

MA2019-7

**MARINE ACCIDENT
INVESTIGATION REPORT**

July 25, 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.

Nobuo Takeda
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


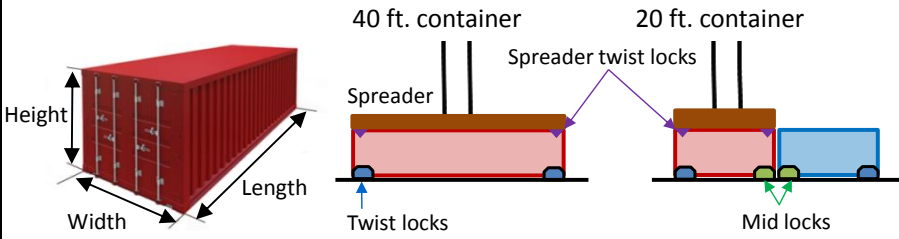
Translation of ORIGINAL to English version
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June 12, 2019

Adopted by the Japan Transport Safety Board

Chairman Nobuo TAKEDA
 Member Yuji SATO
 Member Kenkichi TAMURA
 Member Yoshiko KAKISHIMA
 Member Makiko OKAMOTO

Accident type	Fatality of a stevedore
Date and time	Around 11:14 on January 6, 2019 (local time, UTC+9 hours)
Location	T1 berth of Nabeta wharf, Yatomi city, Aichi Prefecture On a true bearing of approximately 283° and at a distance of 1,400 meters from Nagoya port west passage No.8 light beacon (approximately 35° 01.5' N, 136° 47.8' E)
Summary of the Accident	At around 11:14 on January 6, 2019, while the container vessel HARRIER was moored at the Nabeta wharf, with the master and 17 crew members on board, 7 stevedores were loading containers to the vessel, and a stevedore who was serving as assistant wireless signal person and communicating the conditions of unloading and loading containers by radio apparatus got caught between two containers, then the stevedore was pronounced dead by a doctor.
Process and Progress of the Investigation	<p>(1) Set up of the Investigation The Japan Transport Safety Board appointed an investigator-in-charge and a marine accident investigator to investigate this accident on February 27, 2019, and later appointed a marine accident investigator in addition.</p> <p>(2) Collection of Evidence March 1 and 4: On-site investigations, interviews and collection of questionnaire March 5, 6, 8 and 12: Collection of questionnaire</p> <p>(3) Comments from Parties Relevant to the Cause Comments on the draft report were invited from parties relevant to the cause of accident, but no comments were made.</p> <p>(4) Comments from the Flag State Comments on the draft report were invited from the Flag State of the HARRIER, but no comments were made.</p>
Factual Information	
Vessel type and name	Container vessel HARRIER (registered in Commonwealth of The Bahamas)
Gross tonnage	9,971 tonnes

<p>Vessel number Owner Management company Ship's classification L×B×D, Hull material Engine, Output Date of launch, etc.</p>	<p>9460057 (IMO No.) Legenda Maritime SA (Republic of Philippines) Kotoku Kaiun Co. Ltd. Nippon Kaiji Kyokai (Class NK) 148.00 m × 23.00 m × 11.00 m, steel Diesel engine, 9,960kW August, 2008 (See Photo 1)</p>  <p>Photo 1 M.V. HARRIER</p>				
<p>Information on the cargo, etc.</p>	<p>The sizes of containers are 20 ft. and 40 ft. and the capacity of HARRIER (hereinafter referred to as “the Vessel”) for loading containers was 1,102 TEU*¹ and 551 FTU.</p> <p>40 ft. containers were secured by locking or unlocking using the twist locks in manual rotation, and 20 ft. containers were secured by the twist locks in manual and the mid locks (automatic locking or unlocking), which were positioned between the twist locks.</p> <p>(See Figure 1)</p> <p>Outside dimension of container</p> <table border="0"> <tr> <td>20 ft. container</td> <td>40 ft. container</td> </tr> <tr> <td>W 8 ft. × H 8 ft. 6 in × L 20 ft.</td> <td>W 8 ft. × H 8 ft. 6 in × L 40 ft.</td> </tr> </table>  <p>Figure 1 Outside dimension of container and outline of measure of securing container</p>	20 ft. container	40 ft. container	W 8 ft. × H 8 ft. 6 in × L 20 ft.	W 8 ft. × H 8 ft. 6 in × L 40 ft.
20 ft. container	40 ft. container				
W 8 ft. × H 8 ft. 6 in × L 20 ft.	W 8 ft. × H 8 ft. 6 in × L 40 ft.				

*¹ ‘TEU’ is an abbreviation for ‘Twenty-foot Equivalent Unit’ and means the loading capacity of containers on board, and ‘FTU’ is an abbreviation for ‘Twenty-foot Equivalent Unit’ on board.

Crew Information	<p>Master (Nationality: Filipino), male, 65 years old</p> <p>Endorsement attesting the recognition of certificate under STCW regulation I/10 Navigation Management level (issued by Commonwealth of The Bahamas)</p> <p>Date of issue: November 18, 2016 (valid until July 15, 2020)</p> <p>Stevedore (assistant wireless signal person) (Nationality: Japanese), male, 40 years old</p> <p>Member of the stevedore company (hereinafter referred to as “Company A”), with 12 years of experience in the present rank Gantry crane* 2 (hereinafter referred to as “GC”) operator (Nationality: Japanese), male, 46 years old</p> <p>Crane operator’s licensee</p> <p>Member of Company A, with 8 years of experience in gantry crane operation</p>
Injuries to Persons	Death of one person (Stevedore (assistant wireless signal person), hereinafter referred to as “Stevedore A”)
Damage to Vessel or Other Facilities	Damaged recessed part of a 20 ft. container’s outer side on board
Weather, Sea Conditions and Ship Condition	<p>Weather: Cloudy; Atmospheric temperature – approximately 6.8 °C;</p> <p>Wind direction – North; Wind speed – approximately 4.0m/sec.;</p> <p>Sight – Clear (Visibility approximately 25 km)</p> <p>Sea conditions: Calm; Sea level height – approximately 99cm (Nagoya port); Tide – final phase of ebb tide</p>
Events Leading to the Accident	<p>The Vessel was moored at T1 berth of Nabeta wharf, Yatomi city, Aichi prefecture at around 01:36 on January 6, with the master, navigation officer of operational level (hereinafter referred to as “Navigator A”) and 16 crew members (All crew members were Filipino) on board, and subsequently started cargo handling of containers at around 01:55.</p> <p>Stevedore A and a GC operator (hereinafter referred to as “GC operator A”) belonging to a stevedore group took over cargo handling of containers from the former group at 08:00, when they started handling the containers, and GC operator A took over the operation of ‘No.2 gantry crane of T1 berth’ (hereinafter referred to as “the GC”) from the former GC operator at around 10:15. (See Figure 2)</p>

*2 ‘Gantry crane’ means a pier base type heavy crane for loading containers in this report and has a function of rail running mobile construction. (See Photo 1)

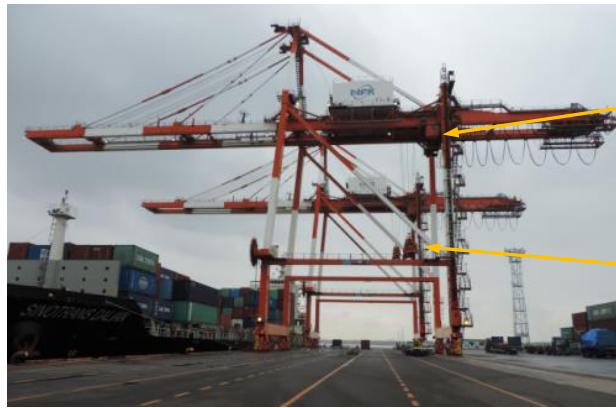
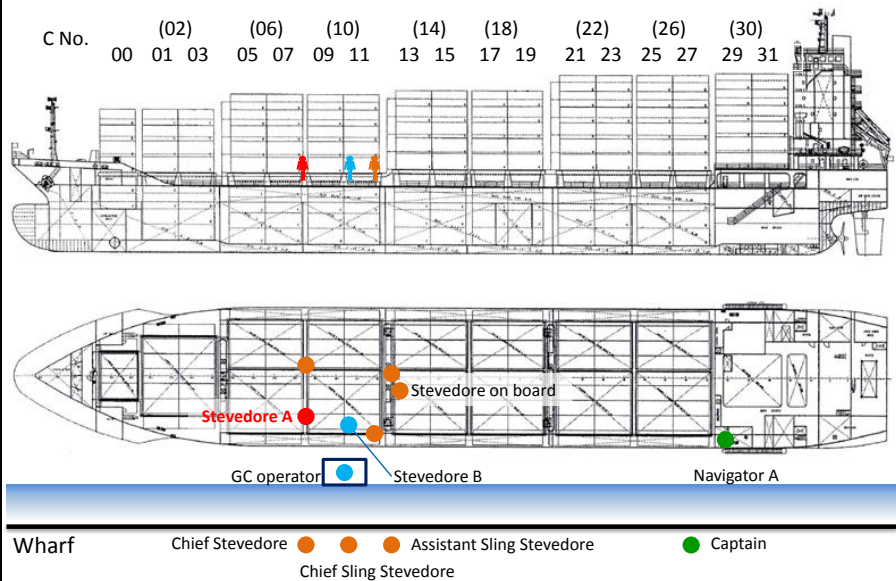


Figure 2 The GC

At around 11:14, Stevedore A was on board around the port side of the passage between No. 07 and No. 09 of the container location number (hereinafter referred to as “C No.”), Stevedore (wireless signal person) (hereinafter referred to as “Stevedore B”) was on board around the port side of C No. 09, and GC operator A was in the operation seat of the GC.

(See Figure 3)



*C No. upper side: 20 ft. container, lower side: 40 ft. container

Figure 3 Position of crew members and stevedore group in general arrangement

At that time, the GC was loading 20 ft. containers, and, according to the schedule, in the next stage of loading work, the GC would start loading 40 ft. containers. The GC was loading the last 20 ft. container (tare weight 2.220 t) (hereinafter referred to as “the

Container”) of this stage of the work, and had just grounded the Container at C No. 09. The Container was hooked automatically by the mid locks (two hooks of 20ft. container) in the aft parts of the bottom of the Container on the Vessel’s hatch on board.

Through the radio apparatus, Stevedore B who was at the port aft side of the Container, informed that the Container had been grounded and the next stage of loading container execution works, which was loading 40 ft. containers, would begin. Stevedore A, the GC operator and the chief stevedore received this information.

GC operator A responded to this information, and at that moment diverted his attention to the preparations for the next stage of loading container execution works. He started hoisting the spreader*³ with a hoisting speed of 3 notch by the GC in the situation where the spreader twist locks had not been released from the upper 4 corner metal shoes’ parts of the Container. At that precise moment, he realized that there was something wrong with the hoisting of the Container and stopped hoisting the Container immediately.

The Container was suddenly pulled from the mid locks and was lifted up, then was swung to aft side by the impact of being pulled and lifted by the GC and bumped to the aft side container (C No. 11) which had already been loaded and the container (C No.11) was damaged recessed part. By the repercussion of the bumping, the Container was swung to the fore side and bumped into the fore side container (C No. 07), which had also already been loaded.

After this, other stevedores on board found out Stevedore A which had been caught between the Container and the loaded container (C No. 07), then he leaned to the fore side container, stood and faced the aft side, was injured when leaving the Container. However, nobody saw the precise moment when the accident occurred.

(See Figure 4)

*³ ‘Spreader ’ means a rectangle frame hardware for hoisting container by GC, and ‘Spreader twist locks’ mean wedge-shaped metallic pin parts on four corner of spreader, by which connect containers into corner connection hardware of container and move by 90 degree up to the fixed position from the releasing position when loading container.



Figure 4 Stevedore accident occurrence place

At around 11:14, Company A immediately called the telephone number 119 (Emergency report) to report the accident, and Stevedore A received emergency medical care by the staff of the rescue squad at around 11:20, and was taken to the hospital at around 12:00. Afterwards, Company A called the telephone number 118 (Japan Coast Guard) at 12:05.

At 13:00, the doctor confirmed that he died due to an open head injury in the hospital.

(See Attached Figure 1 Map of location of the accident, Attached Table 1 Situation of the GC operation and Stevedore A's behavior in this accident)

Other Matters

(1) Condition of the Vessel's hull

The Vessel was not pitching or rolling due to waves or the like.

The drafts of the trim of the Vessel are fore side around 4.49 m, aft side around 7.49 m and trim by the stern condition.

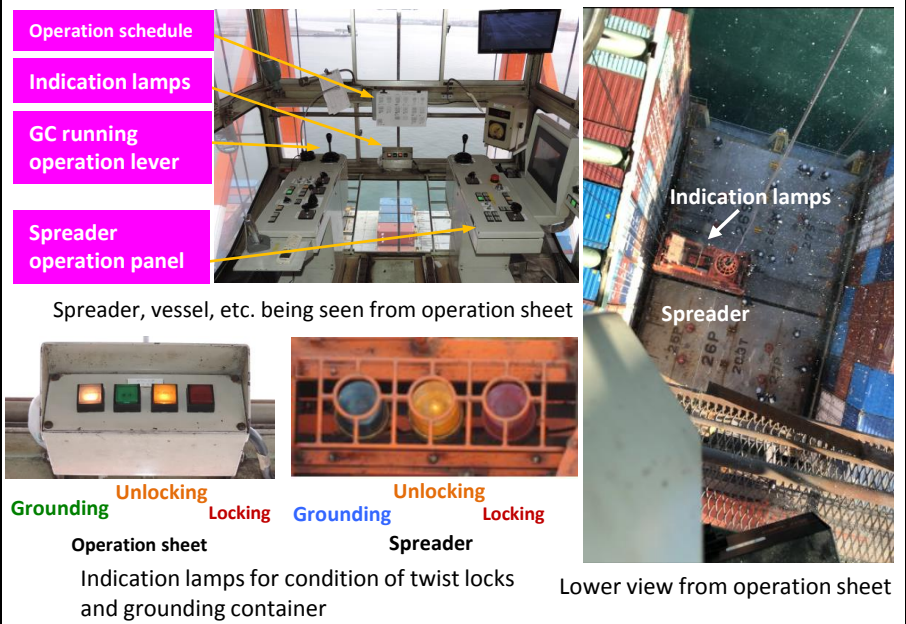
(2) The GC operation panels' assignment and container loading facility

The GC operation panels' assignment and container loading facility are shown in Figure 5, Figure 6 and Figure 7. The lever of GC spreader operation operated smoothly and lightly.

Referring to a harbor cargo handling machine association, the

indication lamps for the operating conditions of spreader twist locks and grounding container (hereinafter referred to as “indication lamps”) on the top of spreader used to be set in the land side of the spreader and usually adopted a type of rotary lamp.

In the on-site investigation it was found out that the indication lamps were set to the sea side of the spreader of the GC and adopted common lamp lights, so it was difficult to see the light condition due to the incidence of daylight.



❖ White lamp (the most left side) means the indication lamp of flipper*4.

Figure 5 The operation sheet of the GC

*4 'Flipper' means a corner guide of spreader when twist locks is inserted in corner connection hardware of container.

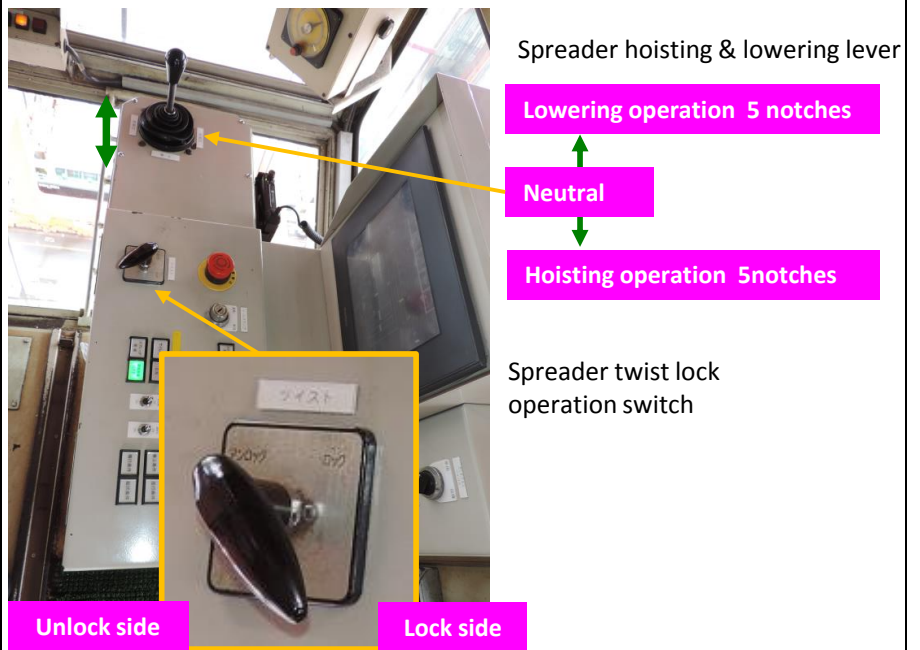
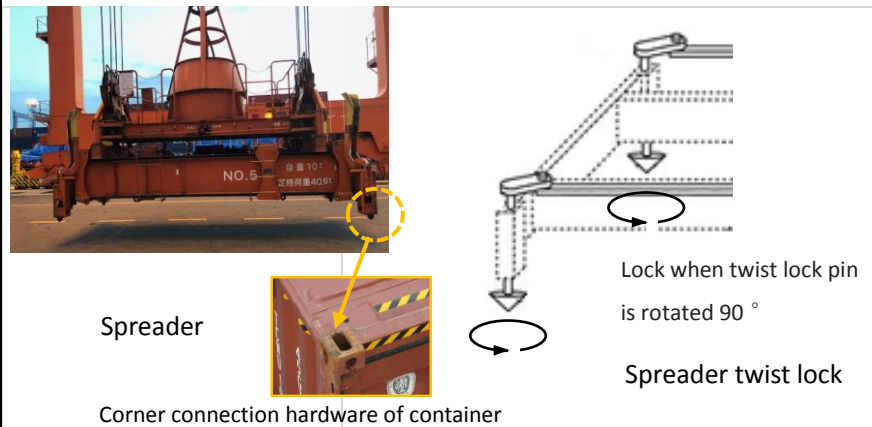
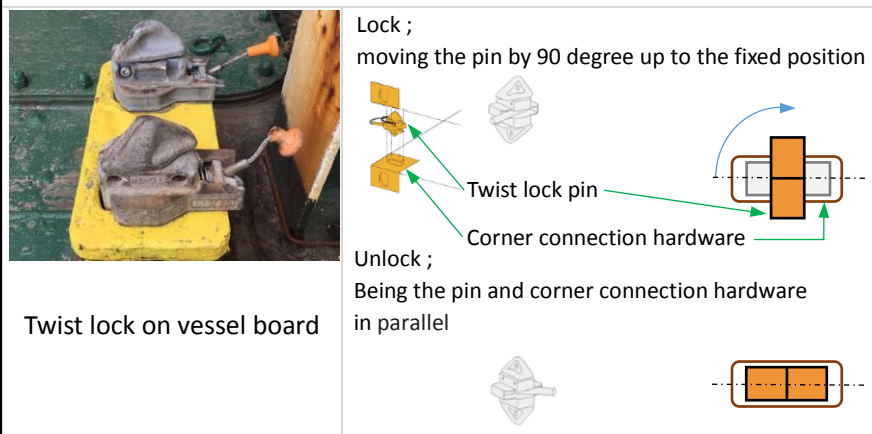
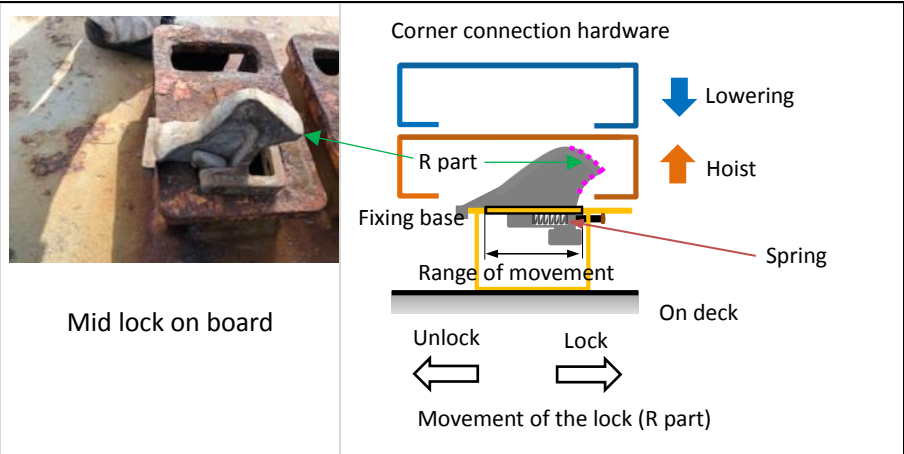


Figure 6 The GC operation panels



❖ The spreader twist locks were operated by the operation switch in the GC operation sheet, and the GC operators are able to confirm the situation of their locks by the indication lamps which were on the spreader and in front of the GC operation sheet.





- ❖ The mid lock was unlocked by moving it to the left side due to the corner connection hardware of container contacting to R part of the mid lock (indicated by dotted line) downward from upper when lowering container, and the hardware contacting to R part upward from below when hoisting container.
- ❖ After that, the mid lock was locked by moving it to the right side automatically.

Figure 7 Container loading facility

(3) Information of safety management in loading container work

Company A had produced a Safety Standard of the container terminal, Working Manual on container vessel (hereinafter referred to as “the Manual”), Operation Manual of gantry crane, Handbook of GC operator, etc., and the under-mentioned notices and procedures were mentioned in the Manual.

① Notice of GC operation

- a) GC operator communicates with chief stevedore on board and the stevedores on berth, and shall do GC operation after confirming in the safety of working places.
- b) In case of hoisting container on tractor chassis and on board, GC shall start to hoist container by 1 notch, while hoisting the container, and check the movement of spreader twist locks in good condition.

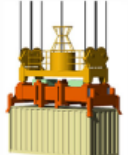
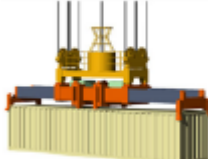
② Notice of loading container on board

The twist locks on board shall be locked after leaving the spreader from container which was loaded.

Note that Company A has considered the operation of releasing the spreader from container on board as the same as the above mentioned operation in the Manual.

(4) Information of situation for the GC operation and Stevedore A's behavior in this accident

- ① After grounding the Container, GC operator A diverted his

	<p>attention to the preparation for the next stage of loading container execution works, which was loading 40 ft. containers as explained from a) to c) bellow. He was convinced that the spreader had been released from the Container, and started to hoist the spreader with hoisting speed at 3 notch by the GC.</p> <p>a) To move the spreader from above the Vessel to the berth side, and extend the spreader both side arms from 20 ft. size to 40 ft. size. (See Figure 8)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>20 ft. container size</p> </div> <div style="text-align: center;">  <p>40 ft. container size</p> </div> </div> <p style="text-align: center;">Figure 8 Spreader extension size for hoisting containers</p> <p>b) To run the GC to the Vessel aft side for being assigned at the center position of loading 40 ft. container.</p> <p>c) To secure the safety conditions by paying attention to the stevedores on the berth before running the GC.</p> <p>② After this accident, another stevedore thought that Stevedore A had the role of locking the twist locks when the containers were loaded and grounded on board, and heard that the Container had just been grounded on board. He approached the Container fore side to operate the twist locks of the parts of the Container bottom fore side on board.</p>
<p>Analysis</p> <p>Involvement of crew members, etc.</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) Casualties to Persons The cause of Stevedore A's death was due to open head injury.</p> <p>(2) Situation of the indication lamps It is somewhat likely that GC operators in the operation sheet of the GC may have had difficulties in seeing the indication lamps of the GC spreader depending on the amount of sun light.</p> <p>(3) Situation of the Container's swing in this accident</p>

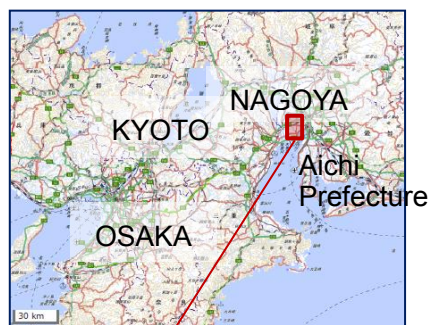
	<p>It is considered probable that the Container was hooked automatically by the mid locks when the Container had been loaded and just grounded on board. The spreader was hoisted at the speed of 3 notch in the situation where the spreader twist locks were not released from the Container, because due to the impact of being pulled from the mid locks at which the Container secured on board, at first, the Container was swung to aft side and bumped to the aft side container which was already loaded, and next, due to the repercussion of the bumping, the Container was swung to the fore side and bumped to the fore side container which had also already been loaded.</p> <p>(4) Situation of the GC operation by GC operator A</p> <p>It is considered probable that GC operator A received the information by the radio from Stevedore B and diverted his attention to the preparation for the next stage of container loading execution works when the Container had just been grounded on board because GC operator A hoisted the spreader without noticing that the spreader was not released from the Container.</p> <p>(5) Situation of Stevedore A's behavior</p> <p>It is somewhat likely that Stevedore A had the role of locking the twist locks at the bottom fore side of the Container when the Container was loaded and grounded on board because Stevedore A heard the information by the radio, approached the Container's fore side and was caught between the Container and the loaded container at fore side due to the Container being lifted and swung to fore side.</p> <p>(6) Analysis of the occurrence of this accident</p> <p>It is considered probable that the accident occurred when Stevedore A was caught between the Container and the fore side container which had already been loaded because the Container swung due to the impact of being pulled suddenly from the mid locks which secured the Container on board, since the GC hoisted the Container at the speed of 3 notch in the situation where the spreader twist locks were not released from the Container when the it was loaded and grounded on the Vessel board.</p>
Probable Causes	<p>It is considered probable that this accident occurred as Stevedore A was caught between the Container and the fore side container which had already been loaded because the Container swung due to the impact of being pulled suddenly from the mid locks which secured the Container on board, since the GC hoisted the Container</p>

	<p>at the speed of 3 notch in the situation where the spreader was not released from the Container, which had been loaded and just grounded on the Vessel board while the Vessel was moored at the wharf.</p> <p>It is considered probable that the GC operator A received the information by the radio and diverted his attention to the preparation for the next stage of container loading execution works when the Container had just been grounded on board because GC operator A hoisted the spreader without noticing that the spreader was not released from the Container.</p> <p>It is somewhat likely that Stevedore A had the role of locking the twist locks at the bottom fore side of the Container when the Container was loaded and grounded on board, because Stevedore A heard the information by the radio, then approached the Container's fore side and was caught between the Container and the loaded container at fore side when the Container was lifted and swung to fore side.</p>
<p>Safety Actions</p>	<p>After this fatal accident, Company A has taken some measures, e.g.) including a review of the contact process from GC operator to Stevedore on board when GC loads containers, and an introduction of temporary stop procedure of spreader after the GC releases the spreader from the container and hoists the container from a vessel.</p> <p>Accordingly, the implementation of the following measures would help to prevent recurrence of a similar accident, etc.</p> <ul style="list-style-type: none"> ▪ GC operator should be reeducated so that they make sure to confirm the release operation of spreader twist locks from the container and the radio communication regarding unlocked spreader twist locks with checking the indication lamps in front of the operation sheet or on top of the spreader. ▪ Stevedore companies should compulsorily take temporary stop procedure of hoisting spreaders after the GC releases it from container on board using hoisting speed at 1 notch, as well as when the GC is loading or grounding container. ▪ Stevedores should observe the 'Notice of loading container on board' of the Manual, keep themselves at safe position when the container is grounded on board, and then begin to approach the container only after visually confirming the release of the spreader from container. ▪ It is desirable that stevedores and GC operators communicate appropriately among themselves by avoiding unnecessary

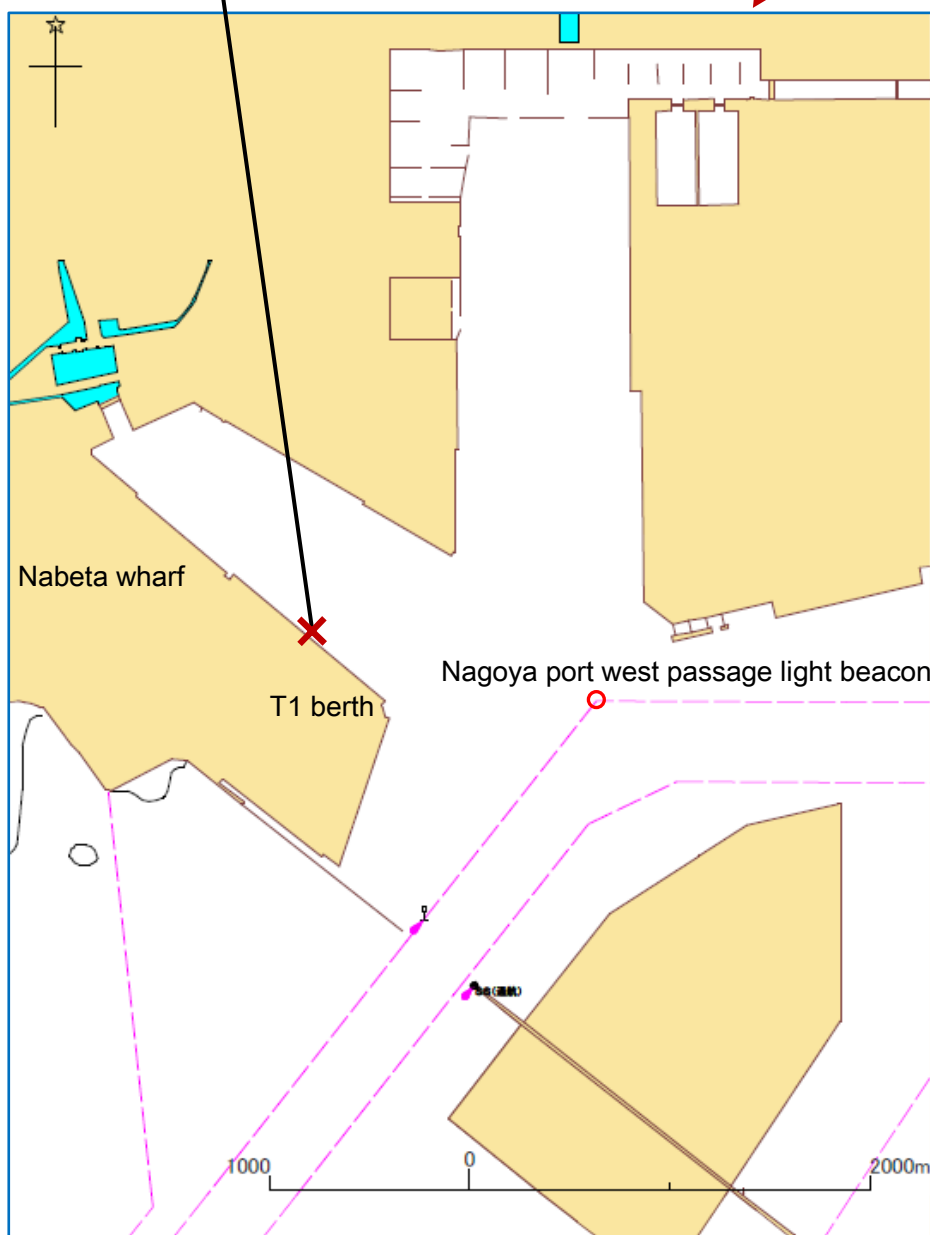
	<p>communication when there is no relevant information for loading containers and emergency information while the GC is grounding a container, hoisting a container or releasing the spreader from a container on board level</p> <ul style="list-style-type: none">• It is desirable that the indication lamps of the GC spreader are positioned where they can be easily seen from GC operation sheet. Rotary lamp light, etc. should be installed as well. <p>Based on the results of the investigation of this fatal marine accident, the Japan Transport Safety Board will widely disseminate this marine accident investigation report to contribute to the prevention of recurrence of the similar maritime accidents and reduction of damages, with the cooperation of Ports and Harbours Bureau of Ministry of Land, Infrastructure, Transport and Tourism, Japan Port Transportation Industry Safety & Health Association, Japan Association of Cargo-handling Machinery System, etc.</p>
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Attached Figure 1. Map of location of the accident

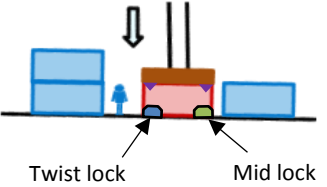




Source of reference : Geographical Survey Inst.



Location of the accident
At around 11:14 on January 6, 2019



Attached Table 1. Situation of the GC operation and Stevedore A' behavior in the accident

Movement of the Container	Details
	<p>The GC loaded and grounded the Container on the Vessel board, and then the bottom aft part of the Container was hooked by two mid locks on board.</p>
	<p>Stevedore A heard the Container's grounding through the radio apparatus. The GC hoisted the spreader at the speed of 3 notch in the situation where the spreader twist locks from the upper side of the Container had not been released.</p> <p>❖ According to the demonstration test by Company A, the container hoisted from the board did not swing at the ordinary hoisting speed (1 notch).</p>
	<p>The Container was lifted up in the situation where it was hooked at the mid locks by the aft trim of approximately 1° harder than the Vessel's even trim .</p>
	<p>The Container was swung to the aft side by the impact caused by the sudden release from the mid locks on board, and bumped the aft side container which had already been loaded.</p>
	<p>When the Container was swung to the fore side by that reversing action, Stevedore A was got caught between the Container and the fore side container which had also already been loaded.</p>