



Transport Accident
Investigation
Commission

Final report

Tuhinga whakamutunga

Marine inquiry MO-2021-205
Container vessel Moana Chief
Serious injury to crew member
Port of Auckland, New Zealand
10 December 2021

April 2023



The Transport Accident Investigation Commission

Te Kōmihana Tirotiro Aituā Waka

No repeat accidents – ever!

“The principal purpose of the Commission shall be to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person.”

Transport Accident Investigation Commission Act 1990, s4 Purpose

The Transport Accident Investigation Commission is an independent Crown entity and standing commission of inquiry. We investigate selected maritime, aviation and rail accidents and incidents that occur in New Zealand or involve New Zealand-registered aircraft or vessels.

Our investigations are for the purpose of avoiding similar accidents in the future. We determine and analyse contributing factors, explain circumstances and causes, identify safety issues, and make recommendations to improve safety. Our findings cannot be used to pursue criminal, civil, or regulatory action.

At the end of every inquiry, we share all relevant knowledge in a final report. We use our information and insight to influence others in the transport sector to improve safety, nationally and internationally.

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Commissioner	David Clarke (from 1 December 2022)

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Chief Investigator of Accidents	Naveen Kozhuppakalam
Lead Investigator for this inquiry	Avinash Figueiredo
Commission General Counsel	Cathryn Bridge

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Kōrero tāpiri ki ngā pūrongo o te Kōmihana

Citations and referencing

The citations section of this report lists public documents. Documents unavailable to the public (that is, not discoverable under the Official Information Act 1982) are referenced in footnotes. This draft report does not cite information derived from interviews during the Commission’s inquiry into the occurrence.

Photographs, diagrams, pictures

The Commission owns the photographs, diagrams and pictures in this report unless otherwise specified.

Verbal probability expressions

For clarity, the Commission uses standardised terminology where possible.

One example of this standardisation is the terminology used to describe the degree of probability (or likelihood) that an event happened, or a condition existed in support of a hypothesis. The Commission has adopted this terminology from the Intergovernmental Panel on Climate Change and Australian Transport Safety Bureau models. The Commission chose these models because of their simplicity, usability, and international use. The Commission considers these models reflect its functions. These functions include making findings and issuing recommendations based on a wide range of evidence, whether or not that evidence would be admissible in a court of law.

Terminology	Likelihood	Equivalent terms
Virtually certain	> 99% probability of occurrence	Almost certain
Very likely	> 90% probability	Highly likely, very probable
Likely	> 66% probability	Probable
About as likely as not	33% to 66% probability	More or less likely
Unlikely	< 33% probability	Improbable
Very unlikely	< 10% probability	Highly unlikely
Exceptionally unlikely	< 1% probability	



Figure 1: Container vessel, *Moana Chief*

Credit: Swire Shipping (NZ) Limited



Part of "Auckland 0.075m Urban Aerial Photos (2017)"
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Figure 2: Location of accident, Fergusson Wharf, Port of Auckland

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1 Executive summary

Tuhinga whakarāpopoto

What happened

- 1.1 On the morning of 10 December 2021, the container vessel *Moana Chief* was preparing to leave the Port of Auckland. The crew had started retrieving the telescopic accommodation ladder when a crew member's lower leg got trapped between the fixed upper ladder and the moving lower ladder, resulting in serious injury to their leg.

Why it happened

- 1.2 As crew members were retrieving the accommodation ladder, it slipped off the Port platform on which it was resting. The slack side chains allowed the ladder to drop and the weight of the ladder was transferred to the fall wire, which caused the lower ladder to slide upwards. A crew member, who was standing in an area that had previously been identified and designated as a danger area, was seriously injured.
- 1.3 Actions to retrieve the accommodation ladder were not consistent with the procedures documented in the vessel's Safety Management System. Several control measures listed in the risk assessment for deploying and retrieving the accommodation ladder were not implemented.
- 1.4 It is **very likely** that the accident could have been prevented, if other crew members standing in the vicinity had intervened and alerted the winch operator to a crew member standing in the designated danger area.

What we can learn

- 1.5 Deploying and retrieving accommodation ladders can be a dangerous operation, and often involves ships' crews working over the side of the vessel. A telescopic accommodation ladder has several moving parts that further increase risk of injury. It is important that users understand how to operate the equipment safely in accordance with the manufacturer's instructions.
- 1.6 Risk assessment and management of a hazard does not end with the implementation of risk controls. Monitoring and reviewing the effectiveness of the risk controls is an ongoing process and should be formalised into the Safety Management System.

Who may benefit

- 1.7 Operators of telescopic accommodation ladders, vessel owners and operators, maritime training facilities and shore-based emergency response agencies may all benefit from the findings in this report.
- 1.8 Any organisation using a safety management system to assess risks and manage hazards, including monitoring the effectiveness of their processes which is essential for safe outcomes, may also benefit.

2 Factual information

Pārongo pono

Telescopic accommodation ladder

- 2.1 Typically, a telescopic¹ accommodation ladder² (the ladder) is made up of two parts: a fixed upper ladder and a moving lower ladder.
- 2.2 Onboard *Moana Chief* (the vessel) the top of the upper ladder was hinged on a turntable mounted onto a platform attached to the ship's deck. The bottom of the upper ladder was supported by two side chains (see Figure 3).
- 2.3 The lower ladder was telescopic and could be extended or retracted. It was secured to the upper ladder by an interlocking guide and rollers. There was an overlap between the two ladders of about 1.5 metres, which provided support and helped maintain rigidity and strength.

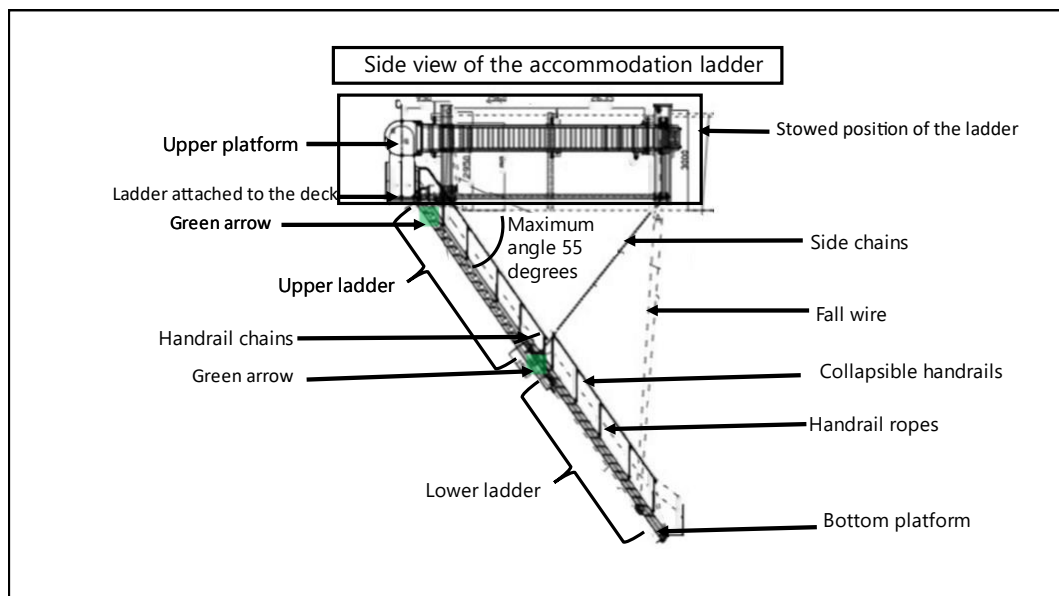


Figure 3: Side view of the telescopic accommodation ladder

- 2.4 The ladder was deployed and retrieved by a fall wire³ connected to a winch⁴. The winch was operated by a remote-control unit on a wandering lead (see Figure 4).

¹ having a construction consisting of sections designed to slide over one another

² a point of access to a ship's deck for shore personnel, accommodation ladders are rigged in the fore and aft direction of the ship and face astern

³ the steel wire rope on a winch used for lowering or lifting a load

⁴ a mechanical device used to pull in or let out or otherwise adjust the tension of a rope or wire



Figure 4: Accommodation ladder remote control

Narrative

- 2.5 On 10 December 2021 at approximately 0515 the container vessel *Moana Chief* completed cargo operations alongside Fergusson Wharf⁵ at the Port of Auckland.
- 2.6 The vessel was due to depart at 0730. At approximately 0700 the duty Integrated Rating (IR)⁶ woke the majority of the crew in preparation for unmooring⁷ operations.

Events at the accommodation ladder

- 2.7 The accommodation ladder team (the team) consisted of the Chief Integrated Rating⁸ (CIR), the Engine Room Watch Rating⁹ (EWR) and the Integrated Rating (IR). The team was responsible for retrieving and stowing the ladder in preparation for sailing.

⁵ a structure built alongside or perpendicular to the shore where ships berth for loading or discharging cargo

⁶ a crew member who can perform the functions and duties of a deck crew member on ships or a crew member in a manned engine room or periodically unmanned engine room

⁷ a procedure to release and cast off the lines of a vessel from the fixtures to which it is moored

⁸ a boatswain, also known as a petty officer on a merchant ship, who controls the work of other seamen

⁹ a crew member in a manned engine room or periodically unmanned engine room on a ship of any propulsion power in any operating area

- 2.8 Two additional IRs helped to remove and stow the accommodation ladder safety net.
- 2.9 The ladder was resting on top of a steel platform known as the Ports of Auckland Limited platform (the Port platform) (see Figure 5). The Port platform was designed to keep the ladder clear from obstructions on the wharf and prevent it from impeding the safe operation of the container cranes, which ran on dedicated rails close to the side of the vessel.

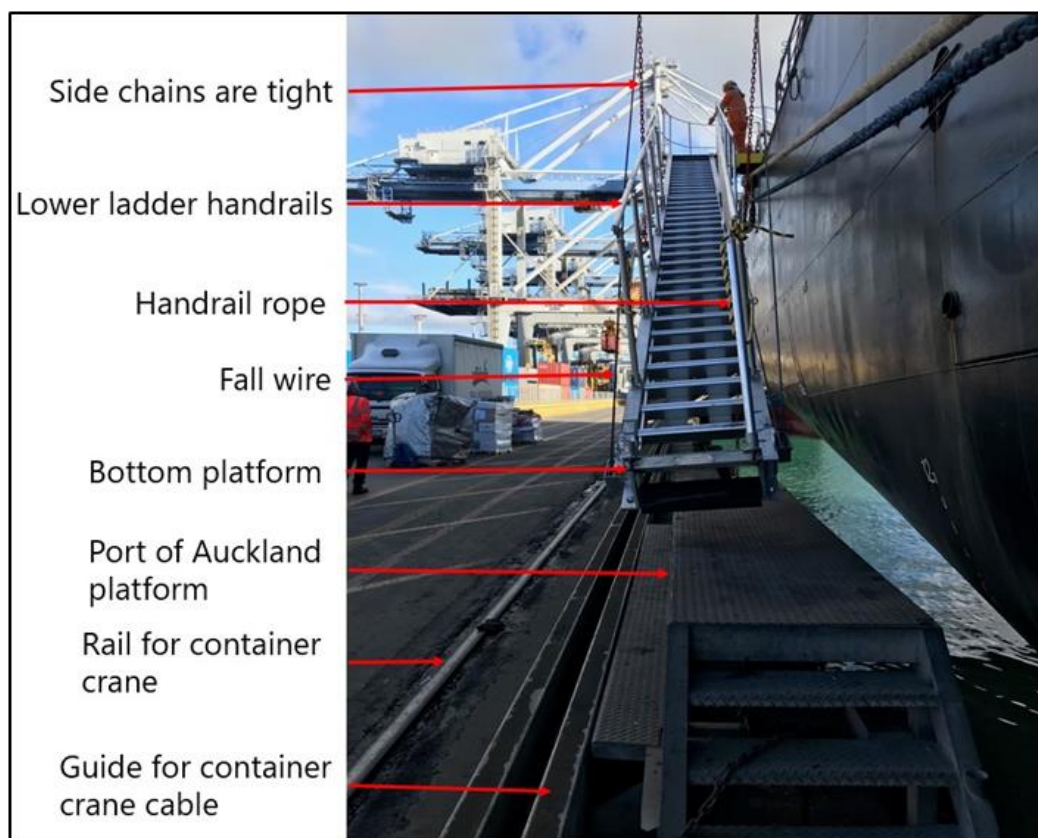


Figure 5: Ports of Auckland Limited platform and accommodation ladder

- 2.10 The CIR was the winch operator and person in charge of rigging¹⁰ and stowing the ladder.
- 2.11 The Chief Officer and the Third Officer were also standing in the vicinity of the ladder observing the operation.
- 2.12 The team and the two additional IRs removed and stowed the accommodation ladder safety net before the Pilot¹¹ boarded the vessel at about 0722.
- 2.13 After the Pilot had boarded the vessel, the team started retrieving the ladder. At approximately 0723, the CIR started the winch and started heaving on the fall wire, which in turn moved the lower ladder up by about one metre. The CIR stopped the winch and directed the EWR and the IR to untie the lower ladder handrail ropes (see Figure 6).

¹⁰ setting up a device or equipment

¹¹ a mariner who manoeuvres ships through dangerous or congested waters, such as harbours or river mouths (maritime pilot, marine pilot, harbour pilot, port pilot, ship pilot or simply pilot)

- 2.14 The EWR walked down to the bottom platform and the IR walked down to the top of the lower ladder. They untied the handrail ropes but left the handrail chains in place, which was the normal procedure (see Figure 6).

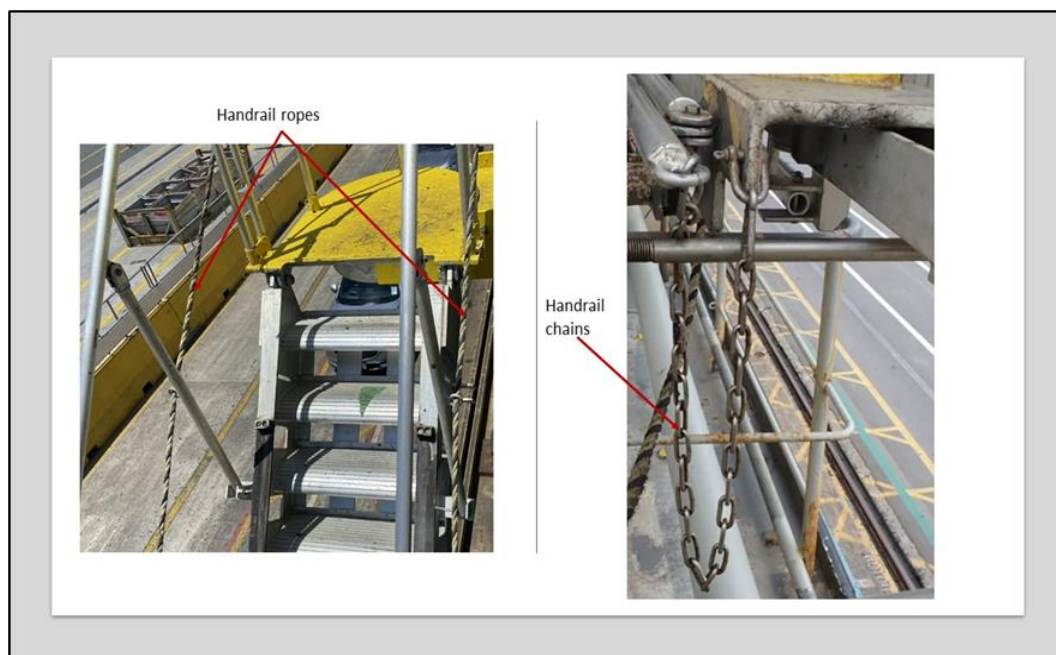


Figure 6: Handrail ropes and chains

- 2.15 At approximately 0724 the CIR resumed retrieving the ladder, with the IR and the EWR standing on the moving lower ladder. Approximately 30 seconds later the CIR stopped the winch. The EWR and the IR lowered the handrails of the lower ladder.
- 2.16 The IR then returned to the upper platform. The EWR stepped onto the upper ladder and walked up a few steps, turned around and placed the two handrail chains, clear of any obstructions, on the top step of the lower ladder.
- 2.17 At approximately 0725 the Chief Officer (who was standing on the poop deck) and the two additional IRs (who had finished removing and stowing the ladder safety net) left to prepare for sailing.
- 2.18 The CIR continued retrieving the ladder until the inboard¹² handrail chain got stuck between the sliding lower ladder and the fixed upper ladder. The CIR stopped the winch and the EWR freed the chain.
- 2.19 The EWR cleared the inboard handrail chain, picked up the outboard¹³ handrail chain, and held onto both chains to prevent them from getting caught again.
- 2.20 The CIR resumed retrieving the ladder, while the EWR remained on the upper ladder and held onto the handrail chains.
- 2.21 At approximately 0726, the lower ladder fell off the Port platform on which it was resting. As the ladder fell it tightened the fall wire and caused an uncontrolled upward movement of the lower ladder.

¹² towards the centre of a ship

¹³ away from the centre of a ship

- 2.22 The sudden upward movement of the lower ladder trapped the EWR's left leg between the top step of the lower ladder and the third step of the fixed upper ladder.
- 2.23 All work stopped immediately and the Third Officer, who was standing on the poop deck nearby, informed the Master on the bridge¹⁴ that there had been an accident.

Events after the accident

- 2.24 The Master saw that the EWR was sitting on the ladder with their left leg trapped between the steps and immediately advised the Pilot that there had been an accident and asked them to inform Harbour Control.
- 2.25 The crew wedged timber between the steps to ease the weight on the EWR's leg and prevent further injury. The crew assured the EWR that they were doing everything possible to free them from the ladder. At approximately 0736 an ambulance was requested.
- 2.26 The vessel's crew considered various options before deciding that the safest option to free the ERW's leg was to cut the step. At approximately 0752 the ladder step was cut away (see Figure 7) and the EWR's leg was freed. At about the same time the first responders boarded the vessel.



Figure 7: Step cut from the lower section of the ladder

- 2.27 An ambulance arrived at approximately 0805. A paramedic boarded the vessel to assess the condition of the injured EWR and administered medication. At approximately 0843 the ambulance left the wharf and took the EWR to hospital.

¹⁴ the place on a ship from which the vessel is normally controlled

Personnel information

- 2.28 The Master had held command¹⁵ since 1989 and had over 43 years' seagoing experience, including 19 years working on container vessels. The Master had worked for Swire Shipping (NZ) Limited (the operator) since 2013 and had command of *Moana Chief* since October 2019.
- 2.29 The Chief Officer had a Master's Certificate of Competency and had joined the vessel the previous day to start a four-week roster. The Chief Officer had worked for the operator since 2011 and had worked on the vessel since February 2020.
- 2.30 The EWR had started their seagoing career in August 2010. They held an Able Seafarers Deck¹⁶ and Engine Room Watch Rating certificate issued by Maritime New Zealand in 2013. The EWR started working onboard *Moana Chief* on 25 March 2020, mostly relieving engine room crew members, but occasionally working on deck.
- 2.31 The CIR had over fifty years' maritime experience, working on a variety of vessels including bulk carriers and liquefied natural gas vessels. The CIR had previous experience working with the telescopic accommodation ladder on the *Moana Chief*.
- 2.32 The IR had over twenty years' experience working on offshore vessels. The IR had joined the vessel on 5 December 2021 for their second four-week term onboard.

Vessel information

- 2.33 The *Moana Chief* was a container vessel. It was owned by John Swire & Sons Limited, a private company registered in the United Kingdom, and operated by Swire Shipping (NZ) Limited. The vessel was registered in New Zealand in September 2019, and its home port was Auckland, New Zealand.
- 2.34 The vessel had operated on a fixed port rotation between Tauranga, Auckland, Lyttelton, Nelson and Marsden Point since September 2019.
- 2.35 At the time of the accident, the vessel had a crew of sixteen that comprised the Master, three deck officers, the Chief Engineer, three engine officers, one CIR, four IRs, one EWR, a cook and a steward.

Poop deck telescopic accommodation ladder

- 2.36 The vessel was originally built with two telescopic accommodation ladders fitted on the main deck¹⁷, one on each side. However, the vessel's draught¹⁸ and the height of tide often resulted in the ladders becoming unsuitable for use at the ports of Auckland and Lyttelton.
- 2.37 To overcome this challenge, the vessel operator fitted a new telescopic accommodation ladder to the vessel in August 2019. It was fitted on the starboard¹⁹

¹⁵ to have control of a ship and to be in charge

¹⁶ a crew member who can perform the functions and duties of a deck crew member on ships

¹⁷ the main continuous deck of a vessel

¹⁸ the depth of the hull immersed in the water

¹⁹ the right side of a vessel when facing forward

side of the poop deck, which was one deck higher than the main deck and allowed for contingencies should the main deck ladders become unsuitable (see Figure 8).

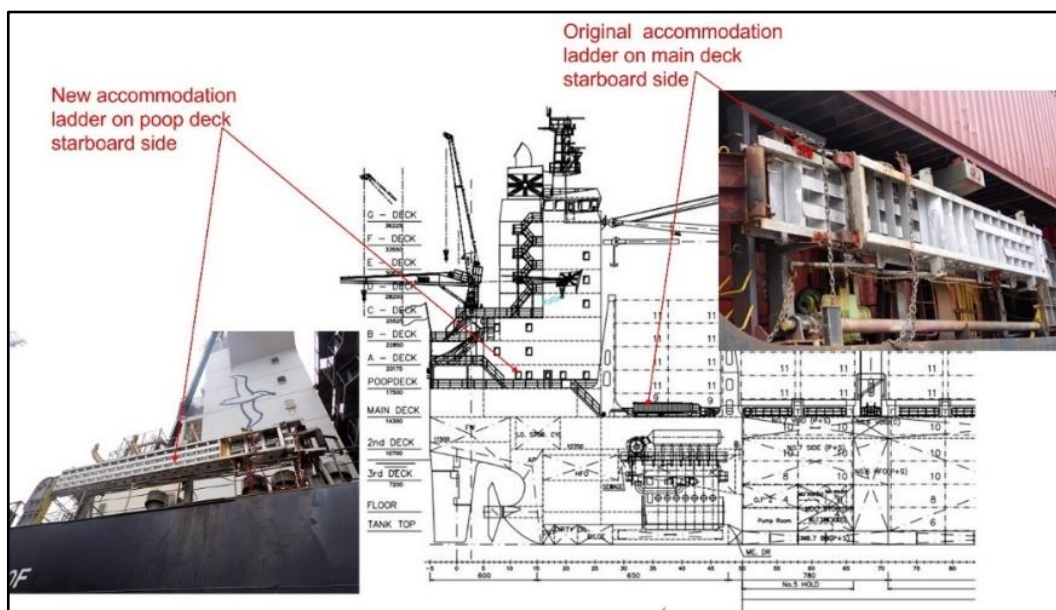


Figure 8: Location of accommodation ladders

- 2.38 The ladder met the requirements of the International Convention for the Safety Of Life At Sea (SOLAS)²⁰ regulation II-1/3-9 Means of Embarkation and Disembarkation from Ships. The ladder was constructed and installed as per the guidance contained in Maritime Safety Committee circular²¹ 1331 (11 June 2009).
- 2.39 The installation was certified by classification society Det Norske Veritas and Germanischer Lloyd (DNV GL). See Appendix 1 for the DNV GL Survey Report.

Regulation

- 2.40 SOLAS chapter II-1 (Construction), Part A-1 (Structure of Vessels), regulation 3-9 covers the Means of Embarkation²² on and Disembarkation²³ from Ships, and states that they shall be inspected and maintained in suitable condition for their intended purpose. It also states that wires used to support the means of embarkation and disembarkation shall be maintained as specified in regulation III/20.4
- 2.41 SOLAS chapter III (Life Saving Appliances and Arrangements), Part B-III (Additional requirements for cargo ships), regulation 20-4 states that fall wires shall be inspected periodically, with special regard to areas passing through sheaves, and renewed when necessary due to deterioration or at intervals of not more than five years.
- 2.42 IMO Maritime Safety Committee circular 1331 provides guidelines on maintenance and examination of accommodation ladders. The circular states that during annual surveys required by SOLAS, the suspension points, davit structures, wire and sheaves of the

²⁰ International Maritime Organization (IMO)'s International Convention for the Safety Of Life At Sea governing maritime safety

²¹ a statutory document issued by IMO's Maritime Safety Committee

²² boarding or going on a ship

²³ leaving or getting off a ship

accommodation ladder should be thoroughly examined. The circular also states that the winch, brake mechanism and remote-control systems should be examined.

Previous issues with the accommodation ladder

Fall wire

2.43 Since its installation in September 2019, there had been ongoing challenges with the fall wire including:

- the wire coming off the winch drum and getting jammed between the drum and the winch
- the wire becoming jammed between the sheave²⁴ and the cheek plates²⁵ at the bottom platform, causing damage to the wire.

2.44 The fall wire of the ladder had been replaced three times since its installation. The issues with the fall wire were resolved in April 2020.

The winch

2.45 In April 2021, the accommodation ladder winch motor failed when the brake clutch sheared off. The winch continued to lower the ladder by gravity alone. The clutch failed again in May 2021.

The side chains

2.46 The side chains were used to support the upper ladder. They were adjusted manually to alter the ladder's angle of inclination. Some crew had reported that the side chains were too long and were cumbersome to adjust. It was unclear if this issue was resolved at the time of the accident.

Poop deck telescopic accommodation ladder operations

Deployment

2.47 In the stowed position the ladder rested on its edge along the ship's side (see Figure 9). The ladder was designed to deploy using gravity. By slackening the fall wire the ladder rotated from its stowed position to a horizontal position outboard of the ship's siderail.

2.48 The ladder handrails were raised and secured manually. The side chains were then manually adjusted by a crew member to the desired length to facilitate the required angle of inclination.

2.49 Further slackening of the fall wires lowered the upper ladder until the side chains were tight and were supporting the weight of the upper ladder (see Figure 10).

²⁴ a grooved wheel that spins on an axle, often used for changing the direction of a wire rope and to lessen the effects of friction

²⁵ plates on each side of the sheave, to prevent the wire from coming off the sheave

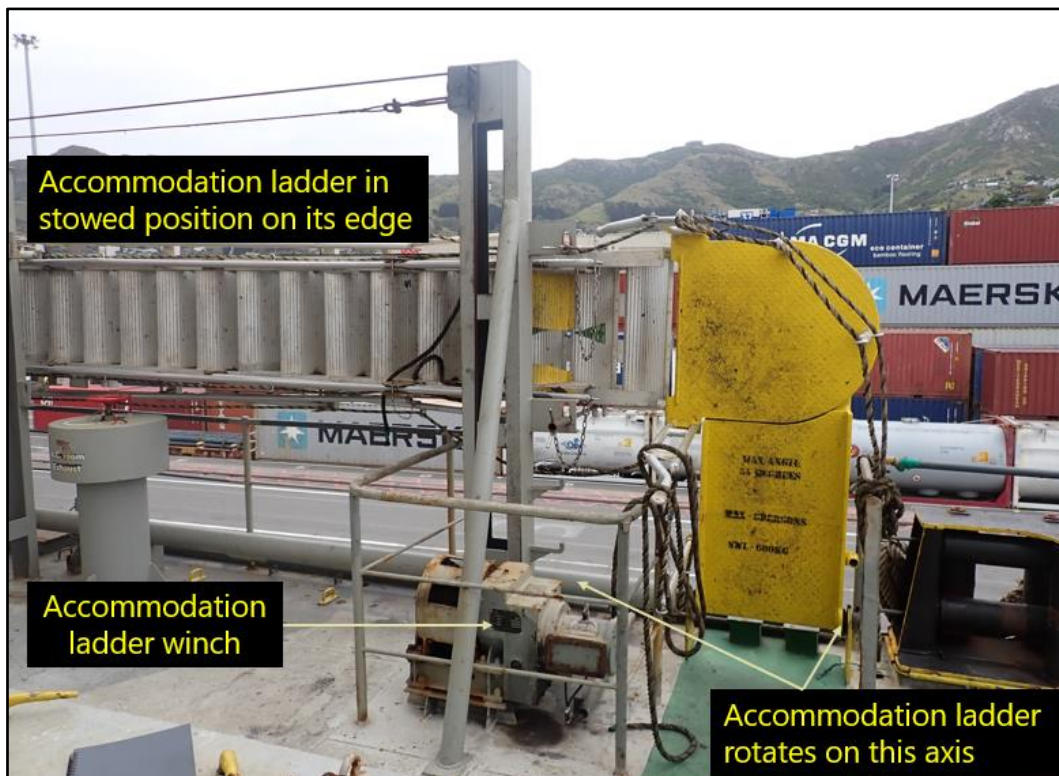


Figure 9: Accommodation ladder in stowed position and winch

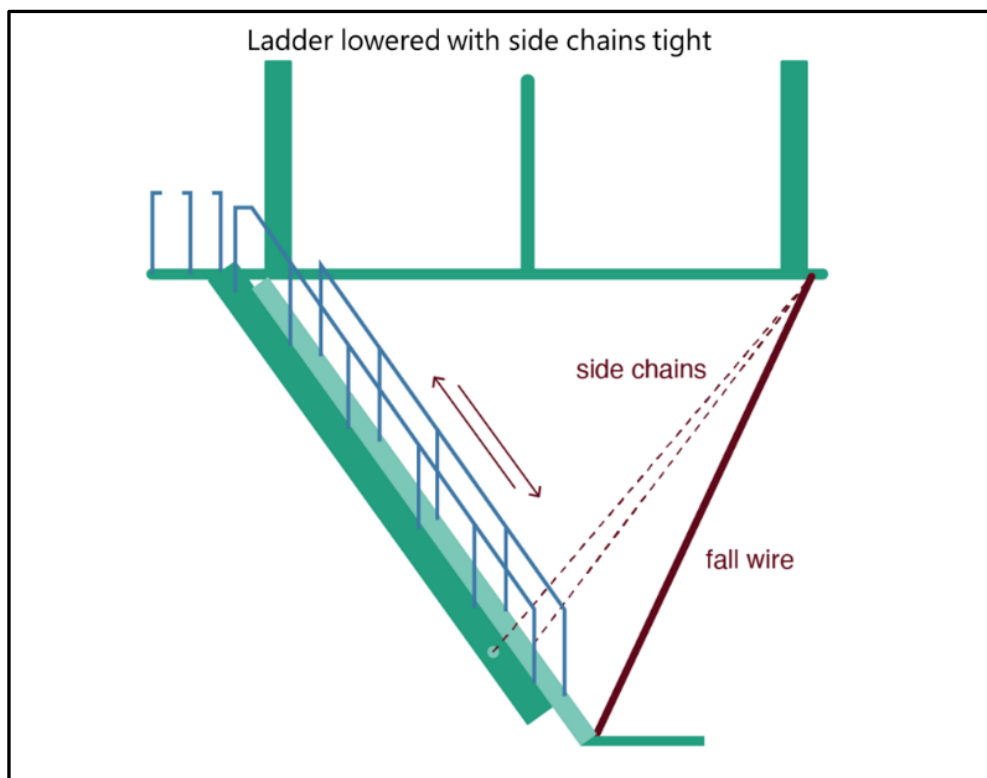


Figure 10: Ladder lowered with side chains tight

- 2.50 When the weight of the upper ladder was supported by the side chains, further slackening of the wire allowed the lower ladder to slide out (see Figure 11). The operation was complete when the lower ladder reached the desired target area (the Port platform) on the wharf.

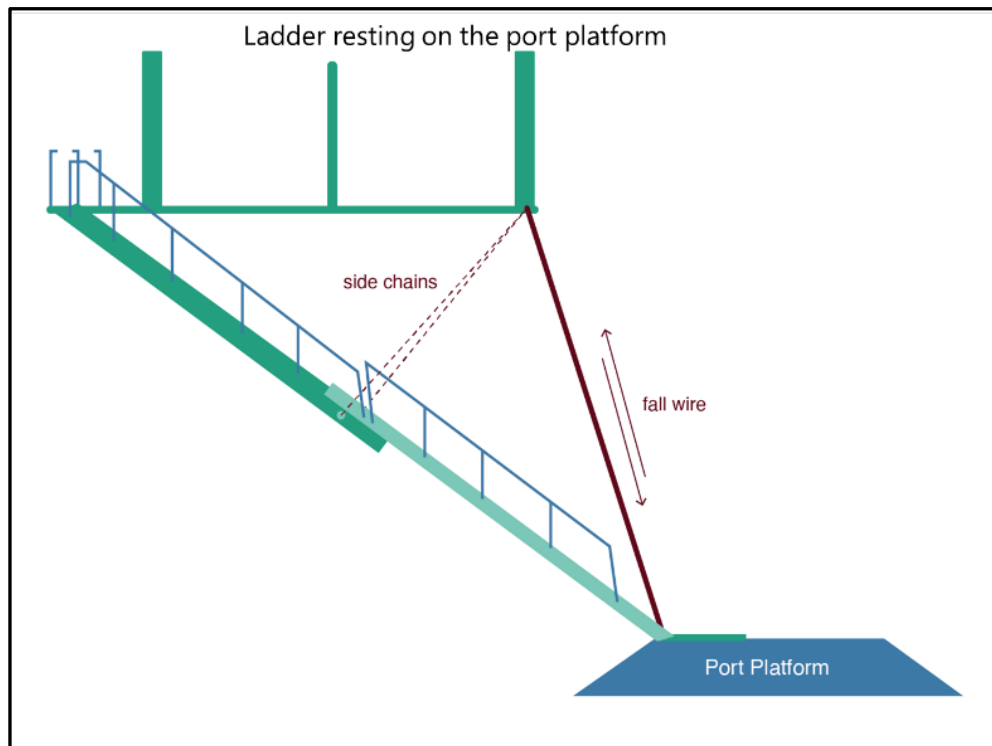


Figure 11: Ladder resting on the Port platform

Retrieval

- 2.51 The retrieval of the ladder was controlled by a winch used to heave in the fall wire. This resulted in the lower ladder sliding up an interlocking guide in the upper ladder until it reached the end point (see Figure 12).
- 2.52 Further heaving of the fall wire took the full weight of both the ladders and lifted them together until the side chains became slack.
- 2.53 When the ladder reached the horizontal the crew, wearing safety harnesses, stepped onto the ladder and lowered the handrails. Further heaving lifted the ladder inwards and into its stowed position at the side of the vessel.
- 2.54 In port, the ladder had to be closely monitored and adjusted to allow for changes in the vessel's draught and the height of tide. Minor adjustments were made by using the fall wire only. If a large adjustment was required, the ladder was retracted and the side chains manually adjusted before redeploying the ladder back down to the wharf. During a four-hour watch period it was normal for the crew to make between three and ten minor adjustments and one or two major adjustments.

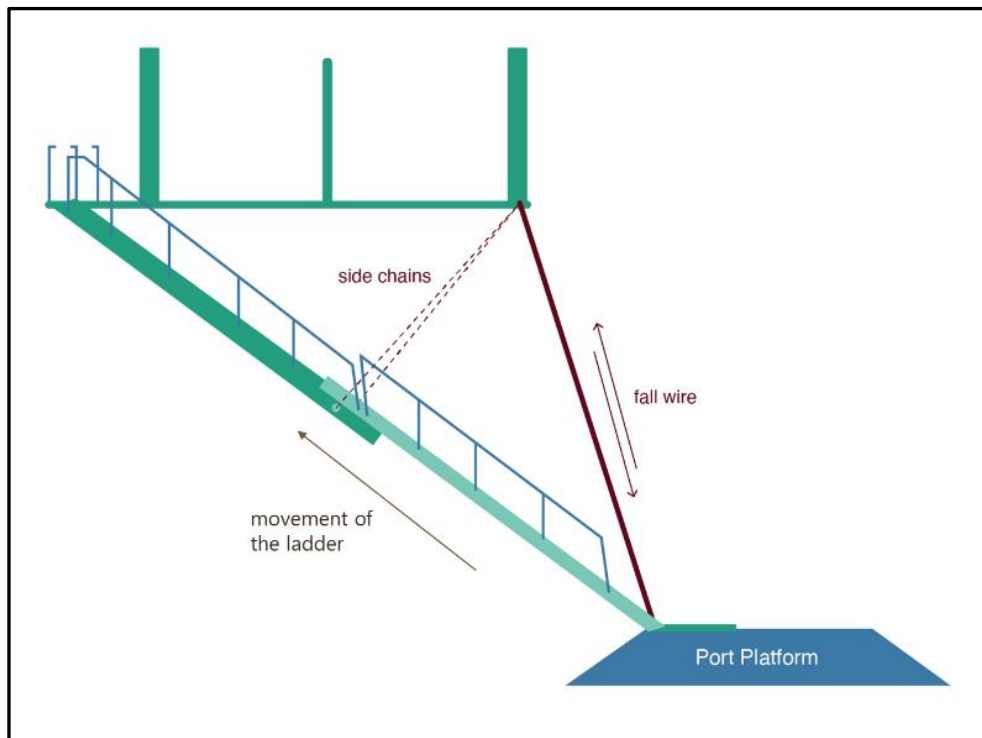


Figure 12: Retrieval of the ladder

Safety management

2.55 Under SOLAS, the International Safety Management (ISM) Code is mandatory for vessels such as the *Moana Chief*. The aim of the Code is to improve safety at sea and protect the marine environment.

Moana Chief Safety Management System

2.56 The following section describes the relevant parts of the operator's safety management system (SMS) that were applicable to this accident.

2.57 Retrieving and deploying the ladder required the crew to work outside the ship's rails, over the side of the vessel. The SMS document N051014D 'Work Overse' explained the need for a risk assessment, a toolbox²⁶ meeting and pre-work meeting to be carried out (see Appendix 2) before starting work. When rigging and unrigging²⁷ the accommodation ladder the crew was to use document N051014C 'Checklist for Pilot, Accommodation, Combination Pilot Ladder' instead (see Appendix 3).

2.58 N051014C required crew working on the accommodation ladder to wear a crew-saver harness secured to a designated strong point. The checklist did not prompt the crew to conduct a toolbox meeting or a pre-work meeting before starting the work.

²⁶ an informal safety meeting generally conducted at the job site before the start of a job or work shift – it forms part of an organisation's overall safety programme

²⁷ to stow away equipment

Poop deck gangway operating procedures

- 2.59 The vessel-specific 'Poop deck gangway operating procedures' were amended in August 2020 following a similar accident²⁸ that occurred on a Singaporean-registered ship not in the Swire Shipping (NZ) Limited's fleet but within the Swire group structure.
- 2.60 The operating procedures had four sections (see Appendix 4). Section One 'Safety Precautions' stated that the CIR was in charge of rigging and stowing the accommodation ladder. It instructed the crew not to stand anywhere on the telescopic part while the accommodation ladder was being raised or lowered. When setting the handrails, only one person with a fall arrester²⁹ was permitted to stand on the upper or lower platform.
- 2.61 Section Three 'Operation' highlighted the need to adjust the side chains when the accommodation ladder was resting on a Port platform.
- 2.62 Section Four 'Stowing the Gangway' covered retrieving and stowing the ladder. It instructed the operator to retrieve the lower ladder until it reached the end point before anyone was allowed to step onto it.

Risk Assessment

- 2.63 The SMS required the crew to conduct a risk assessment for routine jobs. One such risk assessment was 'Accommodation Ladder Rigging Ver 03', dated April 2021. Table 1 highlights some of the hazards identified in the risk assessment and the corresponding control measures (see Appendix 5 for the full risk assessment).

²⁸ refer to paragraphs 2.71–2.75

²⁹ safety equipment used, when working at heights or over the side of a ship, to stop a downward free fall and prevent serious harm or death of the person

Table 1: Identified hazards and corresponding control measures

Hazard	Consequence	Initial Risk	Control Measures
Lack of awareness/ neglect of procedures for working overside	Personal injury/ loss of life	Extreme Risk	Constant education of all crew and passing on of relevant information. Regular safety briefing. Increase awareness. Monitoring and supervision by senior officers / safety officer. Take all precautions as per SMS rigging of accommodation checklist
Fatigue	Loss of situational awareness / human error/ personal injury / damages	Moderate Risk	Make sure all personnel in the operation are well rested. Comply with the work and rest hour requirements
Inexperienced personnel in the job	Wrong operation / personal injury	High Risk	Good toolbox meeting prior to start of the job to make sure all understand what is to be done. Most experienced persons to be used for the job. Continuous supervision and monitoring.
Inadequate PPE / PPE not used.	Person falling overboard / personal injury / loss of life	Extreme Risk	Adequate PPE including safety harness with flotation devices (Crew Saver) to be used. Briefing of personnel involved at the job to highlight the dangers and precautions required
Inadequate work practice	Damage / personal injury	High Risk	Instructions on how to rig and operate gangway should be posted near operating controls
Fall overboard	Injury / death	Extreme Risk	Safety wire to be rigged above accommodation ladder for attaching crew saver harness. Gangway net to be provided

Meteorological and ephemeral information

2.64 The tidal data for Auckland on 10 December 2021 is shown in Table 2:

Table 2: Tidal data for Auckland 10 December 2021

Tide (Auckland)	Time (local)	Height (m)
High Water	0041	3.2
Low Water	0637	0.5
High Water	1312	3.3
Low Water	1918	0.6

The accident occurred about one hour after low water in the morning.

2.65 At the time of the accident the temperature was about 20°C, it was mostly cloudy, with light winds of about 2 metres per second blowing from the southeast.

Recorded data

2.66 A CCTV recording taken by a security camera fitted near the vessel's accommodation ladder was recovered following the accident. The recording allowed investigators to observe the incident as it unfolded.

2.67 CCTV was also recovered from the Fergusson Wharf Camera 1. The recording helped investigators confirm the hypothesis of why the ladder fell off the Port platform.

Site and wreckage information

2.68 Before the injured EWR was safely moved to the poop deck, the bottom platform of the ladder was crushed between the wharf and the vessel's side, when the mooring line was tightened. A Ports of Auckland CCTV camera recorded the occurrence (see Figure 13).

2.69 The ladder was retrieved and stowed after the incident. The bottom platform was badly damaged, which made the ladder unsafe for any further use.



Figure 13: Photos showing damaged bottom platform of accommodation ladder

Previous accommodation ladder occurrence

2.70 On 14 May 2020, a crew member from the Singapore registered container ship *MV Szechuen*, operated by another company within the Swire group structure, suffered serious crush and fracture injuries to both their legs.³⁰

2.71 The Transport Accident Investigation Commission (the Commission) was notified of the incident but chose not to investigate as New Zealand was in COVID-19 Alert Level 4 and travel restrictions were in place.

³⁰ Company investigation report received from Swire Shipping (NZ) Ltd

- 2.72 The accident occurred while retrieving and securing the port side telescopic accommodation ladder at North Port, New Zealand. On this occasion, the lower ladder did not slide up to its end point, stopping approximately 1.5 metres short.
- 2.73 A crew member stepped onto the fixed upper ladder to fold down the handrails. As soon as the handrail on the outboard side was lowered, the lower ladder recoiled and trapped the crew member's lower legs between the steps of the two ladders. The crew member was subsequently removed from the ladder and, after initial first aid, was taken to a hospital in Auckland.
- 2.74 The operator conducted an internal investigation with the following findings.
- The existing practice on the vessel was to untie the handrail rope from the non-shackled end, and leave it in place, before lowering the railings. In this instance, the slack handrail rope on the outboard side of the lower ladder got caught between the two ladders and prevented the lower ladder from sliding up to its 'home' position.
 - The crew member was working in the line of recoil when they stepped onto the fixed upper ladder, with the safety stoppers removed and the taut lower ladder not yet home. When the fouled rope dislodged, the lower ladder sprung upwards and trapped the crew member's legs.
 - The officer in charge and the crew had not identified that even though the ladder was nearly horizontal the lower ladder had not reached its end stop. They had not considered the recoil hazard that the fouled lower ladder posed and continued to work in the line of fire.
 - The design of the telescopic accommodation ladder made the rigging/securing process complicated. It required personnel to step on to the ladder more than once, to remove the stoppers and manually transfer the weight of the lower ladder to the bridle while rigging and vice-versa while securing.
 - The officer in charge did not ensure that the process of securing the accommodation ladder was done safely. The officer was also operating the accommodation ladder winch control from the turntable, where they did not have an overview of the entire operation.
 - There was an operating procedure for the accommodation ladder which was displayed near the location. These procedures were inadequate and did not address all the likely hazards involved with lowering and securing the accommodation ladder.

3 Analysis Tātaritanga

Introduction

- 3.1 Deploying and retrieving an accommodation ladder can be dangerous and often involves crew members working over the side of the vessel. The risks associated with the operation are well known and need to be carefully managed. A telescopic accommodation ladder has several moving parts which can increase the risk of injury. It is important that operators understand the equipment and the hazards associated with it.
- 3.2 The following section analyses the circumstances surrounding the accident to identify those factors which increased the likelihood of the event occurring or increased the severity of its outcome. It also examines any safety issues that have the potential to adversely affect future operations.

Why did the accident occur

- 3.3 Whilst retrieving the telescopic accommodation ladder the crew untied the handrail ropes but left the handrail chains in place. When the inboard handrail chain became caught between the sliding lower ladder and the fixed upper ladder the ERW stepped onto the upper ladder to free it.
- 3.4 Once the EWR had cleared the inboard handrail chain they picked up the outboard handrail chain and held onto both to prevent them from getting caught again. While holding the handrail chains the EWR stood on a ladder step close to the top of the fixed ladder.
- 3.5 As the CIR resumed heaving on the fall wire to retract the lower section of accommodation ladder, the ladder dropped off the Port platform. Because the side chains were slack and not supporting the fixed upper ladder (see Figure 14) the weight was transferred from the Port platform and onto the fall wire. It resulted in an unexpected and uncontrolled upward movement of the lower ladder.

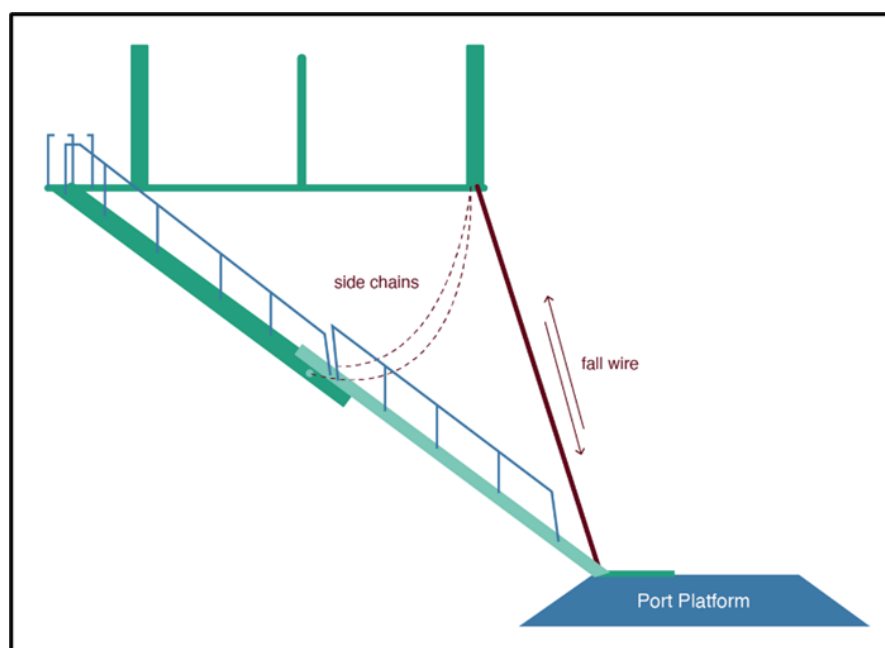


Figure 14: Accommodation ladder before the accident

- 3.6 The lower ladder slid upwards in its interlocking guides and before it reached the end point trapped the EWR's leg between the top step of the lower ladder and the third step of the fixed upper ladder (see Figure 15).

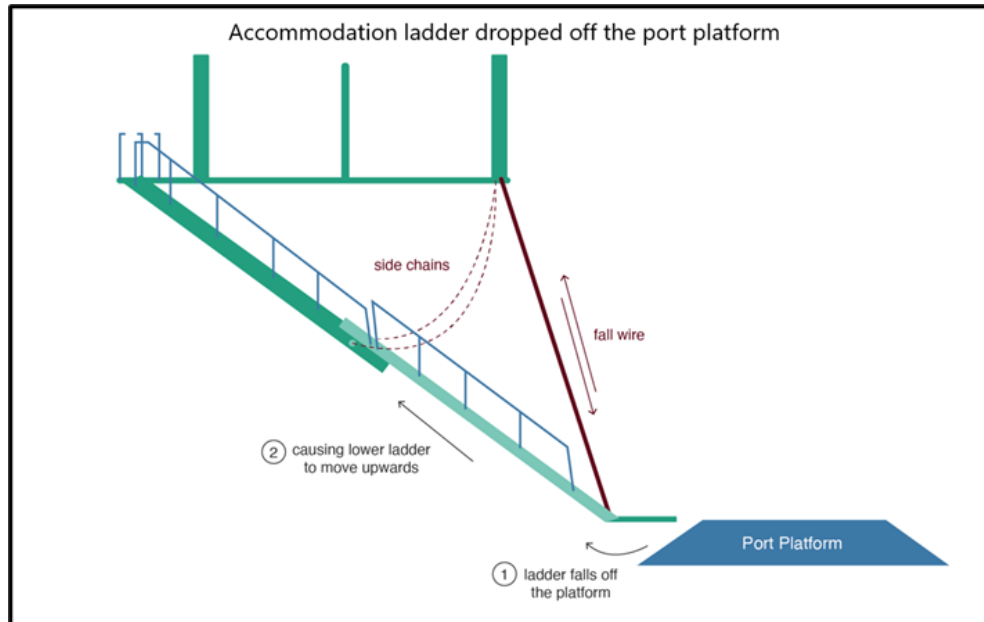


Figure 15: Accommodation ladder dropped off the Port platform

- 3.7 The EWR had stood between the two green arrows marked on the steps of the upper ladder. As a result they were positioned, and working, in an area that had been identified as unsafe (see Figure 16). The arrows were a preventative safety action taken in response to a previous accident on another vessel.

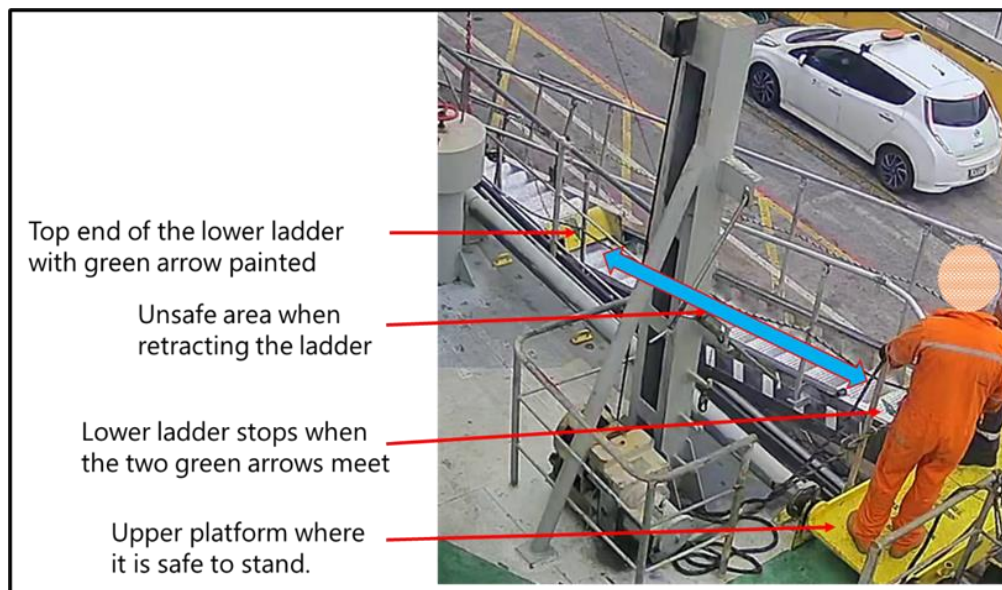


Figure 16: Yellow steps and green arrows marked on the accommodation ladder

- 3.8 Had the state of the ladder been observed by the team before starting its retrieval, it is **very likely** that they would have noticed the slack side chains and, depending upon their knowledge and understanding of the ladder's operation, adjusted them. This would have ensured that when the ladder fell off the Port platform the weight was taken immediately by the side chains and the retrieval operation was kept under safe control. Importantly, the lower ladder would not have been subjected to the force necessary for it to slide up the interlocking guide.
- 3.9 The slack side chains were indicative of an accommodation ladder that had not been tended or adjusted to maintain it in a safe state. When cargo operations were completed, and the stevedores had left the vessel, the requirement to maintain safe access to and from the vessel became less significant.
- 3.10 Had the accommodation ladder operating instructions been followed, specifically that no one was to step on the ladder until the green marks on the upper ladder and the lower ladder fully coincided, then the injury to the crew member could have been avoided.

Risk assessment for retrieving the accommodation ladder

Safety issue: The possibility of the accommodation ladder falling off the Port platform had not been identified as a hazard and risk mitigation control measures were not followed.

- 3.11 The vessel operator had conducted in-house training for all crew in June 2021. It was therefore reasonable to expect that those crew members allocated to deploying and retrieving the ladder would be familiar with the hazards identified in the risk assessment (see Appendix 5).
- 3.12 The operating procedures for the accommodation ladder were posted near the ladder and were referred to in the accommodation ladder risk assessment.
- 3.13 Although the risk assessment had addressed the hazard of stored energy, it had not identified all the possible scenarios likely to cause the lower ladder to retract in an uncontrolled manner. The hazard associated with the ladder falling off the Port platform was a case in point. The consequence of retrieving the ladder whilst it was on a platform and the side chains were slack had also not been considered.
- 3.14 A review by the Commission of the ship's *Accommodation Ladder Rigging Risk Assessment* found that several hazards identified during the risk assessment process might have benefitted from more robust control measures. These hazards are discussed below.

Supervision

- 3.15 The risk assessment had identified that a lack of awareness and neglect of procedures for working overside was considered an extreme hazard associated with operating the accommodation ladder. The control measure in place to mitigate the risk and reduce it to a more manageable level was:

'Constant education of all crew and passing relevant info. Regular safety briefing. Increase awareness. Monitoring & supervision by senior officers / Safety officer. Take all precautions as per SMS rigging accommodation checklist'

- 3.16 Although there were several infringements of the accommodation ladder operating procedure, there was little supervision or intervention by the person in charge of the operation or by the officers observing. It is reasonable to expect a well-trained crew to exercise their judgement and call 'stop work' when they observe an unsafe condition or act that may result in an accident (*refer* to Part B of the form in Appendix 6).
- 3.17 It is **almost certain** that the injury to the crew member could have been avoided had the person in charge, or the officers, called 'stop work' and ensured that the crew member moved to a safe position.

Assessing risk

- 3.18 'Inexperienced personnel in the job' had been identified as a hazard and was considered to be a high risk. The control measure identified to mitigate the risk and reduce it to a more manageable level was:
- 'Good toolbox meeting prior to commencement of the job to make sure all understands what is to be done. Most experience persons to be used for the job. Continuous supervision & monitoring'*
- 3.19 At the time of the accident the EWR had about 44 weeks' experience working on the vessel. Even though the EWR was not a permanent employee, they were regularly rostered as relieving crew on the vessel. They were the most experienced person at the scene in respect of working with the poop deck accommodation ladder. The CIR had recently been appointed as CIR and had not worked with telescopic accommodation ladders before. Similarly, the IR had not worked with telescopic accommodation ladders until sailing on this vessel.
- 3.20 The EWR had been given a later wakeup call due their duties the previous evening. When they arrived at the work site, the operation to retrieve the ladder had already started. There was no evidence to show that a toolbox meeting had been conducted or that checklist N051014, 'Checklist for Pilot, Accommodation, Combination Ladder' (see Appendix 3) had been completed.
- 3.21 The Commission found that the last *pre-work meeting form*³¹ for accommodation ladder operations that the ERW participated in was completed on 22 August 2021, (see Appendix 6) nearly four months before this accident. The vessel operator had a policy for completing pre-work meeting forms for routine tasks. However, for repetitive tasks the policy stated, "For certain work activities that may be repetitive over a relatively short period of time, pre-work meeting need not be conducted prior to each occasion that such a task is undertaken so long as the hazards remain unchanged". The vessel operator told the Commission that for these repetitive work activities, there was an expectation that the toolbox meetings would still be required. An example of repetitive work activity was rigging / unrigging the accommodation ladder or pilot combination ladder.
- 3.22 Had a toolbox meeting been completed and operating instructions consulted before starting to retrieve the accommodation ladder, the Commission considers it **likely** that the danger area marked on the accommodation ladder would have been discussed and the dangers associated with it highlighted.

³¹ A formal risk assessment to evaluate and manage risks associated with an activity

3.23 By not completing a toolbox meeting before starting work, the crew missed the opportunity to review the risks and mitigation strategies and familiarise themselves with their role and responsibilities before starting a routine high-risk activity.

Working overside and falling overboard

3.24 Falling overboard had also been identified as a hazard and was considered high risk with a consequence of injury or death. The control measure to mitigate the risk and reduce it to a more manageable level was for a safety wire to be rigged above the accommodation ladder and used by the crew to clip on a safety harness or fall arrestor. A gangway net was also to be provided.

3.25 At the time of the accident the gangway net had been removed and stored away, which substantially increased the consequence had someone falling overboard. It reinforced the need for crew working overside to wear a safety harness or fall arrestor connected to a designated anchor point.

3.26 On this occasion the designated anchor point was a wire sling rigged above the ladder. The wire was manually spliced and connected across the ladder posts. There was no safe working load marked on the wire and nothing to show that the wire met any New Zealand or international standard to withstand a shock load caused by a person falling.

3.27 New Zealand Maritime Rules Part 49.4 governs the maintenance and inspection of ships' lifting appliance and loose lifting gear. The wire sling used at the accommodation ladder was not part of the ship's lifting gear. The industry best practice is that all wire slings on board a ship have an identification number and a safe working load marked on them, and are inspected and maintained to a similar standard as lifting gear.

3.28 While New Zealand has not formalised these best practises, the United States of America has, through implementing U S Department of Labor Occupational Safety and Health Administration (OSHA) standards 1910.184, which state:

- 1910.184(c)(11): shock loading is prohibited
- 1910.184(c)(13): employers must not load a sling in excess of its recommended safe working load as prescribed by the sling manufacturer on the identification markings permanently affixed to the sling
- 1910.184(c)(14): employers must not use slings without affixed and legible identification markings.

3.29 The standard is accentuated by the United States Coast Guard, Marine Safety Alert, 04-2 'Verify Your Wire Rope Terminations³²: Incorrect Terminations can Lead to Catastrophic Failure'. The safety alert focuses on the importance of verifying the condition and manufacturing of the wire sling terminations used in a load-handling or lifesaving capacity such as this one.

3.30 Notwithstanding the need for certified anchor points, at the time of this accident the crew working overboard were not wearing either a safety harness or a fall arrestor.

3.31 In respect of this accident neither a safety harness nor fall arrestor would have prevented the accident from occurring, but it demonstrates a gap between the

³² the end or ends of a wire rope made by forming an eye through splicing or using engineered fittings

operator's risk mitigation requirements and the equipment and practices onboard the vessel.

- 3.32 The vessel operator had developed a ship specific accommodation ladder procedure, supported by a risk assessment and the crew had been trained in its use.
- 3.33 Safety procedures and instructions alone cannot guarantee that a particular operation is conducted safely; to be effective crew members must follow and comply with them.
- 3.34 However, whilst the vessel continues to operate with the same telescopic accommodation ladders the risk assessment for the operation should be reviewed and procedures contained within the operator's SMS updated in light of this accident. The Commission has made a recommendation in section 6 of this report to address this safety issue.

Safety Culture and Leadership

Safety issue: Non-conformance to operating procedures and a diffusion of responsibility with respect to oversight and supervision are symptomatic of more systemic issues regarding the safety culture onboard.

- 3.35 Following the operator's own internal investigation into the *MV Szechuen* accident, the operator implemented several safety actions to help prevent a similar accident.
- 3.36 To ensure fleet-wide awareness of the accident, the operator issued a safety alert that highlighted the root causes and specified the preventative actions to be implemented. One of the immediate causes identified was that the crew member was in an unsafe position for the task. When the lower section of the accommodation ladder recoiled, it trapped the crew member, causing a serious injury.
- 3.37 The root causes identified in the safety alert are:
- inadequate hazard identification and risk perception
 - lack of situational awareness
 - design of the accommodation ladder with a complicated rigging/unrigging process.
 - improper leadership
 - inadequate procedures of rigging and securing the accommodation ladder.
- 3.38 The vessel's accommodation ladder operating procedures had been amended to take into consideration the root causes and preventative actions specified in the safety alert.
- 3.39 As part of the risk mitigation process, the crew received in-house training and were given the opportunity to discuss the *MV Szechuen* accident. The in-house training was intended to reinforce their understanding of the risks involved when working with the accommodation ladder, and to appreciate the safety benefits of the protections Implementation is prescribed.
- 3.40 The *Moana Chief* accident showed that the implementation of several safety measures identified from the previous accident was ineffective. This was demonstrated by the crew not following the revised procedures and the lack of intervention of other crew members who were observing the operation.
- 3.41 Crew training was an important part of the risk mitigation process. However, there were no audits conducted to assess whether the training was successful and whether there had been a change in behaviour.

- 3.42 Non-conformance to operating procedures, and a diffusion of responsibility are symptomatic (indicators) of more systemic issues. The Commission believes that more can be done by both the operator and the onboard management team to improve safety culture and leadership and reduce at-risk behaviour and non-conformance to operating procedures.
- 3.43 The Commission has made a recommendation in section 6.3 of this report to address this safety issue.

4 Findings

Ngā kitenga

- 4.1 The dynamic working of the telescopic accommodation ladder and the functions of each of the components were not fully understood by the crew. It is **very likely** the risk posed by the loose side chains during retrieval had not been considered.
- 4.2 The possibility of the accommodation ladder falling off the Port platform during retrieval had not been considered by the crew.
- 4.3 The person in charge did not ensure that crew members were wearing the correct safety harnesses and were standing in safe locations, nor that the side chains were correctly adjusted to support the ladder, before operating the winch.
- 4.4 If the team had conducted an effective risk assessment before starting the ladder retrieval operation, it is **likely** that they might have highlighted the need to work in the safe zone, and identified the risks associated with the loose side chains, the position of the bottom platform and the need for the correct PPE to be worn.
- 4.5 On this occasion the lessons learnt from the previous incident (*MV Szechuen*), the ship-specific procedures and risk assessment were not adhered to.
- 4.6 The lack of intervention by crew members observing the retrieval of the accommodation ladder indicated a culture of normalised deviation from documented procedures and an acceptance of unsafe behaviours.

5 Safety issues and remedial action

Ngā take haumanu me ngā mahi whakatika

General

- 5.1 Safety issues are an output from the Commission's analysis. They may not always relate to factors directly contributing to the accident or incident. They typically describe a system problem that has the potential to adversely affect future transport safety.
- 5.2 Safety issues may be addressed by safety actions taken by a participant; otherwise the Commission may issue a recommendation to address the issue.

Risk assessment for rigging the accommodation ladder

Safety issue: The possibility of the accommodation ladder falling off the Port platform had not been identified as a hazard.

- 5.3 Following the accident Swire Shipping (NZ) Limited has completed the following safety actions:
 - updated their procedures for operating the accommodation ladders to include lowering procedures and stowing procedures
 - updated the risk assessment for accommodation ladder operations to include the possibility of the ladder falling off the Port platform
 - implemented pre-work and toolbox meetings for each occasion the ladder is deployed
 - commissioned three newly designed accommodation ladders for the vessel. The new design incorporated a rack and pinion system that eliminated the risk of entrapment, or sudden and rapid movement of the telescopic ladder. The new ladders, winches and davit arms were installed on the vessel in January 2023. The new gangway ladders and their installation were approved by Class (DNV).

The safety culture and leadership

Safety issue: The non-conformance to operating procedures and a diffusion of responsibility with respect to oversight and supervision are symptomatic of more systemic issues regarding the safety culture onboard.

- 5.4 To address this safety issue, Swire Shipping (NZ) Limited have created a new role of Vessel Safety Officer. Some of the responsibilities of this role are:
 - monitoring onboard safety meetings – attending meetings and providing feedback to senior officers to improve safety standards/culture on vessels.
 - join vessel for short trips to monitor crew safety, ensuring commitment and competence to agreed standards, providing feedback to ship and shore management.
 - onboard safety monitoring during layups and dockings, ensuring compliance with safety policy and procedures.

- 5.5 The Commission welcomes the safety action to date. However, it believes these processes need constant attention to ensure the safety of future operations. Therefore, in section 6.3 the Commission has made a recommendation to the operator to address this issue.

Other safety action

- 5.6 Participants may take safety actions to address issues that would not normally result in the Commission issuing a recommendation.

The following safety actions have been taken by Swire Shipping (NZ) Limited.

- 5.7 A Safety Alert was issued to all the company's vessels. The safety alert was discussed at the safety meetings with all crew. The CCTV of the incident was viewed and learnings discussed.
- 5.8 For crew to be involved in the accommodation ladder operations on *Moana Chief*, they are now required to be trained on the operation, be familiar with the operational procedures and complete a sign off.
- 5.9 Swire Shipping (NZ) Limited has created a new role of Vessel Safety Officer which started in July 2022. The responsibilities of the role include in-house training seminars on safety awareness. Following the incident on the *Moana Chief*, a safety-awareness seminar was run in August 2022 and was attended by all crew.
- 5.10 Other responsibilities of the Vessel Safety Officer include:

Training

- develop training documents and facilitate safety training onboard, doing short trips to carry out intensive safety campaigns on company policies and procedures (for example, accident/incident and near miss reporting; slips/trips/falls) and work with crew to ensure that safety reporting is being done
- conduct training of other employees and contractors associated with Swire Shipping (NZ) Limited operations on company policies/procedures, as required
- work with key managers in organising and facilitating required training ashore, including annual Safety Awareness Course training for all crew
- organise required external training with training providers
- monitor and ensure compliance of required internal training. Keep records of training conducted for all crew.

Safety monitoring

- monitoring onboard safety meetings – attending meetings and providing feedback to senior officers to improve safety standards/culture on vessels
- join vessel for short trips to monitor crew safety, ensuring commitment and competence to agreed standards, providing feedback to ship and shore management
- onboard safety monitoring during layups and dockings, ensuring compliance with safety policy and procedures
- monitor safety procedures for work carried out in loading/unloading cargoes on vessels and in port areas. Conduct risk assessments if procedures do not address hazards.

- work with relevant parties (port authorities, stevedoring companies) to ensure that Swire Shipping NZ Limited safety requirements/practices are continually met.

5.11 The Vessel Safety Officer role was filled from 19 July 2022 to 7 October 2022. Swire Shipping (NZ) Limited advised the Commission on 1 March 2023, that the role was vacant, but that they were taking steps to find a suitable replacement.

6 Recommendations

Ngā tūtohutanga

General

- 6.1 The Commission issues recommendations to address safety issues found in its investigations. Recommendations may be addressed to organisations or people. They can relate to safety issues found within an organisation or within the wider transport system that have the potential to contribute to future transport accidents and incidents.
- 6.2 In the interests of transport safety, it is important that recommendations are implemented without delay to help prevent similar accidents or incidents occurring in the future.

New recommendations

- 6.3 **On 22 March 2023, the Commission recommended that Swire Shipping (NZ) Limited review their safety management system to ensure that safety leadership is developed at all levels within the organisation to help develop a strong safety culture. 006/23.**
- 6.4 **On 22 March 2023, the Commission recommended that Maritime New Zealand develop and disseminate clear guidance to highlight the inherent risks associated with the telescopic accommodation ladders 007/23.**

On 29 March 2023, Maritime New Zealand replied:

I write in response to your letter of 24 May 2023 notifying Maritime New Zealand of the final shape of recommendation 007/23; to be included in Report MO-2021-205.

Whilst we have not seen the recommendation in the context of the final report, Maritime New Zealand **accepts** the final recommendation **007/23**; as outlined in your letter: "On 22 March 2023, the Commission recommended that Maritime New Zealand develop and disseminate clear guidance to highlight the inherent risks associated with the telescopic accommodation ladders."

Thank you again for this notification, the opportunity to comment and your careful consideration of our comments.

7 Key lessons

Ngā akoranga matua

- 7.1 The management of a hazard does not end with the implementation of risk controls. Monitoring and reviewing the effectiveness of the controls is an ongoing process and one which should be formalised into the SMS. It should include actively seeking and considering feedback from those personnel involved with the hazard as part of their work.
- 7.2 Safety procedures and instructions have to be actively and intelligently complied with for them to be effective. By themselves they cannot provide assurance that a particular operation is safe; safety leadership is required at all levels within an organisation and is essential to the establishment of a strong safety culture.

8 Data summary

Whakarāpopoto raraunga

Vehicle particulars

Name:	<i>Moana Chief</i>
Type:	Container vessel
Limits:	Sea Areas A1, A2, A3
Classification:	DNV GL (Det Norske Veritas and Germanischer Lloyd).
Length:	175.47 m
Breadth:	27.67 m
Gross tonnage:	18358 tonne
Built:	2010
Propulsion:	HMM-MAN B&W 7S60MC-C MK 16660 kW at 105 RPM
Service speed:	20.5 knots
Owner/operator:	John Swire & Sons Limited / Swire Shipping (NZ) Limited
Port of registry:	Auckland, New Zealand
Minimum crew:	12

Date and time 10 December 2021, 0726

Location Port of Auckland, New Zealand

Persons involved Seven

Injuries One

Damage Secondary incident damage to accommodation ladder

9 Conduct of the Inquiry

He tikanga rapunga

- 9.1 On 10 December 2021, the Deputy Compliance Manager, Maritime New Zealand, notified the Commission of the occurrence. The Commission subsequently opened an inquiry under section 13(1) of the Transport Accident Investigation Commission Act 1990 and appointed an Investigator-in-Charge.
- 9.2 On 10 December 2021 at 1350, a protection order was issued with respect to *Moana Chief* to protect evidence until the investigators arrived.
- 9.3 On 10 December 2021 at 1402, a protection order was issued to Ports of Auckland to protect evidence until the investigators arrived.
- 9.4 On 12 December 2021, two investigators from the Commission boarded the *Moana Chief* to conduct interviews and gather further evidence.
- 9.5 On 14 December 2021, two investigators from the Commission visited Ports of Auckland to conduct interviews and gather further evidence.
- 9.6 On 20 December 2021, two investigators from the Commission visited Ports of Auckland to conduct interviews and gather further evidence.
- 9.7 On 21 December 2021, two investigators from the Commission visited Swire Shipping (NZ) Limited at Auckland to conduct interviews and gather further evidence.
- 9.8 On 25 July 2022, two investigators from the Commission visited *Moana Chief* at Auckland, to conduct interviews with the injured person and gather further evidence.
- 9.9 On 16 November 2022, the Commission considered a Draft Report but deferred approval until after amendments had been made.
- 9.10 On 7 December 2022, the Commission considered a revised Draft Report, and approved that Draft Report for circulation to five interested parties for their comment.
- 9.11 The Commission received four responses, of which three were submissions and one had no comment. No comments were received from one interested party. Changes as a result of the submissions have been included in the Final Report.
- 9.12 On 22 March 2023, the Commission approved the Final Report for publication.

Abbreviations

Whakapotonga

CCTV	closed circuit television
CIR	Chief Integrated Rating
EWR	Engine Room Watch Rating
IMO	International Maritime Organization
IR	Integrated Rating
ISM	International Safety Management
kW	kilowatt
MSC	Maritime Safety Committee
NZ	New Zealand
PPE	personal protective equipment
SMS	safety management system
SOLAS	Safety Of Life At Sea
UK	United Kingdom

Glossary

Kuputaka

Able Seafarer Deck	a crew member who can perform the functions and duties of a deck crew member on ships
accommodation ladder	a point of access to a ship's deck for shore personnel, accommodation ladders are rigged in the fore and aft direction of the ship and face astern
bridge	the place on a ship from which the vessel is normally controlled
cheek plates	plates on each side of the sheave, to prevent the wire from coming off the sheave
Chief Integrated Rating	a boatswain, also known as a petty officer on a merchant ship, who controls the work of other seamen.
command	to have control of a ship and to be in charge
disembarkation	leaving or getting off a ship
draught	the depth of the hull immersed in the water
embarkation	boarding or going on a ship
Engine Room Watch Rating	a crew member in a manned engine room or periodically unmanned engine room on a ship of any propulsion power in any operating area
fall arrester	safety equipment used, when working at heights or over the side of a ship, to stop a downward free fall and prevent serious harm or death of the person
fall wire	the steel wire rope on a winch used for lowering or lifting a load
inboard	towards the centre of a ship

Integrated Rating	a crew member who can perform the functions and duties of a deck crew member on ships or a crew member in a manned engine room or periodically unmanned engine room
main deck	the main continuous deck of a vessel
MSC Circular	a statutory document issued by IMO's Maritime Safety Committee
outboard	away from the centre of a ship
pre work meeting form	a formal risk assessment to evaluate and manage risks associated with an activity
Pilot	a mariner who manoeuvres ships through dangerous or congested waters, such as harbours or river mouths (maritime pilot, marine pilot, harbour pilot, port pilot, ship pilot or simply pilot)
poop deck	a short, high deck located at the stern of a ship
rigging	setting up a device or equipment
sheave	a grooved wheel that spins on an axle, often used for changing the direction of a wire rope and to lessen the effects of friction
SOLAS Convention	International Maritime Organization's International Convention for the Safety Of Life At Sea governing maritime safety
starboard	the right side of a vessel when facing forward
telescopic	having a construction consisting of sections designed to slide over one another
toolbox meeting	an informal safety meeting generally conducted at the job site before the start of a job or work shift – it forms part of an organisation's overall safety programme.
unmooring	a procedure to release and cast off the lines of a vessel from the fixtures to which it is moored
unrigging	to stow away equipment of a device

wharf	a structure built alongside or perpendicular to the shore where ships berth for loading or discharging cargo
winch	a mechanical device used to pull in or let out or otherwise adjust the tension of a rope or wire
wire rope terminations	the end or ends of a wire rope made by forming an eye through splicing or using engineered fittings

Citations

Ngā tohutoru

Maritime and Coastguard Agency. (2015). Code of Safe Working Practices for Merchant Seafarers.

International Maritime Organization. (2020). International Convention for the Safety of Life at Sea.

International Maritime Organisation. (2009). Maritime Safety Committee circular 1331.

United States Coast Guard. (2021). Marine Safety Alert 04-21: Verify Your Wire Rope Terminations: Incorrect Terminations can Lead to Catastrophic Failure.

United States Department of Labor. (2019). Occupational Safety and Health Administration standard 1910-184.

Appendix 1: Survey report for new accommodation ladder

GANGWAY
NEWLY INSTALLED
POOP DECK

SURVEY REPORT

Initial Installation Testing of Gangways and Accommodation Ladders

DNV·GL

Certificate No:
N1351732
DNV GL Id No:
32060
Date of issue:
2019-09-01

Survey report for verification of compliance with initial installation survey and periodic five-yearly survey of gangways and accommodation ladders as required by Reg. II-1/3-9 of the SOLAS 2008 Amendments and MSC/Circ.1331 together with accommodation ladders required by SOLAS V/23.3 for pilots.

Particulars of Ship

Name of Ship: **MOANA CHIEF**
Distinctive Number or Letters: **9V5190**
Port of Registry: **SINGAPORE**
IMO Number: **9516741**

Particulars of gangway / accommodation ladder

Type of product: Gangway Accommodation ladder
Maximum (marked) SWL: **3000 kg**
Minimum operational angle at max SWL: **20 degree**
Length [m]: **12.1**
Number of steps (for acc. ladder): **40**
Marking of the product (if relevant / available):
(Hard stamping by RO, Administration or other or serial number from maker) **SN: 411905
LR ZXC**

	Gangway		Accommodation ladder	
	Yes	No	Yes	No
Static load test carried out with designated SWL in horizontal position?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Static test confirmed in certificate no	<input type="checkbox"/>	<input type="checkbox"/>		
Operational test carried out?			<input checked="" type="checkbox"/>	<input type="checkbox"/>

Issued at Zhoushan, China on 2019-09-01



for DNV GL

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ORDER CONFIRMATION

The China Navigation Company Pte. Ltd.
 300 Beach Road
 27-01, The Concourse
 Singapore 199555
 SINGAPORE

Date req rec: Our reference: Your reference:
 ZHOFIS/YXC/N1351732

Det Norske Veritas (China)
 Company Limited
 Region Greater China
 Zhoushan FiS
 No. 619 Dingshen Road Room
 2104 Building B Harbour
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DNV GL legal entity ("DNV GL"): **Det Norske Veritas (China) Company Limited**

Particulars of Customer

Name of vessel: MOANA CHIEF
 Port of Registry: SINGAPORE
 Customer/Owner ("Customer*"): The China Navigation Company Pte. Ltd.
 Customer ID: 10624133 10352053
 Manager: The China Navigation Company Pte. Ltd.
 Manager ID: 10352053
 Contact person: _____
 Invoicing address: _____
 Place of survey: Zhoushan(CHN,China)
 Date of work: 2019-09-01
 Reference to existing agreement (if relevant): _____

Order Specification (Scope of Work)	Requested
Miscellaneous item occasional survey - Gangway installation and load test	Yes

Condition(s) and Memo(s)	Requested

Additional items to be surveyed

Fee

Terms of payment: Net within 30 days from date of invoice or according to Annual Fee Agreement as applicable



DNV GL Id No: **32060**
Job Id: **1351732**

This agreement (the "Agreement") consists of the Order Confirmation, the General Terms and Conditions and the applicable DNV GL Rules and any other documents explicitly referred to herein. In case there is an existing agreement (e.g. PSA or other) covering the above mentioned Work, such existing agreement as well as the terms and conditions therein shall remain in full force and effect and supersede any contradicting terms in the Agreement. No amendment and/or variation to the Agreement is valid unless duly signed by both parties. Any terms and conditions included in any of Customer's purchase orders shall be disregarded unless explicitly agreed to and duly signed by the authorized representatives of both parties as amending specific terms of this Agreement.

Place: **Zhoushan, China**
Date : **2019-09-01**

Place: **Zhoushan, China**
Date : **2019-09-01**



Appendix 2: N051014D Work Oversight

OPERATIONS Safety, Health & Environment Management N051014D- Work Oversight	Issue D	Page 1 of 2
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	Issued by	QA-Dept

1. General

Overside work is any work carried out on outboard side of the ship's hull and / or Superstructure except when "**Rigging / unrigging accommodation ladder or pilot combination ladder or pilot ladder**"¹

Examples of over side work are:

- Chipping and painting of ship side or outboard side of superstructure
- Reading drafts from a ladder

2. Precautions for overside work

- A risk assessment must be carried out to establish the hazards and control measures.
- The work must be controlled with a permit to work oversight.
- A toolbox meeting and pre work meeting must be conducted before start of work.
- No one is allowed work oversight alone. At least one person must be available to watch / supervise on deck and this person must be in radio contact with Bridge or Officer of the Watch.
- No oversight work is to be undertaken when the vessel is underway and making way. The only exception to this is rigging/unrigging of accommodation ladder and pilot combination ladder.
- Any equipment used must be fit for purpose and its condition must be verified to be good condition before start of work.
- When a stage is rigged oversight, the two gantlines used in its rigging should be at least long enough to trail into the water to provide additional lifelines should a person fall.
- Personnel working oversight must wear a crewsaver and secure their safety line to a strong point on deck. Anchoring points must be permanent fixtures to the ship's structure. Portable rails or stanchions must not be used as anchoring points.
- A lifebuoy attached to sufficient length of buoyant line must be kept ready nearby.
- The area must be properly illuminated if work is undertaken in the hour of darkness.
- Tools and equipment should be sent up and lowered by line in suitable containers.
- If a Bosun's chair is used the precautions listed in N051013P and N051015P are to be taken.

¹ Detailed procedure of "**Rigging / unrigging accommodation ladder or pilot combination ladder or pilot ladder**" is contained in section N051014C

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3. Precautions for checking oversight drafts

- Cadets and trainees must not go oversight to read drafts unless they are supervised by a responsible officer.
- No one is to go oversight to read drafts alone. At least one person must stand by on deck to watch and assist.
- The person going oversight must wear a Crew saver and secure its safety line to a strong point on deck.
- A lifebuoy with buoyant line attached to it shall be kept nearby on deck.
- The person going oversight shall not carry a walkie talkie and should not attempt to write the drafts in a notebook while on the ladder. The read drafts to be communicated verbally to the person on deck who should relay the information to the concerned persons via walkie talkie or note it down.
- Risk assessment need not be carried out every time a person has to go oversight for checking drafts. Risk assessment carried out once must be referred to and discussed in a pre-work meeting every time such a job is performed. However, if circumstances are different to that of the original risk assessment such as to significantly alter the hazards identified, a fresh risk assessment must be carried out and control measures implemented before proceeding with the job.

4. Precautions for working from punts and work boats

- Before using punts or workboats for oversight work, necessary permission shall be obtained from port authorities.
- Punts should be stable and provided with suitable fencing. Unsecured trestles and planks should not be used to give additional height. Safety lines and a working lifejacket must be used.
- A punt or work boat shall not be used if there is a strong tide or current or possibility of wash from passing vessels.
- When work is to be done at or near the stern or near bow/stern thrusters, the duty deck and engineering officers shall be informed. The thrusters must be isolated and appropriate warning notices placed in the engine room, on the bridge and at any local controls.
- The duty engineer and deck officers should also be informed by the person in charge when personnel are working in the vicinity of ship's side discharges so that they are not used until the work is completed. Equipment should be isolated and/or notices to this effect should be attached to the relevant control valves and not removed until the work is completed.

END



Appendix 3: N051014C Checklist for Pilot, Accommodation, Combination Pilot Ladder

OPERATIONS Safety, Health & Environment Management N051014C Checklist for Pilot, Accommodation, Combination Pilot Ladder	Issue D	Page 1 of 1
	Rev	2
	Issued	12/2/2019
	Issued by	QA-Dept

This checklist should be laminated and used at the location by the person in charge

	<ul style="list-style-type: none"> • ALL CHECKS SHALL BE DONE PRIOR TO RIGGING/ UNRIGGING ACCOMMODATION LADDER, COMBINATION PILOT LADDER OR PILOT LADDER • THIS CHECKLIST SAVES LIVES! 	
No	Check-Point	Checked
1)	Personnel rigging/ unrigging the accommodation ladder or pilot ladder wearing appropriate PPE	<input type="checkbox"/>
2)	Crew-Saver donned by personnel going on the accommodation ladder or lowering the pilot ladder <i>Leg straps and chest straps properly secured</i>	<input type="checkbox"/>
3)	Lifebuoy with self-igniting light and buoyant line available in the vicinity	<input type="checkbox"/>
4)	Adequate illumination is provided for safe working in the area	<input type="checkbox"/>
5)	Accommodation ladder wires and sheaves are clear and no kinks on the wires	<input type="checkbox"/>
6)	All personnel in the vicinity are standing clear of the accommodation ladder wire snap back zone	<input type="checkbox"/>
7)	Over-side checked and confirmed all clear to swing out the accommodation ladder or lower pilot ladder	<input type="checkbox"/>
8)	For Personnel going on the accommodation ladder or lowering/ standing on the pilot ladder: - CREW SAVER HARNESS MUST BE SECURED ON THE DESIGNATED STRONG POINT WITH A FALL ARRESTOR ABOVE THE HEAD	<input type="checkbox"/>
<p>*PERSON-IN CHARGE TO CONFIRM OVER THE HAND-HELD RADIO TO THE BRIDGE THAT ALL CHECKS ARE COMPLETED BEFORE PROCEEDING WITH THE WORK ACTIVITY AND COMMENCE ONLY WHEN APPROVED BY THE MASTER ON THE HAND-HELD RADIO</p> <p><i>*If only pilot ladder is to be rigged/ unrigged then point no. 5 and point no.6 are not applicable</i></p> <p><i>*Master shall ensure that ship's speed and prevailing conditions render it safe to undertake this work activity</i></p> <p><i>*Master shall make an entry in the deck logbook that all the checks have been COMPLETED as per this checklist before proceeding with the work activity</i></p>		

Appendix 4: Moana Chief Poop deck gangway operating procedures

Moana Chief

Poop Deck Gangway operation.

Amended. 16/08/2020

POOP DECK GANGWAY OPERATING PROCEDURES

SAFETY PRECAUTIONS

The CIR, is in charge of rigging and stowing the gangway.

Do not stand anywhere on the telescoping sections while the gangway is being raised or lowered. (Only the man with the fall arrestor attached may stand on the upper or lower platforms if it is necessary).

Full PPE must be worn.

One man only on the gangway, wearing a harness attached to the fall arrestor while setting up the hand rails.

When operating the winch keep an eye on the wire drum and all sheaves as the motor over-runs when stopped causing a bird's nest.

Lowering Procedure.

Undo the securing rods and lower out to the horizontal position.

Raise and secure the upper handrails.

Lower the gangway sufficiently to raise and secure the lower handrails. Attach the light chain at the upper end of the lower handrails and ensure the middle rope is tight when lashed.

Lower the gangway to determine where the end will land on the platform. Ideally the end should be in the middle of the platform. If the gangway is too steep the chains will need to be shortened.

The chains will need adjusting and now is the time to get it right before rigging the net ect. It may take several attempts before the chain length is correct.

Once the gangway has landed on the platform ensure there is sufficient slack on the wire, but not too much, to prevent the gangway shifting as the ship rolls during cargo operations.

C:\Users\master.CHINANAV\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\6072467G\POOP DECK GANGWAY OPERATING PROCEDURES.docx

Rig the net carefully and do not lash it to the lower handrails as it will cause damage as the lower section moves up or down.

In Lyttelton the small nets are to be rigged under the lower section handrails. The longer net, on the handrail nearest the ships side, to extend around the lower landing stanchions.

Whenever adjusting the gangway, ensure the wire is correctly in the bottom sheaves. This will require the gearman to check at the bottom of the gangway and the duty mate to operate the winch. Do not do this alone as the wire very easily jumps out of the sheaves. This problem will be rectified ASAP.

OPERATION

This gangway can telescope out to 12 m in length.

The lower section telescopes out when the weight comes on the two support chains. When raising, the lower section will retract until it reaches the stoppers at the top, then both sections rise. Ensure the lower section has reached the top when it starts to rise. If the lower section jams both sections could begin to rise with dangerous consequences. See attached incident report.

The length of the support chains is adjusted by shifting the position of the chain hooks. Both chains must be the same length.

The longer the length of the chains, the steeper the angle of the gangway.

This gangway must land on a platform in Lyttelton or Auckland. It is not suitable to be dragged out onto the wharf.

STOWING THE GANGWAY

Remove the net.

One man to remain at the bottom in a harness connected to the fall arrestor.

C:\Users\master.CHINANAV\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\6072467G\POOP DECK GANGWAY OPERATING PROCEDURES.docx

Ensure the wires are in the sheaves correctly before commencing to raise. When raising ensure the lower section fully reaches the top. When at a safe angle lower the lower handrails ensuring the middle rope is clear of the sliding parts. Bring the gangway horizontal then lower the top handrails.

Note only the one man in the harness is to do this.

Once the handrails are lowered and the IR is off the gangway continue to raise the gangway until it is nearly housed. **Do not pull it bin tight against the housing, housed. (it has an automatic cut out). Finally house with the manual ratchet supplied and the securing rods.** Secure with the securing rods and stow the control cable in the box. Remove the fall arrestor and place in the office with the harness.

Appendix 5: Risk Assessment Accommodation Ladder Rigging dated April 2021

Vessel name:

OPERATION: DECK OPERATIONS AND MAINTENANCE
ACTIVITY: Accommodation Ladder Rigging

INDEX

Ver.03, April 2021

HAZARD ID No.	HAZARD	CONSEQUENCES	INITIAL RISK			CONTROL MEASURES Precautions to be taken	RESIDUAL RISK			ADDITIONAL CONTROL MEASURES (To be completed for E & H residual risk ranking and where applicable)	FINAL RISK		
			Severity - Consequence	Frequency - Likelihood	Risk Ranking		Severity - Consequence	Frequency - Likelihood	Risk Ranking		Severity - Consequence	Frequency - Likelihood	Risk Ranking
1	Lack of awareness / Neglect of procedure for working overside	Personal Injury / Loss of life	5	4	E	Constant education of all crew and passing relevant info. Regular safety briefing. Increase awareness. Monitoring & supervision by senior officers / Safety officer. Take all precautions as per SMS rigging accommodation checklist	5	1	M		5	1	M
2	Fatigue	Loss of situational awareness / Human error / Personal Injury / Damages	3	3	M	Make sure all personnel in the operation well rested. Comply with Work and Rest hour requirements.	3	1	L		3	1	L
3	Insufficient manpower / assistance	Personal Injury	4	3	H	Provide adequate manpower / assistance for the job in hand	4	1	L		4	1	L
4	Inexperienced personnel in the job	Wrong operations / Personal injury	4	3	H	Good tool box meeting prior to commencement of the job to make sure all understands what is to be done. Most experience persons to be used for the job. Continuous supervision & monitoring.	4	1	L		4	1	L
5	Inadequate lighting	Personal Injury	3	3	M	Adequate lights provided. All lights in good working condition. Additional lights used as required.	3	1	L		3	1	L
6	Inadequate PPE / PPE not used.	Person falling overboard / Personal Injury / Loss of life	5	3	E	Adequate PPE including safety harness with floatation devices (Crew Saver) to be used. Briefing of personnel involved at the job to highlight the dangers and precautions required.	5	1	M		5	1	M
7	Adverse weather condition (Rolling, Pitching, Strong winds, Heavy swells, rain, etc)	Personal Injuries / Damages	3	3	M	Not to be rigged until in sheltered water approaching berth at speed of less than 5 knots	3	1	L		3	1	L
8	Inadequate / Failure of communication	Wrong operation / Personal Injury / Damage	3	3	M	Establish closed loop communication with Bridge. Use common working language. Primary means of communication used & secondary means standby. Communication equipment to be maintained and tested as per PMS.	3	1	L		3	1	L
9	Unsafe & Slippery surface on deck / Obstructions around	Slips, Trips & Falls / Personal Injury	4	3	H	Good housekeeping. Working area well maintained. Gangway / ladder steps well maintained. Adequate PPE used. Maintain presence of mind on the job. Always check your steps as a habit.	4	2	M		4	2	M
10	Inadequate / Defective equipment	Personal Injury / Damage	4	3	H	Proper job planning. All equipment including gangway / ladders and PPE (safety harness, Floatation devices) checked well in advance. Equipment maintained as per PMS & manufacturer's instructions.	4	1	L		4	1	L
11	Working in Cold weather	Equipment failure / Damages / Personal Injury	3	3	M	Follow procedure for working in cold weather conditions. Wear sufficient warm gear / PPE. Take dangers of Wind chill into account.	3	1	L		3	1	L
12	Inadequate work practice	Damage / Personal Injury	4	3	H	Instructions on how to rig and operate gangway should be posted near operating controls	4	1	L		4	1	L
13	Gangway Failure	Injury/damage	4	3	H	SWL and max. number of people on gangway to be displayed on outboard side of gangway	4	1	L		4	1	L

CNCo

Deck Operations Maintenance

Rigging of pilot boarding arrangement

Vessel name:

OPERATION: DECK OPERATIONS AND MAINTENANCE
 ACTIVITY: Accommodation Ladder Rigging

INDEX

Ver.03, April 2021

HAZARD ID No.	HAZARD	CONSEQUENCES	INITIAL RISK			CONTROL MEASURES Precautions to be taken	RESIDUAL RISK			ADDITIONAL CONTROL MEASURES (To be completed for E & H residual risk ranking and where applicable)	FINAL RISK		
			Severity - Consequence	Frequency - Likelihood	Risk Ranking		Severity - Consequence	Frequency - Likelihood	Risk Ranking		Severity - Consequence	Frequency - Likelihood	Risk Ranking
14	Fall Overboard	Injury/Deathe	5	3	M	Safety wire to be rigged above accommodation ladder for attaching crew saver harness. Gangway net to be provided.	5	1	M		5	1	M

Officer In-Charge: _____ Date: _____

Master: _____ Date: _____

Consequences							Risk Ranking	Risk Score
Personal Injury	First Aid Case	Lost Time Injury	Moderate Disability	Severe Permanent Disability	Fatality			
Environmental Damage	Minimal or no Impact on the Environment	Minor Impact on the Environment	Moderate Impact on the Environment	Major Impact on the Environment	Catastrophic Impact on the Environment			
Likelihood	(1) Negligible	(2) Minor	(3) Moderate	(4) Major	(5) Catastrophic			
One or more times per year on any ship in the Fleet	(5) Almost Certain	5	10	15	20	25	Extreme Risk	15 – 25
One time per 10 years on any ship in the Fleet	(4) Likely	4	8	12	16	20	High Risk	10 – 15
One time per 5 years on any ship in the Fleet	(3) Possible	3	6	9	12	15	Moderate Risk	5 – 10
One time in the life of the ship (25 Years)	(2) Unlikely	2	4	6	8	10	Low Risk	1 – 5
One times in 40 years in the Industry	(1) Rare	1	2	3	4	5		

CNCo

Deck Operations Maintenance

Rigging of pilot boarding arrangement

Appendix 6: Pre-Work Meeting Form

OPERATIONS Safety, Health and Environment Management N051035C Pre-Work Meeting Form	Issue D Page 1 of 1 Rev 1 Issued 17/01/2019 Issued by QA-Dept
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Ship's Name Maana Chief

Date 22/08/21

A. PRE-WORK MEETING

- To be convened by the senior officer responsible for the work activity.
- Involves planning of the work activity and making the relevant risk assessment ship specific.
- All personnel participating in the work activity to attend the meeting.
- For certain work activities that may be repetitive over a relatively short period of time, Pre-Work meeting need not be conducted prior to each occasion that such a task is undertaken so long as hazards remain unchanged.

Work Activities	Permit Reference (if applicable)	Risk Assessment Reference	Person identified to give Toolbox Talk (Name/ Rank)
1. <u>Repping Accommodation Ladder LTI</u>	<u>N/A</u>	<u>DKOM 59</u>	
2.			
3.			
4.			
5.			
6.			
7.			

Points to remember

- Generic risk assessments must be reviewed and made ship-specific
- If no risk assessment is available, conduct a new risk assessment
- No conflicting work to be undertaken
- If Level-I activity is undertaken, permit to work is required

ATTENDEES (Name/ Rank)

1. <u>IR-</u>	5. <u>IR-</u>
2. <u>IR-</u>	6. <u>IR-</u>
3. <u>IR-</u>	7. <u>IR-</u>
4. <u>IR-</u>	8. <u>IR-</u>

B. TOOLBOX TALK

- Pre-Work meeting is to be followed by Toolbox Talk at worksite.
- Toolbox Talk is to be conducted by an officer or rating leading the team and to consist of the following points:
 - Be aware of the hazards and the control measures.
 - Look out for signs of fatigue and tiredness.
 - Decide on the mode of communication.
 - Don't hesitate to stop work if it is unsafe.
 - Don't undertake conflicting work activities.
 - Wear correct PPE.
 - Always "Take-5" (1- Stop, 2- Think, 3- Look, 4- Access, 5- Look Again)

C. DEBRIEFING

- Debriefing is done after completion of the work activity.
- Debriefing is done by the person giving a Toolbox Talk.
- Discuss what made the job successful.
- Discuss what challenges were faced.
- Discuss if the risk assessment needs a review.

COMPLETED FORM IS TO BE RETAINED FOR 1 YEAR



Kōwhaiwhai - Māori scroll designs

TAIC commissioned its four kōwhaiwhai, Māori scroll designs, from artist Sandy Rodgers (Ngāti Raukawa, Tūwharetoa, MacDougal). Sandy began from thinking of the Commission as a vehicle or vessel for seeking knowledge to understand transport accident tragedies and how to avoid them. A 'waka whai mārama' (i te ara haumarū) is 'a vessel/vehicle in pursuit of understanding'. Waka is a metaphor for the Commission. Mārama (from 'te ao mārama' – the world of light) is for the separation of Rangitāne (Sky Father) and Papatūānuku (Earth Mother) by their son Tāne Māhuta (god of man, forests and everything dwelling within), which brought light and thus awareness to the world. 'Te ara' is 'the path' and 'haumarū' is 'safe' or 'risk free'.

Corporate: Te Ara Haumarū - the safe and risk free path



The eye motif looks to the future, watching the path for obstructions. The encased double koru is the mother and child, symbolising protection, safety and guidance. The triple koru represents the three kete of knowledge that Tāne Māhuta collected from the highest of the heavens to pass their wisdom to humanity. The continual wave is the perpetual line of influence. The succession of humps represents the individual inquiries.

Sandy acknowledges Tāne Māhuta in the creation of this Kōwhaiwhai.

Aviation: Ngā hau e whā - the four winds



To

Sandy, 'Ngā hau e whā' (the four winds), commonly used in Te Reo Māori to refer to people coming together from across Aotearoa, was also redolent of the aviation environment. The design represents the sky, cloud, and wind. There is a manu (bird) form representing the aircraft that move through Aotearoa's 'long white cloud'. The letter 'A' is present, standing for a 'Aviation'.

Sandy acknowledges Ranginui (Sky father) and Tāwhirimātea (God of wind) in the creation of this Kōwhaiwhai.

Maritime: Ara wai - waterways



The

sections of waves flowing across the design represent the many different 'ara wai' (waterways) that ships sail across. The 'V' shape is a ship's prow and its wake. The letter 'M' is present, standing for Maritime.

Sandy acknowledges Tangaroa (God of the sea) in the creation of this Kōwhaiwhai.

Rail: rewhenua - flowing across the land



The design represents the fluid movement of trains across Aotearoa. 'Rere' is to flow or fly. 'Whenua' is the land. The koru forms represent the earth, land and flora that trains pass over and through. The letter 'R' is present, standing for 'Rail'.

Sandy acknowledges Papatūānuku (Earth Mother) and Tāne Mahuta (God of man and forests and everything that dwells within) in the creation of this Kōwhaiwhai.



Transport Accident Investigation Commission

**Recent Maritime Occurrence reports published by
the Transport Accident Investigation Commission
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- MO-2021-203 *Collision between fishing vessel 'Commission' and container ship 'Kota Lembah', 84 nautical miles northeast of Tauranga, Bay of Plenty, New Zealand, 28 July 2021*
- MO-2021-201 *Jet boat KJet 8, loss of control, Shotover River, Queenstown, 21 March 2021*
- MO-2021-203 *Collision between fishing vessel 'Commission; and container ship 'Kota Lembah', 84 nautical miles northeast of Tauranga, Bay of Plenty, New Zealand, 28 July 2021*
- MO-2020-202 *Bulk log carrier Funing, Loss of manoeuvrability while leaving port, Port of Tauranga, 6 July 2020*
- MO-2018-206 *Bulk carrier Alam Seri, loss of control and contact with seabed, Port of Bluff, 28 November 2018*
- MO-2020-201 *Collision between bulk carrier Rose Harmony and fishing vessel Leila Jo, Off Lyttelton, 12 January 2020*
- MO-2019-204 *Capsize of water taxi Henerata, Paterson Inlet, Stewart Island/Rakiura, 12 September 2019*
- MO-2019-203 *Bulk log carrier Coresky OL, Crew fatality during cargo-securing operation, Eastland Port, Gisborne, 3 April 2019*
- MO-2018-205 *Fatality on board the factory trawler San Granit, 14 November 2018*
- MO-2019-202 *Fatal jet boat accident, Hollyford River, Southland, 18 March 2019*
- MO-2019-201 *Jet boat Discovery 2, contact with Skippers Canyon wall, 23 February 2019*
- MO-2018-202 *Accommodation fire on board, fishing trawler Dong Won 701, 9 April 2018*

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