

MA2014-9

**MARINE ACCIDENT
INVESTIGATION REPORT**

September 25, 2014



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.

Norihiro Goto
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

August 28, 2014

Adopted by the Japan Transport Safety Board

Chairman Norihiro Goto

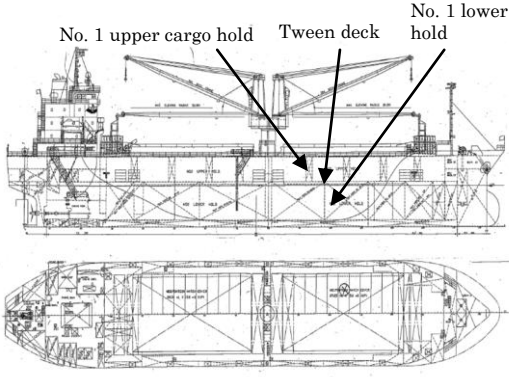
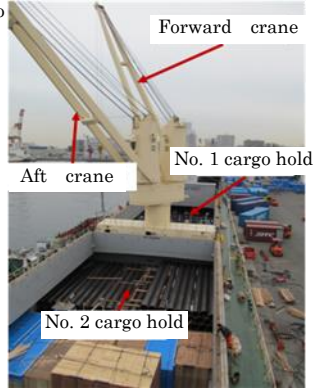
Member Tetsuo Yokoyama

Member Kuniaki Shoji

Member Toshiyuki Ishikawa

Member Mina Nemoto

Accident type	Death and injury of workers
Date and Time	Around 11:10 on March 26, 2013 (local time, UTC + 9 hours)
Location	Liner Berth No. 13, Central Wharf of Port Island, Section II of the Kobe Area, Hanshin Port On a true bearing of 272° and at a distance of approximately 1,900 m from the Kobe No. 6 Breakwater Lighthouse located in Kobe City, Hyogo Prefecture (approximately 34°40.3'N, 135°13.5'E)
Summary of the Accident	At around 11:10 on March 26, 2013, while the cargo vessel JURONG with the master and 20 other crew members onboard was engaged in cargo loading operations at Liner Berth No. 13, Central Wharf of Port Island, Section II of the Kobe Area, Hanshin Port, large tires that had been temporarily placed on the tween deck of the vessel's No. 1 cargo hold fell down, killing one stevedore and injuring another, both of whom were carrying out their duties at the time.
Process and Progress of the Investigation	(1) Set up of the Investigation The Japan Transport Safety Board appointed an investigator-in-charge and another investigator to investigate this accident on March 26, 2013. (2) Collection of Evidence On-site investigation and interviews were conducted on March 26, 2013; interviews were conducted and written replies to questionnaires were collected on March 28, 2013; written replies to questionnaires were collected on March 29 and April 1, 2013 as well as on January 29, 2014; and interviews were conducted on May 29 and 30, 2013 as well as on February 18, 2014. (3) Comments from Parties Relevant to the Cause Comments on the draft report were invited from parties relevant to the cause of the accident. (4) Comments from the Flag State Comments on the draft report were invited from the Flag State of the JURONG.
Factual Information	
Vessel type and name	Cargo vessel, JURONG
IMO number	9543952
Port of registry	Panama, Republic of Panama

<p>Gross tonnage Owner Classification Society L×B×D; Hull material Engine; Output Date of launch Cargo holds; Cargo handling equipment</p>	<p>9,696 tons TOKO KAIUN KAISHA, LTD. (Japan) NK 120.00 × 21.20 × 14.30 m; steel Diesel engine; 3,900 kW September 2006 Two cargo holds (twin deck type); two deck cranes (See Figure 1 and Photo 1.)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Figure 1 General Arrangement on the JURONG</p> </div> <div style="text-align: center;">  <p>Photo 1 Arrangement of Cargo Holds and Cranes</p> </div> </div>
<p>Crew Information</p>	<p>A Master (Nationality: Republic of the Philippines), male, 54 years old Endorsement attesting the recognition of certificate under STCW regulation I/10: Master (issued by the Republic of Panama) Date of issue: August 23, 2011 (valid until June 26, 2016)</p> <p>B Chief Officer (Nationality: Republic of the Philippines), male, 41 years old Endorsement attesting the recognition of certificate under STCW regulation I/10: Master (issued by the Republic of Panama) Date of issue: December 4, 2011 (valid until August 11, 2016)</p> <p>C General Supervisor, male, 51 years old Employed at Nichiei Unyu Kabushiki Kaisha (hereinafter referred to as “Company A”) since 1984; worked as supervisor since 1995 and then as general supervisor since 2012.</p> <p>D Team Leader (operations chief of stevedores), male, 55 years old Employed at Company A since 1981; completed the training course for operations chief of stevedores in 2006; worked as team leader (work leader at stevedoring work place.) since 2011; had approximately 32 years of stevedoring experience.</p> <p>E Stevedore A, male, 57 years old Employed at Company A since 1974; worked occasionally as team leader since 1993; had approximately 39 years of stevedoring experience. He was in good health at the time of the accident.</p>

	<p>F Stevedore B, male, 48 years old Employed at Company A since 1992; worked as assistant team leader since 2006; had approximately 21 years of stevedoring experience. He was in good health at the time of the accident.</p>
Injuries to Persons	One person (Stevedore A) died; one person (Stevedore B) was severely injured
Damage to Vessel (or Other Facilities)	None
Events Leading to the Accident	<p>(1) State of the vessel The JURONG (hereinafter referred to as “the Vessel”) docked at ‘Liner Berth No. 13 at the Central Wharf of Port Island’ (hereinafter referred to as “the Berth”) with the starboard side alongside the berth at around 13:20 on March 24, 2013 and cargo loading onto the Vessel was started on March 25.</p> <p>(2) Progress of events leading up to the occurrence of the accident</p> <p>1) From around 07:30 on March 26, all of Company A’s cargo handling workers assigned to stevedoring operations on the Vessel attended a preoperational briefing on Company A’s premises, in which they were briefed by the General Supervisor of Company A about particulars of the cargo handling operation and were also cautioned to be fully aware of the large tires to be loaded as cargo (2.70 m in diameter and 1.3 tons in weight each) due to the risk of the tires falling. At around 08:00, the stevedores were briefed by the Foreman from Nissin Corporation (primary stevedoring contractor; hereinafter referred to as “Company B”) on the details of the cargo loading operation. (Foreman refers to the person whose job is to make arrangements with the shipping company, its agency or the shipper regarding the vessel’s arrival/departure dates and the schedule for the operations concerned, consult with the Chief Officer on matters required for determining the cargo handling operation procedures as well as safety assurance operations after entry into port, and supervise the cargo handling operation.) After the briefing, cargo loading operation commenced at around 08:30.</p> <p>2) The Team Leader, Stevedore A, Stevedore B, and four other stevedores entered the No.1 upper cargo hold where they engaged in operations for loading the cargo, which included the large tires (hereinafter referred to as “the Loading Operation”). The Loading Operation consisted of loading the tires onto the Vessel from the cargo hold of the barge, which was brought abeam the port side of the Vessel. Inside the barge’s cargo hold, there were stacks of large tires and medium tires (2.19 m</p>

in diameter and 0.8 tons in weight each), with small tires (1.25 m in diameter and 0.09 tons in weight each) loaded on top.

Since the small tires from the barge were temporarily placed using the Vessel's forward crane in the aft space of 'the tween deck of the No. 1 upper cargo hold' (hereinafter referred to as "the Deck"), the space available on the Deck became too small to temporarily place the large tires by resting them against other cargo or objects to prevent them from falling. To cope with the situation, the large and medium tires were temporarily placed in groups of two to five units in an upright position on the Deck.

- 3) The temporarily placed large tires and other tires were then stowed at the bow-side area using a forklift.

(See Photo 2 and Photo 3.)



Photo 2 Tires Stowed on the Barge



Photo 3 Loading Large Tires onto the Vessel

- 4) When the loading operation was interrupted, it was decided that 'a large tire that had fallen sideways during stowing and had been placed at the stern side' (hereinafter referred to as "the Fallen Tire") was to be stowed at the bow-side area after lifting it back to an upright position with the crane.
- 5) Stevedore A undertook the role of watching the operation to lift the Fallen Tire from a point near the tire on the port bow side and providing assistance when necessary, while Stevedore B and two other stevedores were going to attach a sling belt to the Fallen Tire. In the meantime, the order of operation was changed so that the one large tire remaining on the barge was to be loaded prior to handling the Fallen Tire.
- 6) Of the four large tires temporarily placed in an upright position in the port-side on the Deck, the two tires closest to the stern fell down toward the stern at around 11:10, the time when the crane's hook block was moved toward the port side. The large tire closest to the stern (hereinafter referred to as "the Tire") trapped Stevedore A underneath it, while also hitting Stevedore B's left ankle and throwing him down.
(See Photo 4.)

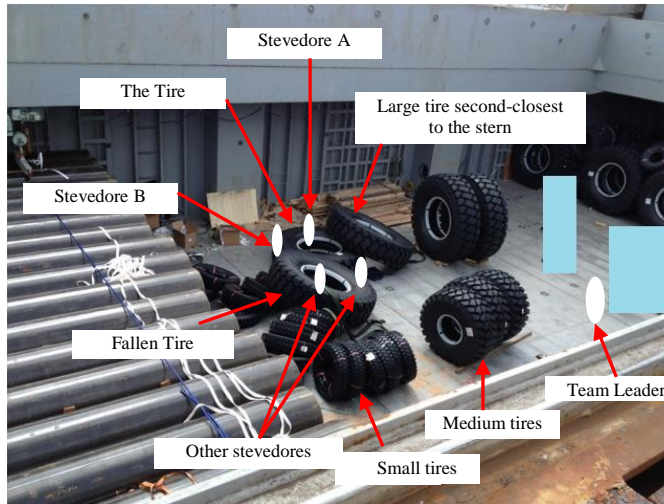


Photo 4 State of the Deck Just after the Accident Occurrence (Personnel locations shown are assumed to be at the time just before the occurrence of the accident.)

(3) Rescue actions

- 1) The Foreman called for an ambulance upon noticing the occurrence of the accident.
- 2) Stevedore B was carried to the berth on a pallet at around 11:20 and then taken in an ambulance to the hospital, where he was diagnosed with a fracture of the left ankle.
- 3) Stevedore A was pulled out toward the bow by other stevedores after the Tire was raised using the forklift. After having been provided with resuscitation by the ambulance crew who arrived at the site later, Stevedore A was taken to the hospital in an ambulance, but was pronounced dead. The cause of death was certified as cardiorespiratory failure.

Weather and Sea Conditions

Weather: Weather – cloudy, Wind – East, Wind force – 2.1 m/s
Sea conditions: Significant wave height – Approx. 0.2 m (NOWPHAS)

Other Matters

(1) Subcontracting

Company A was commissioned by Company B to provide stevedoring, longshoring, lashing and other services including safety management of the cargo handling workers under the service agreement concluded with the latter.

(2) Schedule for the Loading Operation

According to the Loading Operation schedule, the tire loading operation in the No. 1 upper cargo hold was to be interrupted at around 12:00, then the hatch covers for the lower cargo hold were to be opened to load machine cases into the lower cargo hold, and the entire operation was to be finished at around 16:30.

(3) Safety measures taken by Company A

1) Fall prevention measures for temporarily placed large tires

The normal procedure used for loading large tires was as follows: First, two large tires were piled on their sides on the

Deck, which was located directly below the upper deck opening. Next, large tires loaded in groups of two to six units were temporarily placed there by resting them against the pile of large tires to prevent tires from falling. The temporarily placed tires were moved in pairs using a forklift toward the bow, stern, port and starboard in order to rest them against each side.

Then, on the Deck located directly below the upper deck opening, large tires were stowed by resting them against other stowed tires using the crane, without temporarily placing them anywhere.

At the time of the accident, the large tires were temporarily placed on the Deck in an upright position and two square timbers (9 cm × 9 cm × 3 m) were placed to prevent them from rolling. However, square timbers or other materials to prevent the tires from falling sideways were not placed on any side, because the General Supervisor presupposed that Stevedore A and Stevedore B would never work in or near the area involving the risk of tires falling sideways.

2) Hazardous area indication

Since the General Supervisor presupposed that Stevedore A and Stevedore B would never work in or near the area involving the risk of tires falling, no hazardous area indications using safety cones, cone bars, etc. were provided to warn that the tires placed upright posed a dangerous hazard if they fell down.

(4) Onboard operation standard of Company A

The stevedoring standard established by Company A contained general precautions and other requirements to be followed when working inside cargo holds, but it did not include any standards or rules to be applied when performing tire loading operations.

(5) Management system for onboard operations

Concerning the Loading Operation, the Foreman was responsible for all operations involved and handled such tasks as dealing with the Vessel crew, the General Supervisor was responsible for supervising all cargo handling workers of Company A and providing them with the necessary guidance, and the Team Leader assumed the control of operations by Company A's stevedores assigned to the job inside the No. 1 upper cargo hold.

(6) Positions and other information concerning the stevedores

Although the Team Leader was supervising the operation on the starboard side of the Deck facing the port, the cargo shielded the accident site area from his view.

Stevedore B was on the port side of the Fallen Tire facing the starboard and was passing the sling belt under the Fallen Tire, so

	<p>he did not see the scene of the accident.</p> <p>The operator of the forklift and the stevedore serving as an assistant to the forklift operator were working to stow large tires on the bow side facing the bow. The other two stevedores were on the Fallen Tire facing the stern, i.e., toward the crane's hook block. Therefore, none of these workers saw the scene of the accident.</p> <p>(7) At the time of the accident, there was almost no motion of the Vessel and almost no trim (inclination of a vessel in the bow-stern direction).</p> <p>(8) Stevedore B was working a short distance away from the area involving the risk of the Tire falling. After the accident, he thought that the Tire fell, bounced, and struck his left ankle.</p> <p>(9) Given that Stevedore A had 39 years of experience in his job and that all of Company A's cargo handling workers were given precautions against the risk of a tire falling sideways when temporarily placing the large tires in an upright position, the General Supervisor assumed that Stevedore A would never work in or near the area involving the risk of the Tire falling.</p> <p>(10) After the accident, the General Supervisor thought that he should have taken more thorough actions to advise of the danger of a large tire falling when temporarily placed in an upright position in addition to the warning he actually gave to all Company A's cargo handling workers.</p>
<p>Analysis</p> <p>Involvement of crew and others onboard</p> <p>Involvement of vessel, engine, etc.</p> <p>Involvement of weather and sea conditions</p> <p>Analysis of the findings</p>	<p>Applicable</p> <p>Not Applicable</p> <p>Not Applicable</p> <p>(1) The cause of death of Stevedore A was cardiorespiratory failure.</p> <p>(2) It is probable that the Vessel docked at the Berth in Kobe Area Section II of Hanshin Port on March 24, 2013 and that the cargo loading operation commenced on March 25.</p> <p>(3) It is highly probable that all cargo handling workers of Company A attended a preoperational briefing from around 07:30 on March 26 on Company A's premises, in which they were briefed by the General Supervisor on the particulars of the cargo handling operations and were given precautions concerning the risk of the large tires falling, and then the cargo loading operation was started at around 08:30.</p> <p>(4) It is probable that the Loading Operation was carried out by the Team Leader, Stevedore A, Stevedore B, and four other</p>

stevedores, all of whom had entered the No. 1 upper cargo hold.

- (5) It is probable that large tires were temporarily placed in an upright position in groups of two to five units because the small tires that had already been placed temporarily in the stern-side of the Deck made the working space available on the Deck too small to temporarily place the large tires by resting them against other cargo or objects.
- (6) It is probable that Company A did not take measures against sideways falling of large tires temporarily placed in an upright position and did not indicate hazardous areas involving the risk of such tires falling through the use of safety cones, cone bars, etc., .
- (7) It is probable that when the Loading Operation on the Vessel was interrupted, Stevedore B and two other stevedores were going to attach a sling belt to the Fallen Tire, and at that time a decision was made to load the one large tire remaining on the barge prior to stowing the Fallen Tire.
- (8) It is probable that when Stevedore A was in a location on the port bow side of the Fallen Tire, two (including the Tire) stern side tires of the four large tires temporarily placed in an upright position fell down toward the stern at around 11:10, the Tire trapped Stevedore A underneath it and killed him. It is also probable that Stevedore B who was working on the port-side of the Fallen Tire, facing the starboard, was struck by the Tire on his left ankle and thrown down when the Tire fell down and bounced; he suffered an injury to his left ankle.
- (9) It is probable that the Tire temporarily placed in an upright position fell down because it was not provided with any means against a sideways fall, but the details of what led to the Tire falling could not be determined.
- (10) It is somewhat likely that Stevedore A and Stevedore B were working in and near the area involving the risk of the Tire falling because the area was not indicated as a hazardous area and thorough measures to notify the stevedores of the prohibition against access to the area were not taken.
- (11) It is probable that the General Supervisor did not make sure no stevedore entered the area involving the risk of large tires falling and did not provide the Tire with fall prevention means, because he presupposed that Stevedore A would never work in or near the area involving the risk of the Tire falling given that Stevedore A had 39 years of experience in his job and that precautions had been given to all the stevedores of Company A against the risk of falling of large tires temporarily placed in an upright position.
- (12) It is somewhat likely that because Company A neither indicate hazardous areas involving the risk of large tires falling nor such

	<p>hazardous areas, Stevedore A and Stevedore B were working in and near the area involving the danger of the Tire falling. It is, therefore, somewhat likely that not implementing these measures contributed to the occurrence of the accident.</p>
<p>Probable Causes</p>	<p>It is probable that the accident occurred because the Tire, which was one of four large tires temporarily placed in an upright position on the Deck during stevedoring on the Vessel at the Berth located in Section II of the Kobe Area in Hanshin Port, fell down and caused Stevedore A to become trapped underneath the Tire and Stevedore B to be hit on his left ankle and thrown down by the Tire.</p> <p>It is probable that the Tire fell down because it was temporarily placed in an upright position and was not provided with any means against falling sideways.</p> <p>Company A did not indicate hazardous areas involving the risk of large tires falling and did not make sure no stevedore entered such hazardous areas. It is somewhat likely that not implementing these safety measures contributed to the occurrence of the accident.</p>
<p>Safety Actions</p>	<p>It is probable that the accident occurred because the Tire, which was one of four large tires temporarily placed in an upright position on the Deck during stevedoring on the Vessel at the Berth located in Section II of the Kobe Area in Hanshin Port, fell down and caused Stevedore A to become trapped underneath the Tire and Stevedore B to be hit on his left ankle and thrown down by the Tire.</p> <p>It is probable that the Tire fell down because it was temporarily placed in an upright position and was not provided with any means against falling sideways.</p> <p>Company A did not indicate hazardous areas involving the risk of large tires falling and did not make sure no stevedore entered such hazardous areas. It is somewhat likely that not implementing these safety measures contributed to the occurrence of the accident.</p> <p>Consequently, whenever loading operations of large tires onto a vessel are carried out, it is essential to make known to all persons concerned the necessity to provide a means to prevent sideways falling of temporarily placed large tires, to provide indications preventing entry into areas involving the risk of large tires falling, and to make sure no stevedore enters such hazardous areas.</p> <p>After the accident, Company A and Company B established their cargo handling standards for large tires to implement the following measures against recurrence of similar accidents:</p> <ol style="list-style-type: none"> 1. Fall prevention measures for large tires <ol style="list-style-type: none"> 1) Special stands for resting large tires are made and always used when large tires are temporarily placed. 2) Two forklifts are commissioned, one of which is used as a support to prevent sideways falling of temporarily placed large tires

3) Large chocks that fit the size of the tires handled are prepared for use.

2. Prohibition of access to areas involving the risk of large tires falling

Access to areas involving the risk of large tires falling is restricted by placing safety cones, cone bars, etc., during cargo handling operations.

(See Photo 5, Photo 6 and Photo 7.)

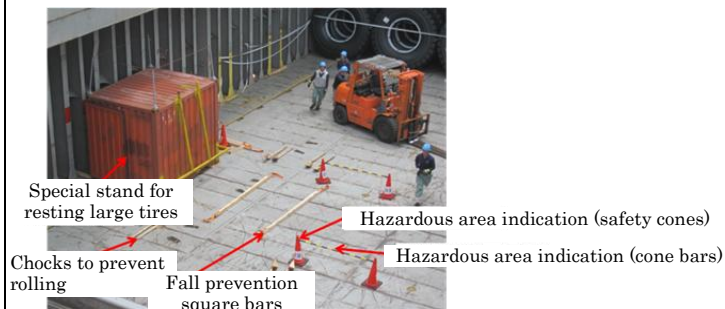


Photo 5 Temporary Tire Placement Area on Deck



Photo 6 Tire Fall Prevention by Forklift – Example 1

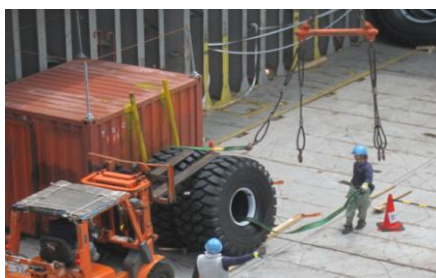


Photo 7 Tire Fall Prevention by Forklift – Example 2

3. Measures for improving safety during loading operations

1) For closer coordination among operation staff members, four transceivers rather than the conventional three (for use on the barge, in the cargo hold and by the foreman) are put in use by adding one for the deck man (stevedore who gives the signals to the winch man to direct the operation of the winch while checking the state of cargo handling operation).

2) The work leader gives precautionary instructions whenever an unsafe operation or condition is found and interrupts the operation until a safe state is reestablished.

4. Securing adequate space for working

By obtaining the information on the state of loading on the barge and the plan for loading into the cargo hold ahead of time,

	<p>unnecessary temporary placement of cargo in the cargo hold is avoided, thus securing adequate working space.</p> <p>5. Providing adequate safety training</p> <ol style="list-style-type: none">1) Kiken yochi training (KYT), or hazardous prediction training, which has so far been given to longshore workers by the companies' safety management office is now also given to stevedores to provide them with appropriate knowledge to avoid hazards.2) All cargo handling workers wear a wrist band on which an appropriate safety slogan is printed in order to raise their safety awareness. <p>6. Improvement of preoperational briefing program</p> <ol style="list-style-type: none">1) The instructions and precautions given by the general supervisor at each preoperational briefing are recited by randomly chosen workers.2) The work leader explains what is considered hazardous during the day's operation and so that all cargo handling workers will be notified of such hazards.
--	---