

MA2014-12

**MARINE ACCIDENT
INVESTIGATION REPORT**

December 18, 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

December 4, 2014

Adopted by the Japan Transport Safety Board

Chairman Norihiro Goto



Member Kuniaki Shoji

Member Satoshi Kosuda

Member Toshiyuki Ishikawa

Member Mina Nemoto

Accident type	Capsize
Date and time	Around 15:44 on April 9, 2013 (local time, UTC+9 hours)
Location	Off Fukui #4 Berth, Hamada Port, Hamada City, Shimane Prefecture Around 070° true bearing, 600m from Hamada Port West Breakwater Lighthouse (approximately 34°52.9' N, 132°03.2' E)
Summary of the Accident	During its service to help unberth container ship MERRY STAR at Hamada Port, Hamada City, Shimane Prefecture, work boat Koun Maru No. 58, with a captain and one worker on board, capsized around 15:44 on April 9, 2013. The captain died.
Process and Progress of the Investigation	<p>(1) Setup of the Investigation On April 10, 2013, the Japan Transport Safety Board appointed an investigator-in-charge and two marine accident investigators to investigate this accident.</p> <p>(2) Collection of Evidence On-site investigation and interviews on April 11 and 12, 2013; interviews and collection of written replies to the questionnaires on April 16, 18, and 30, 2013; interviews on April 24, June 4, 5, 10, and 13, 2013, and February 27, June 17, July 7, August 5, and September 1, 2014</p> <p>(3) Comments on the draft report were invited from parties relevant to the cause of the accident.</p> <p>(4) Comments on the draft report was invited from the Flag State of MERRY STAR.</p>
Factual Information	
Vessel type and name	A: Container ship MERRY STAR (hereinafter referred to as “Vessel A”) (See Photo 1)
Port of registry	Jeju, the Republic of Korea
Gross tonnage	3,997 tons
IMO number	9128324
Owner	NAMSUNG SHIPPING CO., LTD. (hereinafter referred to as “Company A”)
Management company	Company A
L x B x D	107.02m x 17.20m x 8.30m
Hull material	Steel
Engine, Output	Diesel engine, 3,353kW

<p>Propulsion Bow thruster Date of launch</p> <p>Vessel type and name</p> <p>Port of registry Gross tonnage Vessel number Owner</p> <p>L x B x D Hull material Engine, Output Propulsion Date of launch</p>	<p>4-blade fixed pitch propeller x 1 unit 310kW November 13, 1996</p>  <p>Photo 1: Vessel A</p> <p>B: Work boat Koun Maru No. 58 (hereinafter referred to as “Boat B”) (See Photo 2)</p> <p>Hamada City, Shimane Prefecture 11 tons 272-17072 Shimane Prefecture Hamada Koun Co., Ltd. (hereinafter referred to as “Company B”) 13.30m x 4.00m x 1.45m Steel Diesel engine, 330kW 3-blade fixed pitch propeller x 1 unit March, 1994</p>  <p>Photo 2: Boat B</p>
<p>Crew Information</p>	<p>A: Captain of Vessel A (hereinafter referred to as “Captain A”) (Nationality: South Korean), Male, 53 years old Certificate of Chief Officer (issued by the Republic of Korea) Date of issue: June 22, 2012 (valid until December 31, 2016)</p> <p>B: Captain of Boat B (hereinafter referred to as “Captain B”), Male, 43 years old First class small vessel worker; personal water craft worker; passenger service license Date of license register: April 8, 1988 Date of issue: January 21, 2013 (valid until April 7, 2018)</p> <p>Worker of Boat B (hereinafter referred to as “Worker B”), Male, 47 years old</p>
<p>Injuries to Persons</p>	<p>Vessel A: None Boat B: One fatality (Captain B)</p>

Damage to Vessel (or Other Facilities)	Vessel A: None Boat B: The main engine and other areas suffered seawater damage.
Events Leading to the Accident	<p>(1) Situation before Vessel A unberthed</p> <p>On April 8, 2013, when it moored at Busan Port in the Republic of Korea, Vessel A, with Captain A and 13 other crew members (6 South Korean nationals and 7 Myanmar nationals) on board, received the following information from Company B, its agent at Hamada Port where Vessel A would be arriving next: Vessel A would arrive at Fukui #4 Berth; a large lumber carrier (hereinafter referred to as “Vessel C”) was mooring at the adjacent Fukui #3 Berth; and the wind direction and velocity were forecast to be southwest and 8m/s, respectively, around the estimated time of arrival, 09:00 on April 9. Vessel A asked the agent to arrange for a tugboat, and departed from Busan Port at about 20:00.</p> <p>Around 07:50 on April 9, Vessel A received notification from Company B to the effect that the tugboat, which Vessel A had asked Company B to arrange, broke down and had almost no chance to come back. Because the wind was blowing at a velocity of about 8m/s, Vessel A asked Company B to arrange Boat B it had used before. Vessel A had Boat B take the “task to deliver to the quay the heads of mooring lines that Vessel A veered out” (hereinafter referred to as “Line Boat Operation”). Around 08:30, Vessel A took three mooring lines each on the bow and stern, and berthed starboard side head out.</p> <p>Around 14:00, Captain A saw Boat B helping unberth the cement carrier on the stern side of Vessel A, and asked “Company B's manager in charge of Vessel A” (hereinafter referred to as “Manager for Vessel A”) to get Boat B to help unberth Vessel A when it departed from the port.</p> <p>Captain A and Manager for Vessel A had a meeting to discuss the departure operation and agreed to the following: Vessel A would veer out a tow line to Boat B; Boat B should tow Vessel A to 9 o'clock (to the port beam direction of Vessel A); and the chief officer positioned afore would send all instructions from Vessel A to Boat B, using hand signals instead of using transceivers which would allow for direct communication. Manager for Vessel A informed the meeting details to Captain B and Worker B.</p> <p>(2) Situation when Vessel A was unberthing</p> <p>1) Vessel A</p> <p>Around 15:30, Captain A ordered for sailing. Captain A, third officer, and an able seaman took their positions on the bridge, the chief officer and two others on the bow, and second officer and two others on the stern. The chief engineer was on the portside wing of the bridge.</p> <p>Around 15:35, in accordance with Captain A's instructions coming through the microphone for ship maneuvering orders, the chief officer veered out the mooring line of the port bow mooring winch to Boat B. The chief officer adjusted the line's outboard length to about 50m by winding it around the port side bollard to make several figure-eight knots. The</p>

mooring line was used as a tow line.

Around 15:39, after ordering to cast off all mooring lines, Captain A instructed the chief officer to have Boat B, which was now positioned in the port bow direction, tow the vessel to 9 o'clock. At the same time, Captain A ordered to accelerate the bow thruster from slow speed to full speed to the port side, and called engine dead slow ahead.

Captain A, who at this time felt that the wind blowing in the direction of the quay became stronger, instructed the chief officer to have Boat B tow Vessel A more strongly. To prevent Vessel A from being drifted toward Vessel C that moored at the quay, Captain A increased engine speed to half ahead, without informing it to Boat B.

From the chief engineer who was watching Boat B on the portside wing, Captain A received a report to the effect that the towing direction of Boat B was moving gradually to the stern direction. Captain A instructed the chief officer to cast off its tow line.

The chief officer had the able seaman remove the tow line from the bollard in an attempt to veer it outboard, but the line would not cast off. With the help of the mooring winch, the able seaman veered out the tow line more, but the line soon tightened again.

The chief engineer, watching Worker B unable to remove the tow line from the hook, saw Boat B listing to the starboard direction in a few minutes, pulled abeam by the tow line. The chief engineer shouted, "Stop it!" but witnessed that Boat B capsized from starboard stern after it momentarily restored its normal list. The chief engineer reported this situation to Captain A.

(See Appended Table 1: Vessel A's AIS Information (Automatic Identification System) and Voice Records in Simplified VDR (Voyage Data Recorder)

2) Boat B

After finishing cargo handling work for Vessel A, Worker B, wearing a helmet and lifejacket, boarded Boat B from the quay near the stern of Vessel A.

On Boat B, Captain B, who was maneuvering the boat in the steering house wearing a helmet and lifejacket, approached the port bow side of Vessel A. After Worker B put the tow line from Vessel A on the hook mounted behind the steering house, Captain B, responding to hand signals from the chief officer, started to tow the port bow side of Vessel A to 9 o'clock.

Because Vessel A increased its speed after leaving the quay, Boat B moved from 8 o'clock position further to the stern direction of Vessel A.

Although the chief officer had sent no hand signal, Vessel A began to veer out the tow line. Then, Worker B tried to remove the tow line from the hook but could not, because it tightened again in a few seconds. When Worker B moved to the port side of the steering house, Boat B listed heavily to the starboard direction, and water began to flow in over the

bulwark. Worker B stepped on the portside bulwark to jump into the sea. Immediately after, Boat B capsized in the starboard direction.

(3) Situation after Boat B capsized

1) Captain A

Reported from the chief engineer that Boat B had capsized, Captain A called full astern after stopping the engine, and ordered to cast the portside anchor around 15:45. Around 15:50, Manager for Vessel A informed Captain A that the manager had reported the occurrence of the accident to the Japan Coast Guard.

2) Captain B

To approach Fukui #4 Berth after Vessel A finished unberthing, a domestic cargo ship was waiting off the quay. After Boat B capsized, the captain of this ship found Captain B in a lifejacket floating in the bow direction of Vessel C. Then the ship headed for that point.

When one of his crew talked to Captain B, the captain of the domestic cargo ship saw Captain B waving his hand and thought he was all right. Because the patrol boat of Japan Coast Guard was coming up and the position of Vessel C was close, the captain decided to leave that point.

On the quay near the stern of Vessel C, Manager for Vessel A saw Worker B jumping into the sea off Boat B. The manager also saw Boat B in a capsized state being pulled by Vessel A, and thought that Captain B was confined in the boat.

Company B's manager in charge of Vessel C, who kept watching Boat B, saw Captain B floating about 150m away from Vessel C and supposedly waving his hand to the approaching domestic cargo ship. The manager thought Captain B was all right. Later, this manager saw Captain B put his face in the water, and about two minutes later, throw his arms straight up and sink with his body coming out of the lifejacket.

3) Worker B



After jumping into the sea, Worker B took off his work shoes and helmet and swam toward the quay. The worker saw Vessel C rattling down a Jacob's ladder on the port side. The worker headed for the direction and climbed up the ladder by himself.

4) Manager for Vessel A

After completing a departure procedure, Manager for Vessel A was watching Vessel A unberthing at the quay. When seeing Boat B capsizing, he reported the occurrence of an accident to the Japan Coast Guard around 15:45. After that, he called Captain A to inform that he had reported the occurrence of the accident to the Japan Coast Guard.

(4) Cause of Captain B's death

Around 17:13, a diver who was engaged in the search found Captain B about 180m north of the accident site. Around 18:02, he was confirmed dead by a doctor at the hospital he was taken to. A postmortem examination concluded that the direct cause of death was suffocation by seawater inhalation, and that sickness or wound leading to the death was

	<p>subarachnoid hemorrhage.</p> <p>According to the statements of the doctor who conducted the postmortem examination, Captain B had been hit on the head and developed subarachnoid hemorrhage, and it was possible that his consciousness deteriorated with time.</p> <p>(See Appended Figure 1: Schematic View of How this Accident Occurred)</p>																												
<p>Weather and Sea Conditions</p>	<p>(1) The table below shows 10-minute weather observations around the time of this accident at Hamada Weather Station located approximately 2,300m northeast of where the accident occurred.</p> <table border="1" data-bbox="547 577 1428 842"> <thead> <tr> <th rowspan="2">Time (H:M)</th> <th rowspan="2">Air Tem. (°C)</th> <th colspan="4">Wind Direction and Velocity (m/s)</th> </tr> <tr> <th>Mean</th> <th>W.D.</th> <th>Max. Velocity</th> <th>W.D.</th> </tr> </thead> <tbody> <tr> <td>15:30</td> <td>14.5</td> <td>7.5</td> <td>WSW</td> <td>13.6</td> <td>WSW</td> </tr> <tr> <td>15:40</td> <td>14.0</td> <td>8.3</td> <td>WSW</td> <td>16.6</td> <td>WSW</td> </tr> <tr> <td>15:50</td> <td>13.9</td> <td>9.5</td> <td>WSW</td> <td>16.5</td> <td>WSW</td> </tr> </tbody> </table> <p>(2) A strong wind warning was issued at 09:25 on April 9 for Hamada City, which forecast strong winds with mean velocities of 12m/s or greater onshore, and 15m/s or greater offshore. The warning was still valid around the time of this accident.</p> <p>(3) The tide was at the end of ebb tide. The wave height was about 50cm.</p> <p>(4) The seawater thermometer installed in the water channel in front of Shimane Prefectural Fisheries Technology Center, located approximately 2,500m north-northeast of the accident site, measured 14.4°C at 15:00 and 14.5°C at 16:00 on April 9.</p>	Time (H:M)	Air Tem. (°C)	Wind Direction and Velocity (m/s)				Mean	W.D.	Max. Velocity	W.D.	15:30	14.5	7.5	WSW	13.6	WSW	15:40	14.0	8.3	WSW	16.6	WSW	15:50	13.9	9.5	WSW	16.5	WSW
Time (H:M)	Air Tem. (°C)			Wind Direction and Velocity (m/s)																									
		Mean	W.D.	Max. Velocity	W.D.																								
15:30	14.5	7.5	WSW	13.6	WSW																								
15:40	14.0	8.3	WSW	16.6	WSW																								
15:50	13.9	9.5	WSW	16.5	WSW																								
<p>Other Matters</p>	<p>(1) Crew Information</p> <p>1) Captain A, who joined Vessel A in September 2012, came to call Hamada Port as frequently as once every week since the end of January 2013. But Captain A had not used a tugboat in Hamada Port before this accident occurred.</p> <p>Captain A could understand Japanese for everyday conversation.</p> <p>2) Captain B joined Company B in 1994 and had no health problems at the time of this accident. The captain was about 152cm tall and weighed about 59 kg.</p> <p>(2) Vessel Information</p> <p>The hook on Boat B was not equipped with an emergency breakaway device.</p> <p>(See Photo 3 and Photo 4)</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;"> Photo 3: Stern of Boat B Photo 4: Hook </p>																												

(3) Information on Operation Management

1) According to the Tugboat Operation, which was stated in the navigation procedure manual of Company A, vessels up to 1,000 to 5,000 gross tonnage and equipped with a bow thruster may use tugboats when the wind velocity is 13m/s or greater.

2) Company B had a procedure manual for Line Boat Operation, but did not have one for vessel unberthing support operation, which was not intended business for Boat B.

(4) Information on Lifesaving and Rescue

1) The lifejacket Captain B wore had an about-7-cm-long, vertical split on the back below the neck. It seemed that the split was produced when the jacket was caught by something in vessel structure at the time of this accident. (See Photo 5 and Photo 6)



Photo 5: Captain B's Lifejacket

Photo 6: Split on Lifejacket

2) Around 15:45, after receiving a report that this accident had occurred, the Japan Coast Guard dispatched a patrol boat. Before arriving at the site, the office received notification to the effect that Captain B was missing. The office started sea surface search, and at the same time, asked civilian divers for underwater search.

(5) Other Information

1) On April 9, 2013, the tugboat resident at Hamada Port returned to the home base after completion of an intermediate inspection at a shipyard located at Kanmon Port, Shimonoseki. Around 07:30 when it was about to leave the quay in preparation for Vessel A's arrival, the tugboat found one of the two propellers out of order. Around 19:40, the tugboat was brought back into normal condition.

2) When asked by a large vessel to berth or unberth at Hamada Port, the person who conducted acts similar to pilotage (the person who did not have a pilotage license piloted a vessel in the sea area where pilotage district is not specified) had arranged the tugboat resident at Misumi Port, Hamada City, in addition to the tugboat resident at Hamada Port. When a coal carrier was arriving at Misumi Port and the tugboat resident was unavailable, this person used Boat B instead.

In such a case, this person made sure that direct communication through transceivers was available. In the situation where Boat B was connected to a tow line, the person did not use the main engine on the large vessel side for fear that it might pull the boat abeam. The person had used Boat B in place of the tugboat a total of 35 times since 2008 until the time of this accident.

<p>Analysis</p> <p>Involvement of crew members</p> <p>Involvement of vessel, engine, etc.</p> <p>Involvement of weather and sea conditions</p> <p>Analysis of the findings</p>	<p>A: Applicable B: Not Applicable</p> <p>A: Not Applicable B: Applicable</p> <p>A: Applicable B: Not Applicable</p> <p>(1) It is probable that the following things occurred. Captain A was aware that the tugboat was out of order and unavailable. The captain saw Boat B helping unberth the vessel that moored on the stern side of Vessel A, and decided to use Boat B for unberthing support operation.</p> <p>(2) It is probable that the following things occurred. The Manager for Vessel A had a meeting with Captain A on how Boat B should support the unberthing operation and communicate with Vessel A. The Manager for Vessel A informed the meeting details to Captain B and Worker B.</p> <p>(3) It is probable that the following things occurred. During the meeting described in (2) above, Captain A decided that the chief officer positioned afore would send all instructions from Vessel A to Boat B, using hand signals without using transceivers which would allow for direct communication.</p> <p>(4) It is probable that the following things occurred. Around 15:35 on April 9, 2013, Vessel A, with Captain A and other crew members at their positions, veered out the mooring line of the port bow mooring winch to Boat B as a tow line. Around 15:39, Captain A instructed the chief officer to have Boat B, now positioned in the port bow direction, tow the vessel to the port beam direction. At the same time, Captain A ordered to accelerate the bow thruster from slow speed to full speed to the portside direction, and called engine dead slow ahead.</p> <p>(5) It is probable that the following things occurred. Captain A felt that the wind blowing in the direction of the quay became stronger. To prevent the vessel from being drifted toward Vessel C that moored at the quay, Captain A increased engine speed to half ahead, without informing it to Boat B. It was somewhat likely that the maximum wind velocity exceeded 16m/s at that time.</p> <p>(6) It is probable that the following things occurred. From the chief engineer who was watching Boat B on the portside wing, Captain A received a report to the effect that the towing direction of Boat B was moving gradually to the stern direction. Captain A instructed the chief officer to cast off the tow line and increased speed. The captain paid more attention to preventing the vessel from being drifted toward Vessel C, without checking the status of Boat B.</p> <p>(7) It is probable that the following things occurred. Without sending any hand signal to Boat B, Vessel A began to veer out the tow line. Worker B tried to remove the tow line from the hook but could not, because it tightened again in a few seconds.</p>
---	---

	<p>(8) It is probable that the following things occurred. Because Vessel A increased its speed, Boat B moved from the 8 o'clock position further to the stern direction of Vessel A. Around 15:44, Boat B was pulled abeam and capsized.</p> <p>(9) It is probable that the following things occurred. Captain A did not inform Boat B that Vessel A would be increasing its speed. Although having increased its speed, Captain A paid more attention to preventing Vessel A from being drifted toward Vessel C, without checking the status of Boat B. Vessel A pulled abeam Boat B as a result.</p> <p>(10) It is somewhat likely that the following things occurred. If Captain A had informed Boat B ahead of time that Vessel A would be increasing its speed, by means of direct communication such as transceivers, the boat could have understood the intent of Vessel A and removed the tow line from the hook, and Vessel A could have prevented pulling the boat abeam.</p> <p>(11) It is somewhat likely that the following things occurred. Captain B floated on the sea surface, with a lifejacket on, but the captain's consciousness deteriorated with time. The captain's lifejacket was caught by something in vessel structure, which produced a split on the back, and the captain was no longer able to wear the lifejacket adequately. Because Captain B had died, the situation could not be determined.</p> <p>(12) The direct cause of Captain B's death was suffocation by seawater inhalation induced by subarachnoid hemorrhage.</p>
<p>Probable Causes</p>	<p>It is probable that this accident occurred as follows. When unberthing from the quay to depart from Hamada Port, Vessel A veered out its mooring line as a tow line to Boat B, now positioned in the port bow direction, and had Boat B tow Vessel A to the port beam direction. When Captain A increased speed to prevent Vessel A from being drifted toward Vessel C, Boat B moved to the stern direction of Vessel A. Vessel A tried to cast off the tow line but could not, and as a result, Boat B was pulled abeam by Vessel A and capsized.</p> <p>It is probable that Vessel A pulled abeam Boat B, because Captain A did not inform Boat B that Vessel A would be increasing its speed, and because after increasing its speed, Captain A paid more attention to preventing Vessel A from being drifted toward Vessel C, without checking the status of the boat.</p>
<p>Safety Actions</p>	<p>After this accident, Company B came up with safety actions and decided to implement the following measures.</p> <p>(1) Boat B should not be used for vessel unberthing assistance operations in the future.</p> <p>(2) The existing hook on Boat B was replaced with one equipped with an emergency breakaway device. (See Photo 7)</p> <p>(3) The existing lifejackets were replaced with long-johns type lifejackets.</p>



Photo 7: Hook after Replacement
(with emergency breakaway device)

To prevent recurrence of similar accidents in the future, the following things are considered useful:

1) When the vessel uses a boat for berthing or unberthing support, the vessel should understand the important features of the boat and should not increase its speed in a way that pulls the boat abeam.

2) When the vessel uses a boat for berthing or unberthing support, the vessel should use transceivers that would allow for direct communication.

Company A should make the above items fully understood by captains joining vessels under their management.

Appended Table 1: Vessel A's AIS Information and Voice Records in Simplified VDR

*1No.	Time (H:M:S)	North Latitude (°-'-")	East Longitude (°-'-")	Speed (knot)	Heading (°)	Voice recorded in simplified VDR
	15:38:08					Bow thruster, slow port
	15:39:38					Bow thruster, full port
1)	15:40:17	34-52-46.9	132-03-19.4	0	345	
	15:41:22					Dead slow ahead
	15:41:33					Slow ahead
	15:41:48					Half ahead
2)	15:42:57	34-52-48.2	132-03-18.1	2.6	332	Starboard 10°
	15:43:01					Mid ships
	15:43:13					Let go, let go ^{*2}
	15:43:20					<i>Brother, stop</i> ^{*3}
	15:43:22					Let go, let go, let go ^{*2}
	15:43:36					<i>Cast off, cast off</i> ^{*3}
3)	15:43:39	34-52-50.8	132-03-16.3	4.7	324	
	15:43:40					Stop engine
	15:43:45					<i>Pulling boat, tugboat</i> ^{*3}
4)	15:44:07	34-52-53.0	132-03-14.4	5.8	321	
	15:44:23					Slow ahead
5)	15:44:29	34-52-55.0	132-03-12.7	6.5	318	
	15:44:34					Stop engine
6)	15:44:57	34-52-57.6	132-03-10.2	7.0	311	Slow astern
	15:45:03					Half astern
7)	15:45:07	34-52-58.4	132-03-09.3	6.7	308	
	15:45:19					Full astern
8)	15:45:48	34-53-00.8	132-03-05.9	4.5	302	

*1 Each number 1) through 8) corresponds to the same number in Appended Figure 1.

*2 "Let go" means "Cast off."

*3 Italic descriptions are translations from Korean into Japanese.

Appended Figure 1: Schematic View of How this Accident Occurred

