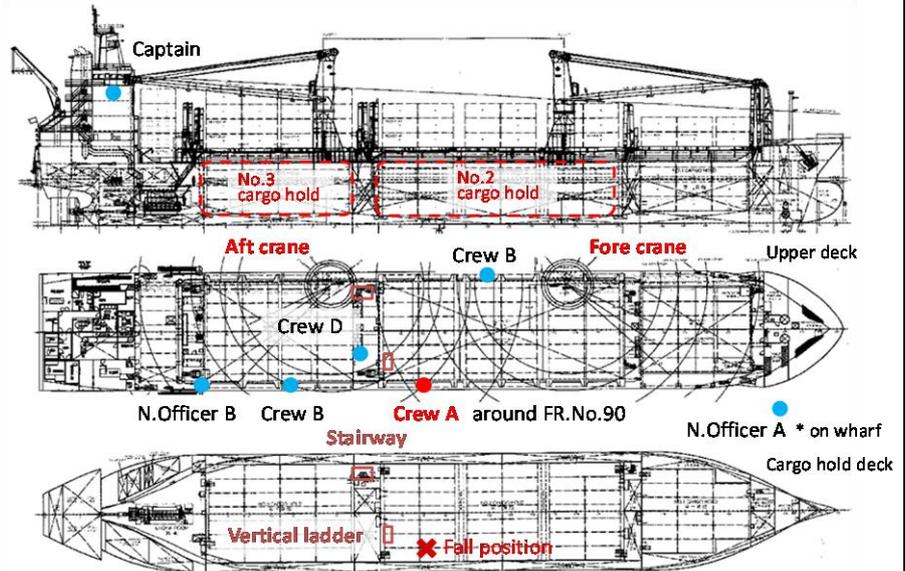


Figure 2 Position of crew members in general arrangement

The cleaning work was an item of routine works taking about 30 minutes, with the aim of maintaining the watertightness of the cargo hold. To prevent water invasion between the hatch cover of the cargo hold and the hatch coaming, the crew members were sweeping cargo mineral dust using portable ladders (hereinafter referred to as “the Ladder”) and cleaning brushes after the cargo unloading operation. At the time of the accident, the cleaning work was being carried out in the same way as usual. (See Photo 2)

Hatch coaming of cargo hold



Photo 2 Environment of cleaning work and cleaning tools

When doing the cleaning work, Crew Member D, who was at the aft starboard side of the No. 2 cargo hold, saw that Crew Member A's upper body from his thigh was higher than the top of the hatch coaming on the upper deck starboard side of the No. 2 cargo hold, and that he was doing the cleaning work utilizing the cleaning brush.

Crew Member D looked at Crew Member A, who came to be in an unstable posture and fell forward, then twisted his body and tried to clutch at the upper hatch coaming of the No. 2 cargo hold with his left hand. However, he fell head-first with his back facing downward to the bottom of the No. 2 cargo hold at around 17:26.

At the same time, Crew Member B heard the sound of something falling when he was walking toward the stern in the passage of the No. 2 cargo hold port side on the upper deck. Crew Member B then looked out into the interior of the No. 2 cargo hold and noticed Crew Member A lying on his back on the cargo hold floor. Crew Member B descended the stairs to the floor to confirm the condition of Crew Member A, where it appeared that Crew Member A was no longer breathing.

(See Figure 3 and Photo 3)

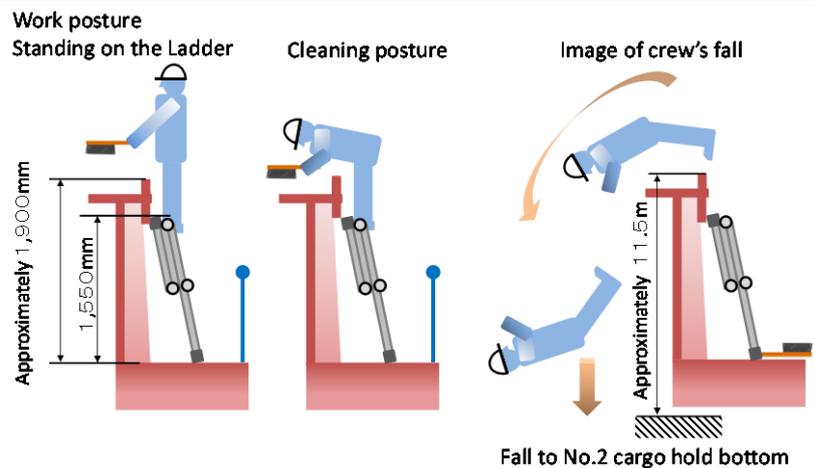


Figure 3 Work posture on the Ladder and situation of fall

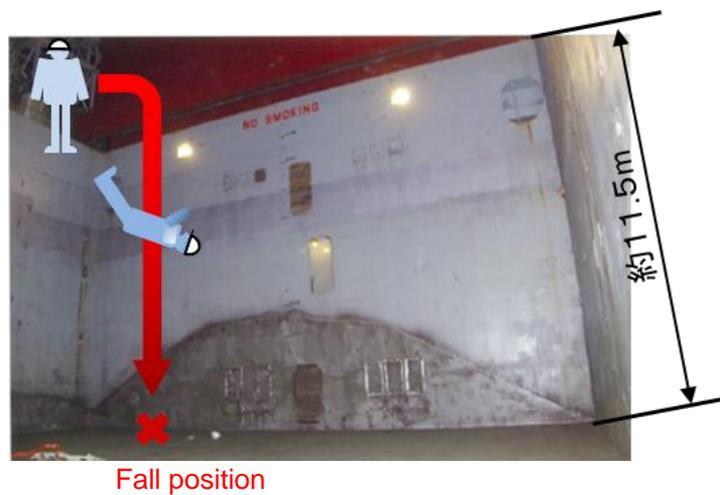


Photo 3 No. 2 cargo hold and fall location of Crew Member A

Using the transceiver, Crew Member D informed the other crew members that Crew Member A had fallen into the No. 2 cargo hold.

N. Officer A contacted the representative of the vessel's agent and asked the agent to report the occurrence of this crew accident to the relevant organizations such as the Japan Coast Guard (hereinafter referred to as "JCG"). The agent notified the JCG of the occurrence of the crew member fall accident, then requested that the master contact the ship owner and the management company.

At around 18:00, the patrol boats of the Regional JCG office and the police arrived at the vessel.

At around 20:00, Crew Member A was laid on a stretcher and pulled up from the No. 2 cargo hold by the vessel fore crane and carried to the JCG boat, and was conveyed to Uno port, Tamano City, Okayama Prefecture. On arrival at the port, Crew Member A had already gone into cardiopulmonary arrest, and at around 21:25 a doctor confirmed that he had died instantly due to brain contusion and compound skull fracture.

(See Attached Figure 1. Map of location of the accident)

Other Matters	<p>(1) Working hours and medical condition of Crew Member A before this accident</p> <p>① Crew Member A was on watch duty from 00:00 to 04:00 and from 12:00 to 16:00 on September 17, took 16 hours as rest time, and was shifted to daily work to take charge of the cargo unloading and doing the cleaning work from 08:00 to 12:00 and from 13:00 to 17:00 on September 18, then was on overtime at 17:26 when the accident occurred.</p> <p>② Crew Member A seemed to be in good health according to the formal medical and health documents, and was in good health condition on the day of the accident in the master's estimation.</p> <p>(2) Facilities, equipment and their usage regarding to the cleaning work</p> <p>① The vessel was not carrying out the ballast water operation at the time of the accident, and also was not subject to inclination of the hull, pitching or rolling due to waves or the like.</p> <p>② The height from the top of the No. 2 cargo hold hatch coaming to the bottom of the No. 2 cargo hold was approximately 11.5 meters. There were no handrails or similar structures designed to prevent falling erected on the vessel around the hatch coaming at the time of the accident.</p> <p>③ Crew Member A wore work wear, safety shoes and a helmet, but did not use fall prevention gear such as a harness-type safety belt*¹.</p> <p>④ During the on-site investigation, other crew members of the vessel reproduced the situation of how Crew Member A used the Ladder in the cleaning work. As a result, it seemed that it was necessary for Crew Member A to climb to the vicinity of the top of the Ladder in order for his working posture to have the upper body from the thigh being higher than the top of the cargo hold hatch coaming.</p> <p>⑤ Around the location where Crew Member A fell, the helmet had fallen and had its chin strap hooked to the inner harness unit, the brush used by Crew Member A had fallen in the vicinity of the Ladder on the upper deck, and the Ladder on which Crew Member A had climbed was maintained in a standing state at the same position as at the time of the accident.</p> <p>⑥ N. Officer B after the accident thought that Crew Member A came to be in an unstable posture on the Ladder when he put his leg on the top of the air vent of the ballast tank which was on the stern side from the Ladder, in order to pull and remove the Ladder to the stern side with his other leg.</p>
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*¹ A "harness type safety belt" means a form of protective equipment for protection against falls from a height by securing several primary parts of the worker's body, such as shoulder, waist, thigh, etc.

N. Officer A and N. Officer B knew that this method of moving the Ladders was being carried out in everyday work. Figure 4 shows the image of moving the Ladder.

(See Figure 4)

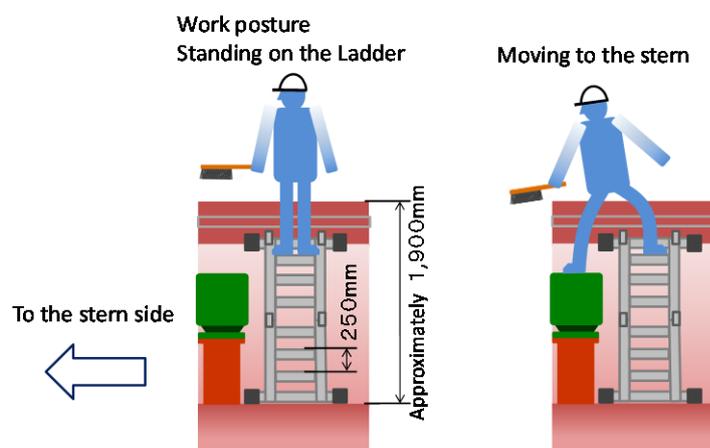


Figure 4 Image of moving the Ladder

(3) Information on safety management implemented by Company A

① Company A had produced a Safety Management Manual (hereinafter referred to as “the Manual”) based on the “International Safety Management Code for the Safe Operation of Ships and for Pollution Prevention” (ISM Code), but had not specified any procedure for the cleaning work.

The chapter “Safety at Work – General” of the procedure manual “Ship Operation Manual” specified the “Code of Safe Working Practices for Merchant Seafarers” (hereinafter referred to as “the CSWP”) published by the Maritime & Coastguard Agency, UK, as one of the main references for safe working onboard.

The CSWP, which laid down standards of performance and monitoring for working onboard according to the CSWP requirements, stated guidelines including fitting methods for safety gear such as adjusting the helmet harness appropriately to wear on the head as well as the usage methods of portable ladders (hereinafter referred to as “the Ladder guidelines”) mentioned below, etc. The CSWP had already been provided onboard the vessel.

- a. Portable ladders are lashed at the top and the upper supporting point.
- b. Portable ladders should extend to at least 1 m (3 rungs) above the upper supporting point or landing place.
- c. Portable ladders should be pitched at 75° from the horizontal.

- d. There should be three points of contact on a portable ladder when working.
- e. The body should always face the portable ladder.
- f. Personnel must use a safety harness with a lifeline secured above the work position, where practicable.

(See Figure 5)

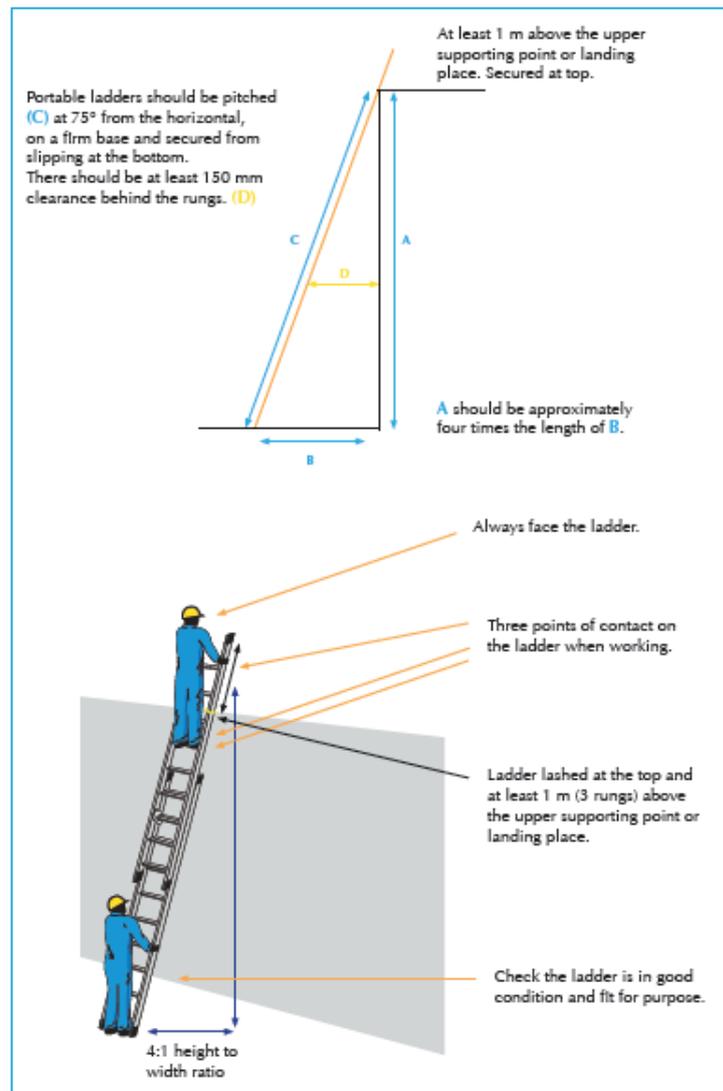


Figure 5 Ladder guidelines in the CSWP
Published by the Maritime & Coastguard Agency, UK

According to Company A, the CSWP was an integral part of the Safety Management System (hereinafter referred to as “the System”), and was utilized when the master and the officers provided guidance to the crew and assessed the risks on board, and it was used as the source of guidance and recommendations for Safety Meetings on board.

② The risk assessment*² sheet for portable ladders

*² “Risk assessment” is a process of risk analysis management that consists of finding out how much risk is involved in some work.

On this vessel, the risk assessment sheet for portable ladders prepared based on the Manual which was processed in the prescribed sheet onboard noted some cautions such as fixing the top of the ladder, do not over-reach, using the a safety harness with fall absorber where practicable, etc., in the column of “Preventive / Control measures / Instructions” of this sheet.

③ Responsibility of Company A in the Manual

According to the Manual, Company A has been responsible for implementation, maintenance and monitoring concerning the whole System, in addition to ensuring that the System was understood and observed by sea staff and shore employees.

(4) Situation of usage of the Ladder in the cleaning work

According to the on-site investigations and interviews, the vessel carried out the cleaning work with respect to item (3)① as follows.

① The Ladder was not lashed at the top and at the contact point on the deck.

② The Ladder was not extended above the upper supporting point and the top of the cargo hatch coaming, therefore the top of the Ladder was 570 mm lower than the top of the cargo hatch coaming.

③ The Ladder was pitched at around 79° from the horizontal.

④ According to Figure 3 and Photo 3 in “Events Leading to the Accident”, while engaged in the cleaning duty, Crew Member A did not support his body with three points of contact and over-reached on the Ladder.

⑤ According to item (2)⑥ in “Other Matters”, the Ladder pulling and removing methods did not involve Crew Member A facing the Ladder.

(5) Recognition of management officers regarding the cleaning work and the usage of the Ladder

① Recognition of management officers

The master had recognized the risk of the cleaning work in that the worker runs a risk when the centroid position of the worker’s body leaned forward above and beyond the top of the cargo hold hatch coaming.

In the morning on the day of the accident, N. Officer A gave notices to the crew members with the transceiver that he had already given for the cleaning work, e.g., not to climb to the highest or a higher position of the Ladder, and to remember his previous cautions, therefore he also thought all crew members were aware of his cautions.

② Information on work at height

According to the Merchant Shipping and Fishing Vessels

	<p>(Health and Safety at Work) (Work at Height) Regulations 2010 issued by the Maritime & Coastguard Agency, UK, although the “2 metre rule” had been applied previously, the Regulations were amended in 2010 such that the provisions are applied to all work carried out “at height” where a person could fall a distance liable to result in an injury to them, and were applied irrespective of whether work is being carried out at 2 metres or above or below 2 metres.</p> <p>The height of the top of the cargo hold hatch coaming was approximately 1,900 mm from the deck, and the master and N. Officer A did not regard the cleaning work as an aloft work, because they thought that the aloft work was work in a place higher than 2 metres.</p> <p>③ Exchange of opinions for measures to prevent recurrence regarding this accident in the Safety Meeting</p> <p>After this accident, the vessel held the Safety Meeting to discuss measures to prevent the recurrence of this crew fall accident, however there was no suggestion of any preventive measures regarding applying the Ladder guidelines in the cleaning work by the crew members.</p> <p>(6) Information received from Company A regarding an investigation of this accident conducted by a survey company</p> <p>According to an initial report received from Company A, which had been drawn up and sent by a survey company, the method of using the Ladder was different from the Ladder guidelines and the reason why Crew Member A fell was unknown because it was not clear how Crew Member A had used the Ladder at the time of the accident; however, the Ladder was in an unstable position so that Crew Member A was in an unbalanced position and fell off the unbalanced Ladder and fell to the bottom of the cargo hold; furthermore, the vessel complied with the ISM system and carried out education and training in accordance with the guidelines, and the Safety Meeting was carried out every month.</p> <p>(7) Comments on this accident by the Flag State</p> <p>According to the reply of the maritime authority of the Flag State, it seemed that the Flag State would classify this crew fall accident as an accident involving the aloft work, and would look into the ISM (the Manual) of the vessel as the main area of the safety investigation onboard for this accident orientation.</p>
<p>Analysis</p> <p>Involvement of crew members</p> <p>Involvement of vessel, engine, etc.</p>	<p>Applicable</p> <p>Not Applicable</p>

<p>Involvement of weather and sea conditions</p> <p>Analysis of the findings</p>	<p>Not Applicable</p> <p>(1) Casualties to Persons The cause of Crew Member A's instantaneous death was brain contusion and compound skull fracture.</p> <p>(2) Medical Condition and Working Situation of Crew Member A It is considered probable that Crew Member A was in good health, and took rest time of about 16 hours before his working hours on the day of the accident, such that Crew Member A engaged in the cleaning duty without any health problems.</p> <p>(3) Weather, Sea Condition and Ship's Situation It is considered probable that, because the weather was clear and calm, and because the vessel did not perform the ballast water operation at the time of the accident, the vessel was in good condition such as the vessel hull not inclining, rolling and pitching, and not imparting shock waves.</p> <p>(4) Situation of Crew Member A's Working Posture It is considered probable that Crew Member A was climbing to around the highest or a higher position on the Ladder, because he was seen to have his upper body from his thigh in a position higher than the top of the cargo hold hatch coaming while he was using the cleaning blush.</p> <p>(5) Causal Factors of Crew Member A's fall</p> <p>① It is considered probable that Crew Member A fell forward and fell to the bottom of the cargo hold because he was working in an unstable posture due to having his body inclined forward without supporting his upper body on the narrow rung of the Ladder when doing the cleaning work.</p> <p>② It is considered probable that Crew Member A's helmet came off while he was falling, because he did not hook the helmet chin strap to his chin and did not wear the helmet appropriately.</p> <p>③ It is considered probable that Crew Member-A was not able to prevent his fall because he was not using a safety belt as a harness.</p> <p>(6) Causal Factor of Safety Management</p> <p>① It is considered probable that, according to item (4) in "Other Matters", Crew Member-A being in an unstable posture on the Ladder involved the fact that that the vessel carried out the cleaning work by methods that differ from the Ladder guidelines.</p> <p>② It is considered probable that the vessel did not take risk reduction measures in the cleaning work, which had been noted in the risk assessment sheet for portable ladders.</p> <p>③ It is considered probable that the vessel approved the crew</p>
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	<p>members always performing different working methods from the Ladder guidelines of the CSWP in everyday work, although the master and the officers who had responsibility for the safety of working onboard had understood the risk of the cleaning work and had provided some cautions.</p> <p>It is somewhat likely that the master and the officers who had responsibility for the safety of working onboard did not know how to apply the “Work at Height Regulation” as “at height” where a person could fall a distance liable to result in an injury to them irrespective of the working height, and therefore the vessel did not apply the Ladder guidelines of the CSWP in the cleaning work.</p> <p>④ It is somewhat likely that Company A was insufficient in monitoring that the crew members clearly understood the Ladder guidelines of the CSWP and then applied and performed the Ladder guidelines in the cleaning work, although Company A had implemented education and training and held Safety Meetings periodically for the crew members onboard all the vessels operated by Company A according to the System.</p>
<p>Probable Causes</p>	<p>It is considered probable that this accident at around 17:26 on June 18 when Crew Member A fell forward and fell from the upper deck to the bottom of the cargo hold bottom occurred because Crew Member A was working while being in an unstable posture on the Ladder when the vessel was doing the cleaning work while the vessel was moored at Mitsubishi Naoshima wharf.</p> <p>It is considered probable that the vessel carried out the cleaning work by the methods that differed from the Ladder guidelines of the CSWP, and that because there was nothing to support his upper body on the Ladder, Crew Member A was performing the cleaning work while being in an unstable posture on the Ladder.</p> <p>It is somewhat likely that Company A was insufficient in monitoring that the crew members clearly understood the Ladder guidelines of the CSWP and then applied and performed the Ladder guidelines in the cleaning work, because the vessel carried out the working methods being different from the Ladder guidelines in everyday work.</p>
<p>Safety Actions</p>	<p>1. Measures to prevent recurrence and to reduce of damage regarding this accident</p> <p>It is considered probable that it is necessary for the following measures to be implemented to prevent recurrence and to reduce the damage of similar accidents.</p> <p>(1) Company A should have the master supervise the crew members to certainly take preventive measures for fall accident in the cleaning work.</p>

	<p>(2) The master and Designated Person Ashore of Company A should implement the risk assessment of the cleaning work on an individual work basis, and Company A should take the necessary measures for all the vessels operated by Company A to prevent fall accidents by using a safety harness, etc. according to this assessment.</p> <p>(3) Company A should have all the vessels operated by Company A observe the Ladder guidelines of the CSWP. On the other hand, Company A should take other safety measures for all the vessels operated by Company A including changing the use of the Ladder if it seems that it is difficult to conform to the Ladder guidelines in the cleaning work.</p> <p>(4) Company A should enhance monitoring of the safety education such as appropriately wearing a helmet in all the vessels operated by Company A.</p> <p>2. Measures taken by Company A</p> <p>(1) Company A has established a re-training system for management level with the main themes of risk assessment of onboard working and improvement of safety working culture. Captains and chief engineers take part in the re-training before embarking on the vessels to have them achieve safety knowledge in ship operations and furthermore to instruct crew members while they are on the vessels.</p> <p>(2) Company A has increased the number of visits by the person in charge of the System to the vessels operated by Company A as monitoring activities that aim to cultivate a safety working culture and compliance system.</p> <p>(3) Company A has had the opportunity to implement safety meetings utilizing materials such as the CSWP between the crew members of the vessels operated by Company A and the person in charge of the System. In the meeting, they communicated the information on the fatal accident involving a crew member and the causes, and exchanged opinions to provide feedback to crew training.</p> <p>Based on the results of the investigation of this fatal maritime accident, the Japan Transport Safety Board will cause this marine accident investigation report to be widely disseminated to contribute to the prevention of recurrence of the same maritime accident and reduction in damage, with the cooperation of the Japan Distributor Association, the Japanese Shipowners' Association, etc.</p>
Safety Recommendations	In view of the results of this accident investigation, the Japan Transport Safety Board recommends that Krey Schiffahrts GmbH

& Co. KG, which is the Management company of the cargo vessel ERIK, takes the following measures for the purpose of preventing the occurrence of a similar accident and reducing damage.

1. Krey Schiffahrts GmbH & Co. KG should have the master of the ERIK supervise the crew members to certainly take preventive measures for fall accident in “the cleaning work of the upper hatch coaming of the cargo holds on the upper deck”.
2. The master of the ERIK and Designated Person Ashore of Krey Schiffahrts GmbH & Co. KG should implement the risk assessment of “the cleaning work of the upper hatch coaming of the cargo holds on the upper deck” on an individual work basis, and Krey Schiffahrts GmbH & Co. KG should take the necessary measures for the ERIK to prevent fall accidents by using a safety harness, etc. based on this assessment.
3. Krey Schiffahrts GmbH & Co. KG should have all the vessels operated by the Company observe the portable ladder guidelines in the chapter “WORK AT HEIGHT” of the “Code of Safe Working Practices for Merchant Seafarers”. On the other hand, Krey Schiffahrts GmbH & Co. KG should take other safety measures for all the vessels operated by the Company including changing the use of the portable ladder if it seems that it is difficult to conform to the portable ladder guidelines in the cleaning work.
4. Krey Schiffahrts GmbH & Co. KG should enhance monitoring of safety education that covers such as appropriately wearing a helmet in all the vessels operated by the Company.

Attached Figure 1. Map of location of the accident



Source: Geospatial Information Authority of Japan