

Accident Report

Fatality

Tasman Resolution

11 January 2007

Class A





Photograph 1
Tasman Resolution

SUMMARY

On 11 January 2007, the Marshall Islands flag general cargo vessel *Tasman Resolution* was berthed starboard side to Mount Maunganui wharf at the Port of Tauranga. The vessel had been operating on the New Zealand coast for the previous 12 days after completing a voyage from the Far East.

At approximately 2240 on the evening of Thursday 11 January, the ship's Boatswain, together with the Third Officer, and two Able Seamen, was assisting to move pontoon covers from number five hatch and stow them on top of number three hatch.

After connecting the Number 1 gantry crane hook to the centre pontoon cover of number 5 hatch, the Boatswain climbed off the starboard side of the pontoon cover onto the main deck.

At approximately 2244, the gantry crane lifted the pontoon cover off number 5 hatch coaming and started to travel forward along the deck towards number 3 hatch. Meanwhile, the Boatswain was still between the number 5 hatch coaming and the inboard side of the moving gantry crane.

At approximately 2331, a Stevedore noticed a body on the deck inboard of the gantry crane track and adjacent to the starboard side of number 5 hatch. He immediately raised the alarm.

The body was found to be that of the Boatswain. He had suffered massive injuries and was dead when discovered.

The accident was immediately investigated by Maritime New Zealand (MNZ).

NARRATIVE

At approximately 0930 on Thursday 11 January 2007, *Tasman Resolution* berthed starboard side to berth number 8 at Mount Maunganui Wharf, Port of Tauranga. Cargo operations commenced at approximately 1030.

At approximately 1530, a new shift of stevedores commenced work on board the vessel. Two gangs of stevedores were employed. One was loading timber and logs and the other was involved in preparing number 4 hold in readiness for loading liner board.

At 1800, the deck watch was relieved by the 1800-2400 watch and the Third Officer became the Duty Officer. The stevedores had loaded approximately 80 reels of liner board in number 4 hold when, at approximately 2100, it started raining. At approximately 2110, the Duty Officer was instructed by the stevedores to close number 4 hatch due to the weather conditions. At this time, the stevedore gang was put on standby. The stevedores left the vessel with the exception of the Number 1 gantry crane driver who elected to stay in the cab of the crane and sleep. The stevedores asked the Duty Officer to remove the pontoon covers from number 5 hatch in readiness for loading cargo.

For the next hour and a half, the ship's crew were employed in closing the pontoon covers at number 4 hatch and removing the pontoon covers from number 5 hatch and placing them on top of number 3 hatch.

At 2230, the Third Officer, the Boatswain and Able Seaman (1) were on deck assisting in the repositioning of the pontoon covers. The Number 1 gantry crane, which was used to transport the pontoon covers, was being driven by Able Seaman (2).

At 2238, the Third Officer walked aft along the starboard side of the main deck from the vicinity of number 3 hatch towards the after accommodation. At this juncture, the Number 1 gantry crane was in the process of moving the forward most pontoon cover at number 5 hatch to number 3 hatch.

At 2240, Able Seaman (1) unhooked the gantry crane's hook from the pontoon cover after it had been landed on top of number 3 hatch. The Number 1 gantry crane then started travelling aft towards number 5 hatch to remove the last pontoon cover. At this time, the Third Officer returned to the starboard side of the main deck adjacent to number 5 hatch. He talked briefly to the Boatswain, who was standing on top of the last pontoon cover on number 5 hatch, and then carried on to the accommodation.

At 2243, after connecting the Number 1 gantry crane hook to the last pontoon cover, the Boatswain climbed down from the number 5 hatch coaming onto the starboard side of the main deck and inboard of the gantry crane track.

Camera footage from a Port security camera shows that thirty two seconds after the Boatswain climbed down off the pontoon cover, at 2244, the gantry crane lifted the pontoon cover clear of the number 5 hatch coaming and commenced travelling forward towards number 3 hatch. The Boatswain is thought to have been trapped between the after inboard leg of the Number 1 gantry crane and the number 5 hatch coaming at this juncture. The after leg of the gantry crane travelled past the king beam (*Photograph 7*) approximately thirty seconds after it started moving.

At 2247, Able Seaman (1) unhooked the pontoon cover after it had been landed on top of number 3 hatch. He then climbed onto the forward end of number 4 hatch and walked to the after end where he commenced rigging safety lines so as to create a guard for number 5 hatch, which was now fully open.

At 2251, the gantry crane hook was landed on the quayside where the hook beam was connected by the stevedores. Able Seaman (2), who was driving the Number 1 gantry crane, woke the stevedore who had been dozing in the crane cab.

At 2255, the Stevedore commenced driving the number 1 gantry crane. The first lift was that of a man cage, with two men inside, which was lowered into number 5 hold so that the two men could start to mark off the log cargo.

At 2257, Able Seaman (2) climbed down from the Number 1 gantry crane and proceeded towards the accommodation block.

At 2308, after the log cargo had been marked off, the man cage was removed from number 5 hold and landed on the wharf. Two bundles of logs were then loaded into number 5 hold.

At 2230, cargo operations ceased and the stevedores started to leave the vessel for a break,

At 2231, the Stevedore Hatchman at number 5 hold, walked forward, inboard of the gantry crane track, and discovered a body lying on the main deck on the starboard side of number 5 hatch. Upon making this discovery, he immediately proceeded to the vicinity of the gangway and raised the alarm to his supervisor and the ship's crew.

At 2235, the Third Officer arrived at the scene of the accident and identified the body as being that of the ship's Boatswain.

The Police and Ambulance were called by the Stevedoring Supervisor and arrived on board a short time later.

COMMENT & ANALYSIS

Tasman Resolution

Tasman Resolution is a Marshall Islands flag general cargo vessel of 18 936 gross tonnes (23 853 deadweight tonnes), with six holds located forward of the aft accommodation. It is fitted with two gantry cranes manufactured by Ishikawajima-Harima Heavy Industries (IHI) in Japan.

The vessel has a length overall of 173.95 metres (m), a beam of 27.60m and a moulded depth of 15.40m. The two gantry cranes, which can move the length of the deck, in a forward and aft direction from number 6 hold to number two hold, are used for opening and closing the hatches and can be extended over the ship's side for the loading and discharge of cargoes.

The vessel was completed in 1988 by Ishikawajima-Harima Heavy Industries Company Ltd at Kure, Japan and was originally named ***Sunshine Amazon***. Subsequently, it was renamed ***New Resolution***, ***Gertrude Oldendorf***, ***New Resolution***, ***Kota Manis*** and ***New Resolution***. At the time of this accident, it was owned by Parman MPP KS of Oslo, Norway and was managed by Kirsten Marine SA of Piraeus, Greece.

Tasman Resolution is employed on a liner service from New Zealand to the Far East and back. It is chartered to Tasman Orient Line Ltd.

At the time of the accident, the vessel had a crew of twenty three consisting of the Master, three deck officers, four engineer officers, an electrical officer and fourteen ratings. All the crew were Russian nationals.

Gantry Cranes

Two gantry cranes straddle the hatches and run on rails set on the main deck, each side of the vessel. Each gantry crane has a Safe Working Load (SWL) of 40 tonnes and is controlled from a cab located in the centre of the traveller. The cab of Number 1 gantry crane (*See Photograph 4*) is located at the forward end of the gantry and faces aft. It is in a fixed position longitudinally, but moves athwartships, across the vessel, in conjunction with the crane hook. The drivers' position in the cab is approximately 14m above the main deck.

The gantry cranes, which are powered by electro-hydraulic systems, are fitted with a flashing yellow light on each supporting leg. These lights are positioned approximately 4 metres above the main deck. On Number 1 gantry crane there are electronic audible alarms which play through loudspeakers located on the starboard forward leg and the port after leg. The flashing lights and audible alarms are activated automatically whenever the gantry is moving along the deck.

Emergency stop wires (*See Photograph 3*) are provided along the outboard side of the main structure of each gantry. The wire is painted red and is positioned at a height of approximately 1.80m above the deck, reducing to 1.60m above the deck at the legs of the gantry. This wire does not extend around the machinery at the after end of the leg (*See Photograph 3*).

There is no emergency stop wire along the inboard side of the gantry crane. There is a proximity switch located on each leg, 350mm directly above the gantry track (*See Photograph 3*). This stops the crane should any obstacle be detected on the rail itself.

The crane driver's visibility is restricted from the driver's position within the cab. The crane driver therefore relies on either radio contact or hand signals from a man on deck when he is operating the crane. The cab has glass windows, one of which was open at the time of the accident.

The two gantry cranes travel along the deck at a maximum speed of 20m per minute.

At the after end of Number 1 gantry crane on the starboard side, there is a timing mechanism (*See Photograph 5*). At the time of the accident, this mechanism was incomplete. It consisted of a pinion which did not mesh with any other and which rotated when the crane moved. It was located 280mm above the deck and was only guarded on the forward side such that the after side was left unguarded (*See Photograph 5*).

Forward of this mechanism are the main pinions which mesh with the rack on the inboard side of the track to propel the gantry crane.

It is probable that at some stage, damage had occurred to the timing mechanism and that a temporary repair had been effected. This damage would likely have been inflicted by a lashing bar that had incorrectly been stowed in a bin inboard of the gantry track.

Subsequent to the accident, and before the vessel returned to New Zealand, the mechanism was repaired and a guard was fitted which covered the after end of the mechanism.

The timing mechanism now consists of three pinions as designed. When questioned, the ship's senior officers denied all knowledge of any repairs having been carried out and attributed them to the Chief Engineer who had recently paid off.

At the time of the accident, the crane machinery was painted a dark red colour.



Photograph 2
Gantry Cranes



Emergency stop wire

Proximity switch

Photograph 3
Number 1 Gantry machinery



Photograph 4
View from cab of Number 1 gantry looking to port.



Photograph 5
Unguarded pinion viewed from aft

Hatch Covers and Coamings

The two gantry cranes travel close to the hatch coamings. In places, there are additional obstructions such as electrical boxes, fire hydrants, hose boxes and lashing gear bins that protrude from the side of the hatch coaming, thus further reducing the distance between the hatch coaming and the inboard side of the gantry cranes. On numbers 3 and 5 hatches, the hatch coaming protrudes outwards, due to the location of a king beam in the centre of the hatch (*See Photographs 6, 7 & 10 and Figures 1 & 2*). In this position, the distance between the hatch coaming and the machinery at the after end of Number 1 gantry crane, measures approximately 150mm compared to the average distance of approximately 500mm away from the king beam protrusion.

The hatch coaming at number 5 hold is approximately 890mm in height, and approximately 27 500mm in length.

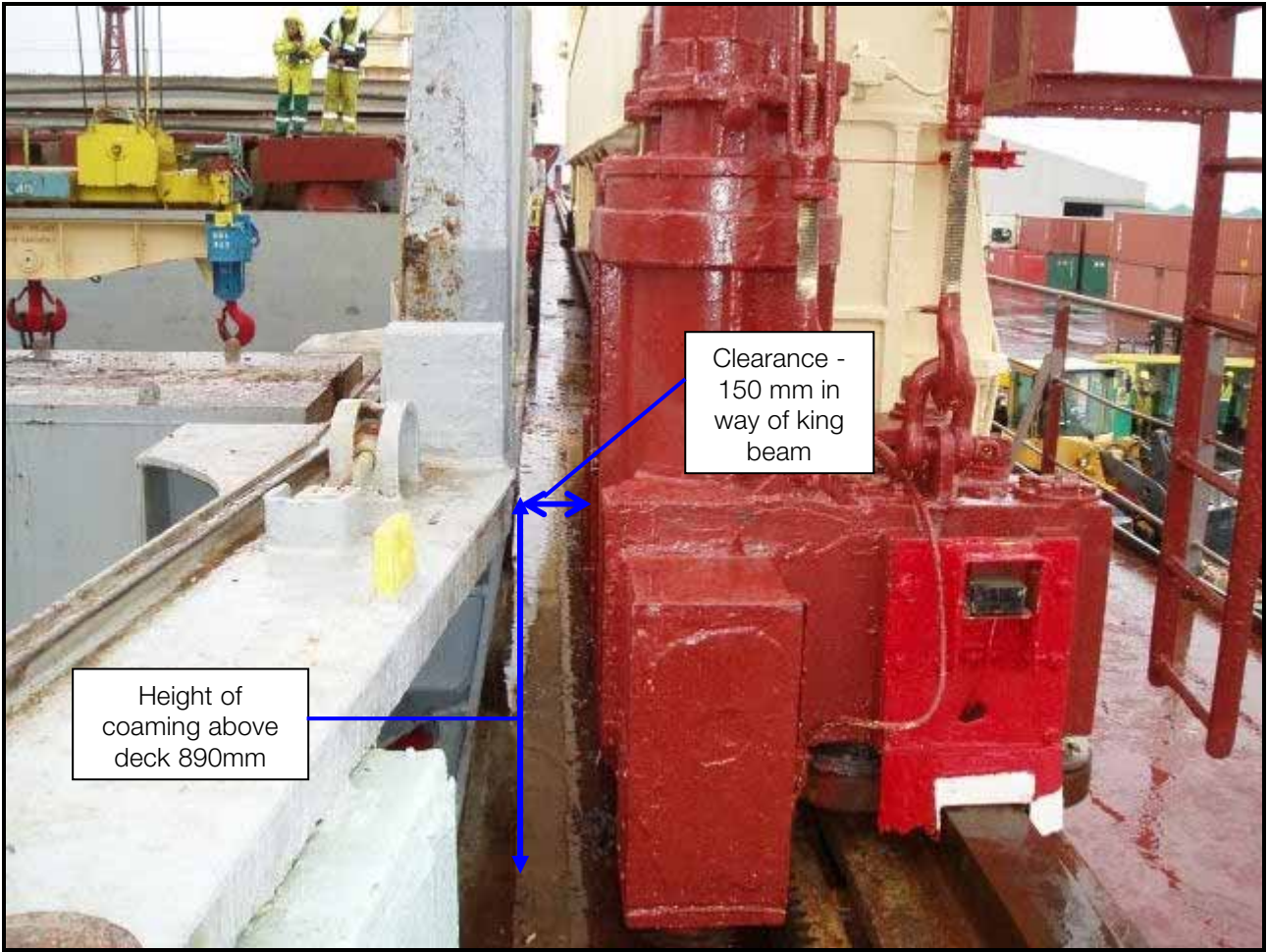
Number 5 hatch is covered by four pontoon covers, each extending the full width of the hatch. These pontoon covers are identified from forward to aft as numbers 5F, 5MF, 5AF and 5A. Each pontoon cover is between 25 and 28 tonnes in weight.

There is a fixed ladder at the forward end of 5MF pontoon. Hand holds are welded to the sides of number 5MF and 5AF pontoons (*See Photograph 8*). These are used to climb on and off the pontoon covers.

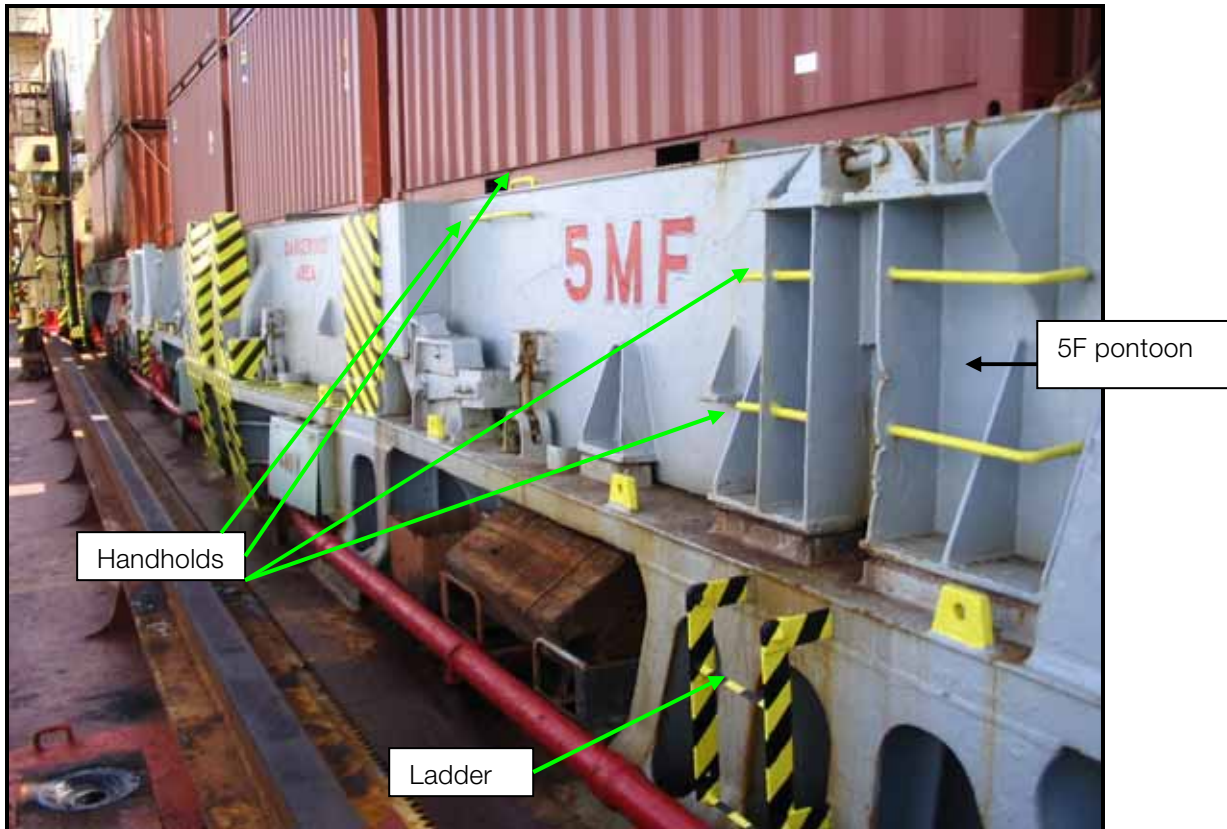
The fixed ladder is located at the forward end of number 5MF. When number 5F pontoon is removed, it is unlikely that the ladder would be used to climb down from number 5MF pontoon cover as it would mean getting very close to the open hold. For this reason, it would be safer to use the hand holds further aft.



Photograph 6
View of number 5 hatch coaming from aft showing the gantry crane adjacent to the restricted space in way of the king beam



Photograph 7
Clearances between the king beam and the gantry crane machinery



Photograph 8

View of 5MF from forward following repainting that was conducted after the accident.

The Crew

At the time of the accident, there were five members of the Deck Department on watch. The Officer of the Watch was the Third Officer and assisting him were the Boatswain, an Able Seaman driving the Number 1 gantry crane, an Ordinary Seaman on Gangway duties and an Able Seaman on deck. Their watch was from 1800 to 2400.

The Third Officer was 26 years old. He had been on board the vessel for approximately 10 weeks. It was his second contract since obtaining his Certificate of Competency.

The Third Officer had undergone documented familiarisation training upon first joining the vessel, but no documented training records were discovered by MNZ that related specifically to the operation of the ship's gantry cranes. He had received practical training in the use of the gantry cranes from the Chief Officer and Boatswain.

The Boatswain was 56 years old. He had been at sea for approximately 30 years and had served on board both *Tasman Resolution* and *Tasman Independence* for three previous contracts. He had been on board the vessel on this contract for approximately 6 weeks. He had undergone documented familiarisation training upon first joining the vessel, but no documented training records were discovered by MNZ that related specifically to the operation of the ship's gantry cranes. He was reported to be in good health and had completed a medical examination prior to joining the vessel. He had not sought medical attention since joining the vessel.

The Boatswain's Human Activity Data Form was compiled and supplied by the Chief Officer. According to this document, which was completed after the accident, the Boatswain had 7 hours of sleep on the night before the accident. He had been on cargo watch from 0700 to 1200. At 1200 he had a meal break, and then slept from 1300 until 1500. From 1500, until he commenced cargo watch at 1800, he partook in 'recreation' for three hours. The Master stated that the Boatswain never drank alcohol.

Personal Protective Equipment

At the time of the accident, the Boatswain was wearing a bright yellow hard hat, safety shoes and a dark blue set of coveralls. The Boatswain was not in possession of a VHF radio or other means of radio communication.

This clothing was standard for the crew of *Tasman Resolution*, with the only difference being the officers wearing white coveralls.

The stevedores, when working on board the vessel, wore hi-visibility clothing with reflective stripes attached.

The Stevedores

The stevedores left the vessel at approximately 2110. One of the stevedores, who had been driving Number 1 gantry crane, elected to remain in the cab of the crane during this break in proceedings. He dozed whilst an Able Seaman took over to help in removing the pontoon covers.

The stevedores resumed work on the vessel at 2255. Able Seaman (2), who had been driving the Number 1 gantry crane during the re-positioning of the pontoon covers, climbed down from the cab at 2257, leaving the stevedore crane driver in control.

The stevedores assigned to be working on board the vessel with the Number 1 gantry crane, comprised a crane driver and a hatchman.

Witnesses

There were no known witnesses to the accident. The Third Officer stated that the last time he saw the Boatswain was when he was in the vicinity of number 5 hatch, between approximately 2250 and 2310. The Third Officer claims to have witnessed the stevedores connecting the hook at approximately 2252 after which he proceeded to the Master's cabin and then the wheelhouse.

Able Seaman (1) stated that he last saw the Boatswain when the Boatswain was climbing off the forward pontoon cover on the starboard side of number 5 hatch. The Able Seaman was at number 3 hatch at the time, and it is possible, given the distance, that he may have been mistaken in thinking that it was the forward pontoon cover (5F) instead of the forward centre cover (5MF) that the Boatswain climbed off.

The Able Seaman who was stationed at the gangway last saw the Boatswain at approximately 2200. He was informed of the accident by a stevedore. He immediately informed the Third Officer.

When the Third Officer was re interviewed by MNZ upon the vessel's return to New Zealand and shown the Port security camera footage, he admitted that he had not been present when the stevedores connected the cargo hook, and that he had not been present when the last pontoon was lifted off number 5 hatch.

Able Seaman (2), when shown the camera footage, revised his evidence, stating that the Third Officer did not give a hand signal to lift the last pontoon, but that he heard a voice which he took to be the signal to hoist. He does not know for certain whose voice he heard, but believes it was the Third Officer's.

The Third Officer and Able Seaman (2) told differing accounts of what had occurred when initially interviewed by MNZ and the Marshal Island Investigator and when they were re-interviewed by MNZ. They are thought to have colluded in an attempt to synchronise their accounts.

Accident Site

The Boatswain's body was discovered lying on the main deck in a position immediately aft of the king beam protrusion on the starboard side of number 5 hatch. His safety helmet was found on the main deck, approximately 1m aft of his body. His right shoe was found at the forward end of the king beam protrusion. Fragments of material from the Boatswain's overalls were found in the teeth of the timing pinion on the after inboard leg of the Number 1 gantry crane.

Material and body tissue was found in the main rack teeth on the in board side of the gantry track in the vicinity of the Boatswain's body and of his shoe. A pool of blood was found below the 440v reefer plug box located forward of the extrusion (*See Photograph 10 & Figure 1*).



Photograph 10

View of number 5 hatch from starboard forward after repainting corresponding with *Figure 1* below

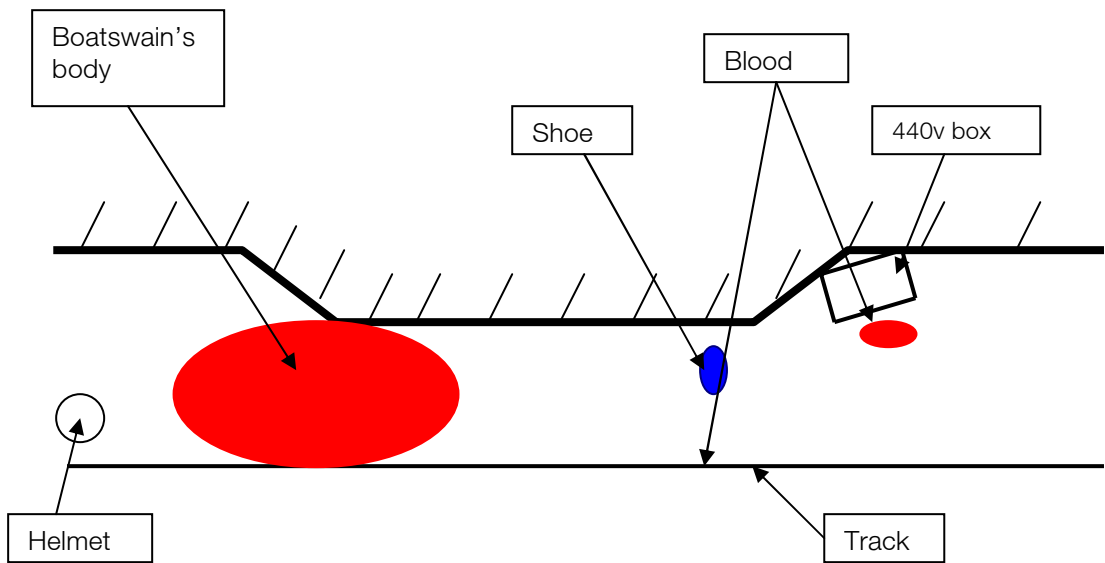


Figure 1

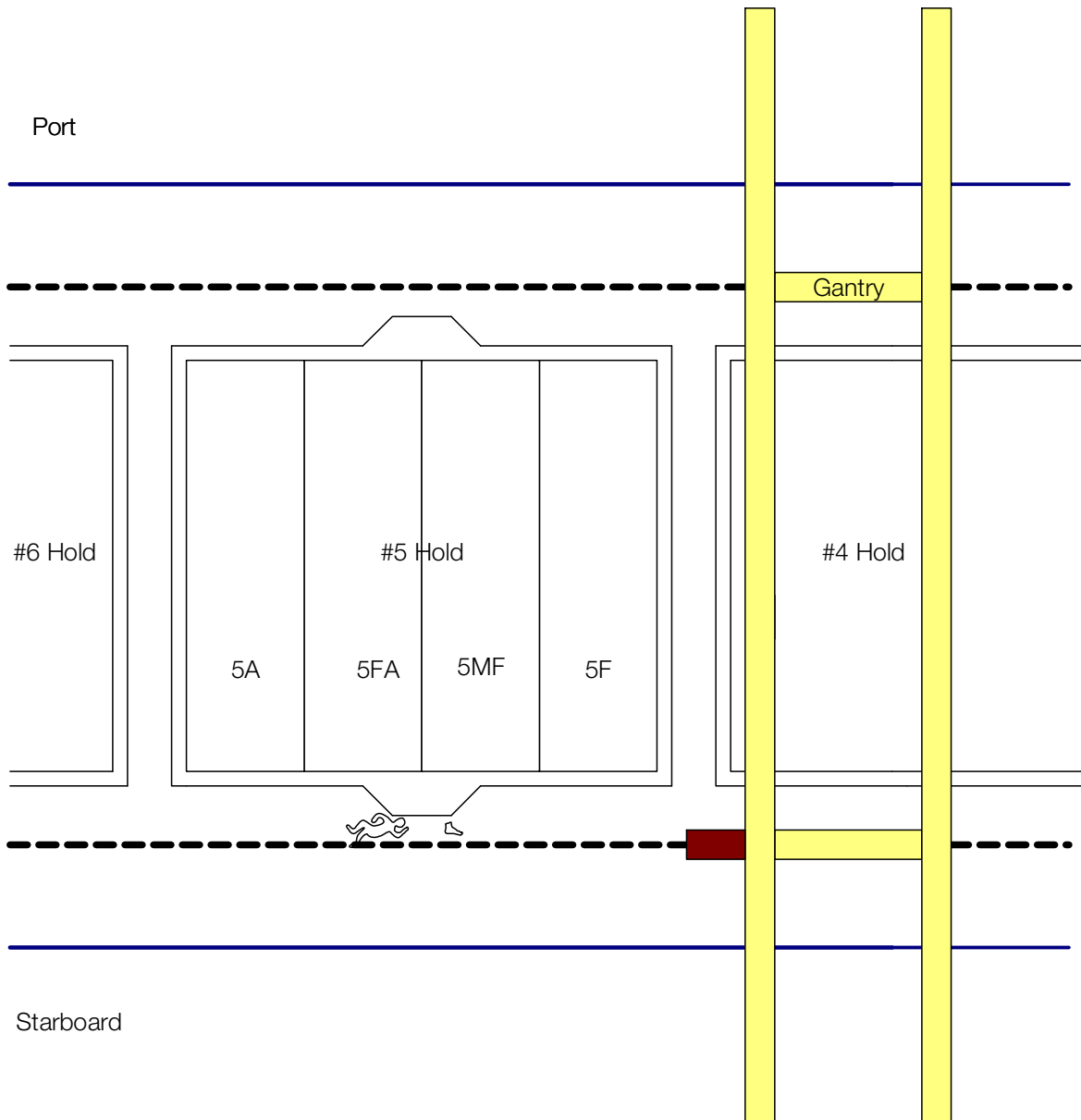


Figure 2
Plan view of part of main deck showing location of the accident

Environment

At the time of the accident, it was dark. Artificial light was provided by numerous floodlights both on board the vessel and ashore. The lighting was sufficient to allow cargo operations to be carried out safely and efficiently.

It had been raining since approximately 2100.

CCTV

The Port of Tauranga has numerous security cameras positioned around its property. On the night of the accident, one of those cameras was focused on the starboard side of *Tasman Resolution*.

The closed circuit television (CCTV) footage was able to be downloaded and replayed during the investigation.

The Port security officer checked the time recorded on the relevant camera after the incident and found it to be the correct local time.

Injuries

The Boatswain suffered massive injuries and was already dead when discovered.

Post Mortem

The Pathologist concluded that the cause of death was major abdominal and thoracic trauma.

No evidence of alcohol or cannabis usage was detected.

Action Taken

Since the accident, the owners/managers of *Tasman Resolution* and *Tasman Independence* have commenced work to extend the emergency stop wire around the entire base of each gantry crane.

The ship's crew have painted hazardous 'squeeze' areas on the hatch coamings. They have also stencilled warning notices on the legs of the gantries and on deck.

The legs of the gantry cranes have been repainted with yellow and black diagonal hazard stripes.

The stevedore company has issued a Safety Alert to all of their employees, highlighting this accident.

CONCLUSIONS

The accident occurred shortly after the Boatswain climbed down from 5MF pontoon cover prior to its being lifted by the Number 1 gantry crane. As the adjacent pontoon covers, located immediately forward and abaft this cover had already been lifted clear, the Boatswain had to climb down onto the main deck on the starboard side of number 5 hatch. Shortly afterwards, the Number 1 gantry crane started travelling forward towards number 3 hatch. It is thought that the Boatswain became trapped between the after inboard leg of the Number 1 gantry crane and the number 5 hatch coaming, in the vicinity of the king beam, and that his body was crushed, causing him to fall to the deck.

It is not known why the Boatswain did not leave the area immediately after he climbed off the pontoon cover. Camera footage showed that he had thirty two seconds to move clear before the Number 1 gantry crane started to move. It is not known if his body became caught in the pinion gearing at this stage or later when the gantry crane returned to number 5 hatch.

The Duty Officer was not in the vicinity and the crane driver's view was severely restricted once the pontoon cover was lifted clear of the hatch.

Due to the configuration of the emergency stop wire, it would have been impossible for the Boatswain to have activated an emergency stop from his position on the inboard side of the gantry crane.

RECOMMENDATIONS

It is recommended that the owners/managers of *Tasman Resolution*:

1. Install emergency stop devices along the inboard side of each gantry crane and around the machinery on this vessel and her sister vessel *Tasman Independence*.
2. Install audible sirens on each leg of the gantry cranes.
3. Introduce documented procedures prohibiting crew members being between the gantry cranes and the hatch coamings whenever the cranes are liable to travel forward or aft.
4. Install guards around the pinion gearing on both vessels.
5. Formalise procedures for ensuring crew keep clear of gantry cranes when moving pontoon covers.
6. Ensure that all crew members wear high visibility clothing whilst engaged in cargo operations.
7. It is recommended that whenever possible, both ship's crew and stevedores ensure that clearance is given to the crane driver, both by radio and visually, before a gantry crane is moved.
8. It is recommended that this report be promulgated to all stevedoring companies in New Zealand and that these companies highlight the dangers of gantry cranes to their employees.
9. It is recommended that copies of this report be sent to the secretariats of the Tokyo MOU and the International Maritime Organisation (IMO).

VESSEL INFORMATION

Ship Type:	General Cargo Vessel
Certified Operating Limit:	Unlimited
Port of Registry:	Majuro
Flag:	Marshall Islands
IMO No.:	8714918
Built:	1988
Construction Material:	Steel
Length Overall (m):	174
Maximum Breadth:	27.6
Gross Tonnage:	18936
Net Tonnage:	7808
Registered Owner:	Parman MPP KS, Oslo, Norway
Ship Operator/Manager:	Kristen Marine S.A, Greece
Classification Society	Det Norske Veritas
Accident Investigator:	Andrew Hayton