Transport Accident Investigation Commission

Final Report
Tuhinga whakamutunga

Maritime inquiry MO-2022-207
***Fishing vessel* Boy Roel**
Serious workplace injury
Off Tauranga, Bay of Plenty, New Zealand
12 December 2022

September 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.

Commissioners

Chief Commissioner	Jane Meares
Deputy Chief Commissioner	Stephen Davies Howard
Commissioner	Paula Rose, QSO
Commissioner	Bernadette Roka Arapere
Commissioner	David Clarke

Key Commission personnel

Chief Executive	Martin Sawyers
Chief Investigator of Accidents	Naveen Kozhuppakalam
Investigator-in-Charge for this inquiry	Avinash Figueiredo
Commission General Counsel	Cathryn Bridge

Notes about Commission reports
Kōrero tāpiri ki ngā pūrongo o te Kōmihana

Citations and referencing

Any citations are for public documents. Documents unavailable to the public (that is, not discoverable under the Official Information Act 1982) are referenced in footnotes. Information derived from interviews during the Commission's inquiry into the occurrence is used without attribution.

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: Fishing vessel *Boy Roel*

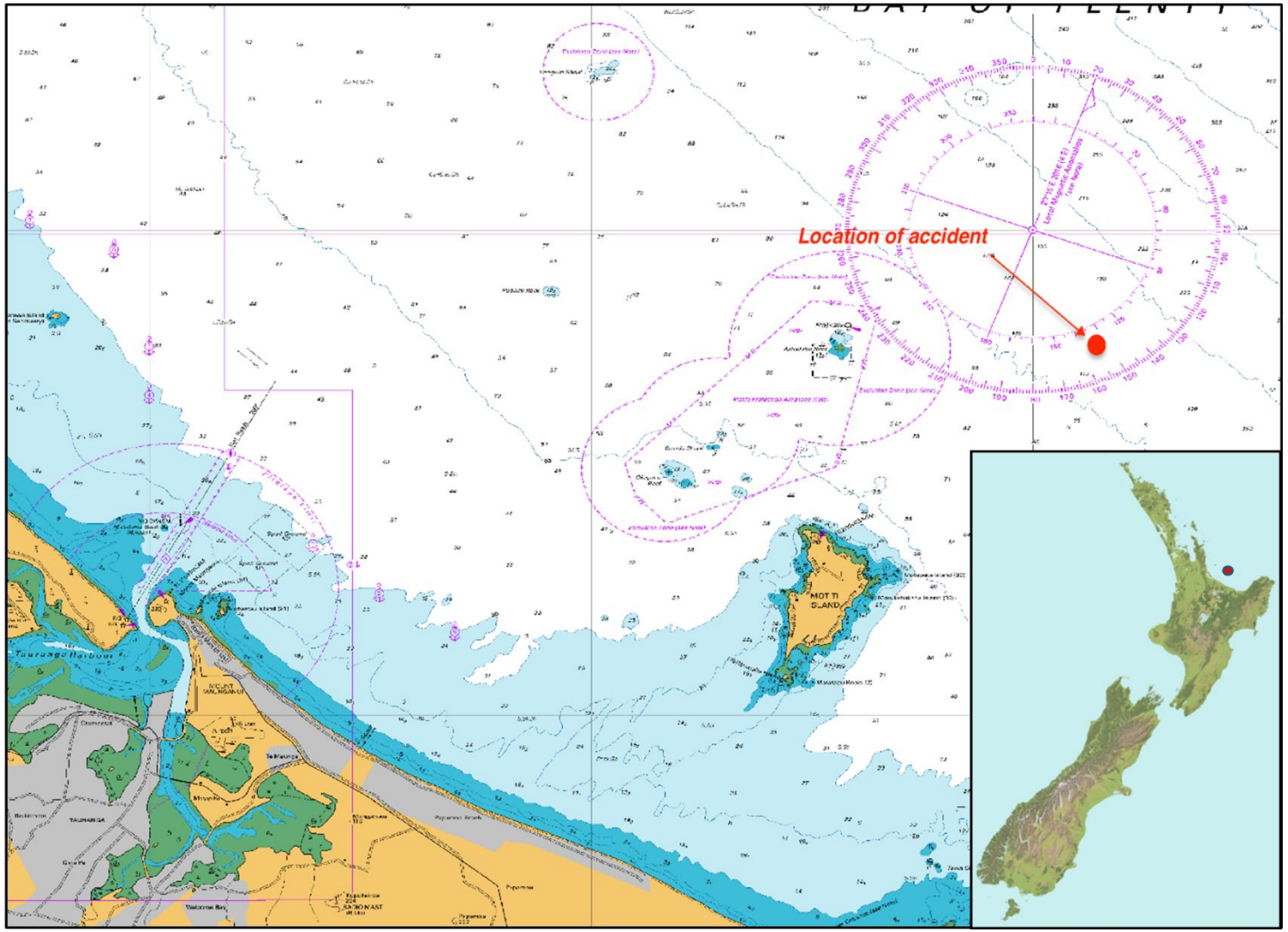

Figure 2: Location of accident

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1 Executive summary
Tuhinga whakarāpopoto

What happened

1.1. On 12 December 2022 the Danish seine fishing vessel *Boy Roel* was fishing in the Bay of Plenty. While a net was being hauled from the seabed, the skipper climbed over the top of a winch to access the wheelhouse. The skipper's leg became caught and was drawn into the rope that was hauling in the net as the rope wound around the winch drum.

1.2. The skipper sustained multiple fractures and head injuries.

Why it happened

1.3. The winch could only be controlled from the wheelhouse; there were no remote means to stop it operating in cases of emergency.

1.4. The skipper was in a rush to access the wheelhouse and was distracted as they climbed over the winch.

1.5. The bottoms of the skipper's waterproof leggings were unsecured. This allowed them to be drawn into the rope as it wound around the winch.

What we can learn

1.6. Unguarded winch arrangements on fishing vessels are hazards that must be thoroughly assessed to reduce the risk of harm.

1.7. Seafarers should, where possible, avoid climbing over unguarded moving machinery and ropes and rigging under tension.

1.8. Loose clothing is a significant hazard when working around running machinery.

1.9. It is important that vessel operators conduct thorough risk assessments to identify and control all hazards that could result in harm.

Who may benefit

1.10. Fishers and all other seafarers, fishing boat operators and anyone who works around moving machinery, may benefit from the findings in this report.

2 Factual information
Pārongo pono

Narrative

2.1 The *Boy Roel* was a 15.2 metre Danish seine fishing vessel that operated primarily out of Tauranga. The Danish seine fishing technique involves deploying a trawl warp[1] over the stern[2]. The leading end of the warp is attached to a buoy while the other end is attached to one end of a net. The net is then deployed to the desired sea depth using a trawl warp attached to its other end. The vessel then circles around and picks up the buoy, enabling the net and trawl warps to encircle the fish.

Figure 3: *Boy Roel* at the dock showing the typical trawl warp arrangement (red lines depict the trawl warp)

2.2 On board the *Boy Roel,* each trawl warp was wound several times around one of two warping drums[3], located on either side of the wheelhouse. The two warping drums were connected to a common shaft that ran through the engine room below the wheelhouse, driven by a single hydraulic winch motor. The speed and direction of the winch motor could be adjusted using a controller on a short lead in the wheelhouse.

2.3 From the winch drum, each trawl warp was fed onto a large, hydraulically driven warp retrieval drum (*see* Figure 3). Each warp retrieval drum rotated to apply sufficient tension to the trawl warp to keep the turns tight around the warping drum. If the warp retrieval drums were exerting tension on the trawl warp, the trawl warp would be wound in by the rotating warping drum. If the tension were released (by slowing the speed of the warp retrieval drum), the trawl warp would surge (slip) on the warping drum and stop hauling the net. The speed of the warp retrieval drums could be adjusted from the wheelhouse (*see* Figures 3 and 4).

[1] A synthetic rope used to haul in a trawl fishing net.
[2] The rear of a vessel.
[3] Devices that provide power to haul on a rope or cable.

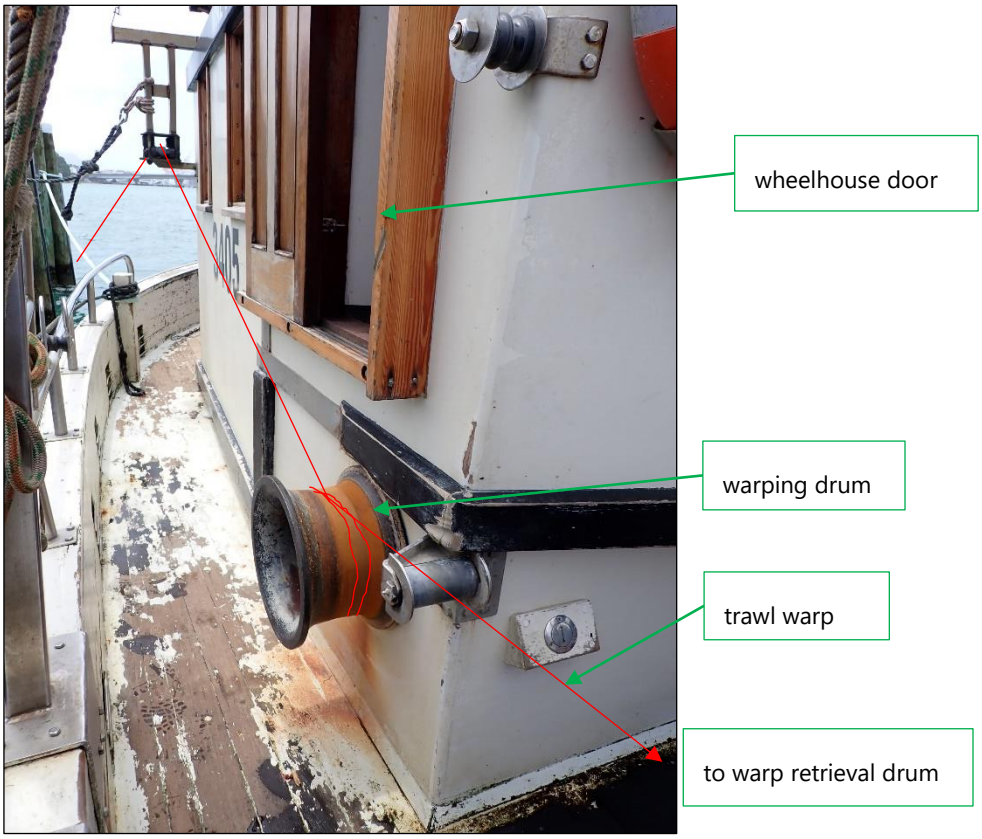

Figure 4:

2.4 Once this arrangement had been set up, the net would be drawn slowly across the seabed then winched to the surface at an increasing speed to prevent fish escaping ahead of the net.

2.5 The *Boy Roel* departed from Tauranga at about 0630 on 12 December 2022, heading for its fishing area in the Bay of Plenty, about 20 nautical miles east-northeast of Tauranga Harbour. The skipper and two deckhands were on board. The deckhands rested while the skipper navigated to the fishing area. The weather was fine, with light variable winds and a low swell.

2.6 Between 1000 and 1030 the crew deployed the net and began the seining process. By 1130 the winches had been set to haul the net from the depths at the maximum rate. The skipper and one deckhand were on the foredeck[4] donning their wet-working gear in preparation for receiving the trawl net on board. The skipper had not fully secured their waterproof leggings when the net began to surface near the stern of the vessel sooner than expected. The skipper rushed towards the starboard[5] door of the wheelhouse with the intention of slowing the winch speed. The skipper met the other deckhand, who was walking along the starboard-side deck towards the foredeck.

2.7 A metal frame had been constructed on top of the bulwarks[6] adjacent to the starboard wheelhouse door, to prevent the crew falling overboard while negotiating

[4] The deck at the forward part of the vessel.
[5] The right side of the vessel.

[6] Solid handrails.

the large step up to the wheelhouse door. The skipper was looking at and explaining to the deckhand their intention to slow the winch as they stepped up on top of the bulwarks and up to the wheelhouse door. The skipper misplaced their feet, and the unsecured bottoms of their waterproof leggings became trapped in the trawl warp as it wound around the warping drum below (*see* Figure 5).

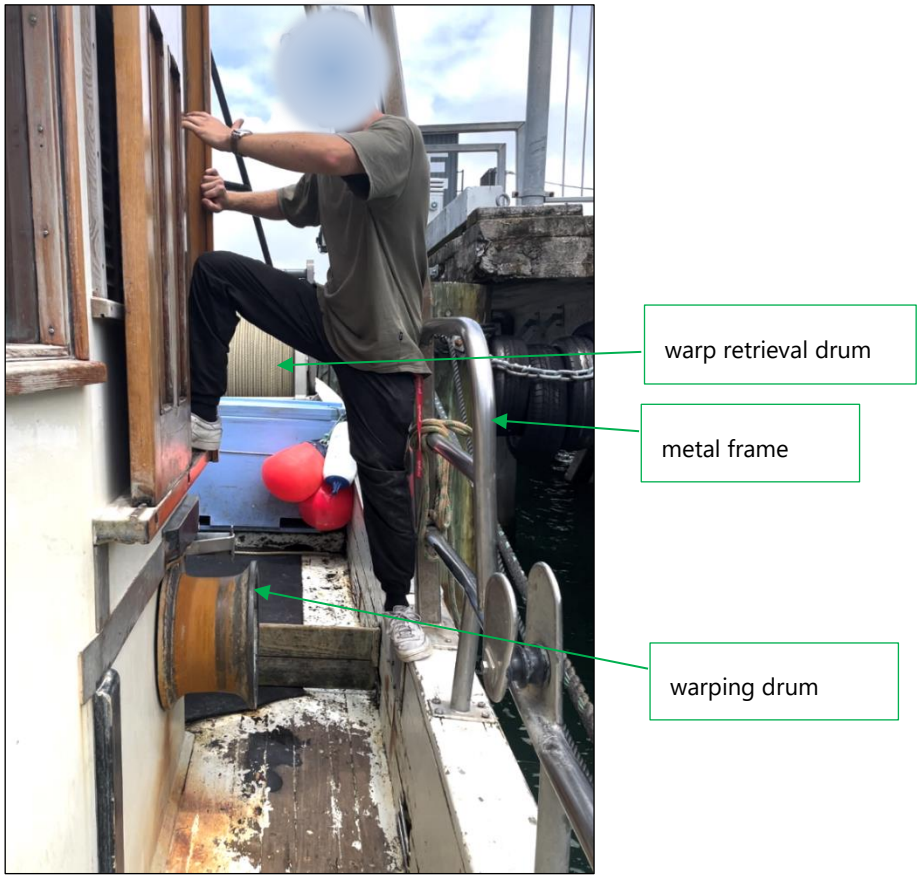

Figure 5: A crew member recreates the process of stepping onto the bulwarks to climb into the wheelhouse

2.8 The skipper's leg was drawn in and trapped between the trawl warp and the warping drum. One of the deckhands, who was close by, saw what had happened and climbed up and over the entangled skipper and into the wheelhouse, where he stopped the winch.

2.9 The two deckhands cut the skipper free from the trawl warp, moved them to the cabin and administered first aid. The skipper had suffered multiple fractures to their legs, feet and hands, and sustained head injuries.

2.10 At 1215 one of the deckhands issued a Mayday call[7] on VHF (Very High Frequency) Channel 16, which was answered by Maritime Radio at the Maritime Operations Centre in Wellington and passed on to the Rescue Coordination Centre New Zealand (RCCNZ).

2.11 RCCNZ tasked a rescue helicopter operated by Northern Rescue Helicopters. The helicopter departed Auckland at 1322. Meanwhile, the two deckhands recovered the

[7] A distress call via radio communications.

net and trawl warps from the sea and navigated the *Boy Roel* towards Tauranga at maximum speed.

2.12 The rescue helicopter rendezvoused with the *Boy Roel* at 1352, and by 1431 two rescue swimmers/medics had been lowered into the water and boarded the *Boy Roel*. The medics began administering further first aid to the skipper.

2.13 RCCNZ had also tasked Tauranga Coastguard with responding. A coastguard rescue vessel departed Tauranga at 1350 and rendezvoused with the *Boy Roel* at 1427. The first responders decided that the safest and most efficient method of evacuating the skipper was to transfer the skipper and the medics to the coastguard rescue vessel; this was achieved by 1508. The skipper was transferred to a waiting ambulance at Tauranga by 1520.

2.14 The two deckhands navigated the *Boy Roel* back to Tauranga.

Personnel information

2.15 The skipper had started fishing in the family business as a school leaver in 1995 and had been involved in the industry since. The skipper held a Skipper Restricted Limits certificate[8] and had been operating the *Boy Roel* since 2009, taking ownership of the vessel in 2012.

2.16 Both deckhands also had extensive experience in the fishing industry and held Skipper Restricted Limits certificates. They frequently crewed the *Boy Roel* on their own.

Organisational information

2.17 Maritime New Zealand had issued the vessel owner with a Maritime Transport Operator Certificate (MTOC) under the company name of Kdee Limited. The MTOC was current at the time of the accident; it was due to expire in February 2026.

2.18 The day-to-day operational management of the *Boy Roel* was carried out by Tauranga Fishing Limited.[9] Maritime New Zealand had approved a Maritime Transport Operator Plan (MTOP) for the *Boy Roel*.

2.19 All the *Boy Roel*'s maritime documents and surveys were current at the time of the accident.

[8] Endorsed for up to 24-metre vessels.
[9] On 8 February 2023 the company changed its name to Two Lease Limited.

3 Analysis
Tātaritanga

Introduction

3.1 The following section analyses the circumstances surrounding the event to identify those factors that 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.

3.2 The *Boy Roel* was compliant with all relevant maritime legislation for its type and operation and no mechanical or equipment failure contributed to the accident. The weather conditions were good. The crew were well rested, having slept at home the previous night, and were only about five hours into their first working day when the accident occurred.

3.3 The controls for adjusting the speed and direction of the winches were in the wheelhouse. Once the winch arrangement had been set in operation, only an adjustment of the warping drum speed was required to control the rate at which the net was hauled to the surface. In this case, the warping drums had been set at maximum speed, as was normal when hauling a net to the surface.

3.4 Three factors contributed to the skipper being entrapped by the trawl warp: haste; distraction; and loose clothing.

3.5 The skipper was surprised by the net's early arrival at the sea surface and was rushing to slow or stop the winch motor before it reached the stern of the vessel. At the time of the accident the skipper was looking at the deckhand and explaining their surprise instead of concentrating on the placement of their feet. The bottoms of the skipper's waterproof leggings were unsecured and loose. Consequently, when the skipper misplaced their footing, the leggings became caught in the moving parts of the trawl.

3.6 Risk management is important for the safety of a crew and a vessel. Thorough hazard identification is critical to effective risk management. If a hazard is not identified, it will not be assessed and may not be adequately controlled.

3.7 If a hazard cannot be removed, the likelihood of it resulting in harm should be reduced to as low as reasonably practicable. Some effort should be put into reducing the consequences of a hazard arising. As a general guideline, it is good industry practice to put 80 per cent of effort into prevention and 20 per cent into mitigating the consequences.

3.8 The *Boy Roel* crew were in the habit of climbing over the rotating warping drum on the starboard side to gain access to the wheelhouse while fishing. They were aware that the trawl warp winding around the rotating warping drum was a hazard to be avoided, but this hazard had not been documented in the MTOP hazard register and had not been adequately addressed.

3.9 The hazard could not be removed, as these components were essential for the purpose of catching fish. However, several measures could reasonably have been taken to reduce the likelihood of this accident occurring. Examples include forbidding crew from routinely accessing the wheelhouse via the outside doors when the warping drums were moving and instead accessing the wheelhouse from the aft

working deck via the cabin; and providing an alternative method for controlling the winches outside the wheelhouse by duplicating the controls outside the wheelhouse or lengthening the remote winch control to allow more freedom of control.

3.10 There was no emergency stop for the winch motor. If emergency stops had been located in key working areas, the skipper might have been able to stop the winches without accessing the wheelhouse, or a deckhand might have been able to stop the winch sooner and potentially reduce the severity of the skipper's injuries, and not put themselves at similar risk when climbing into the wheelhouse door.

3.11 Since the accident, the operator has constructed a platform over the warping drums to aid crew in accessing the wheelhouse from the deck. The procedures in the MTOP have also been amended to forbid crew accessing the wheelhouse through the side doors when warping drums are being operated.

3.12 The operator is also exploring technical and/or procedural changes to ensure the crew always has the ability to control or stop winches in an emergency.

3.13 The Transport Accident Investigation Commission (the Commission) is of the view these safety actions have addressed the safety issues identified, and therefore no recommendation has been made.

4 Findings
Ngā kitenga

4.1 There was no evidence of mechanical or equipment failure contributing to the accident.

4.2 The qualifications and experience of the crew exceeded those required under the *Boy Roel*'s Maritime Transport Operator Plan.

4.3 The skipper misplaced their footing while climbing over moving machinery under load and became entangled in the trawl warp as it wound onto the warping drum. Haste, distraction and wearing loose (unsecured) waterproof leggings were factors contributing to the accident.

4.4 The obvious hazard of climbing over moving machinery had been identified but had not been adequately assessed and controlled. There were several measures the operator could have taken to reduce the risk to as low as reasonably practicable.

5 Key lessons
Ngā akoranga matua

General

5.1 Unguarded winch arrangements on fishing vessels are hazards that must be thoroughly assessed to reduce the risk of their resulting in harm.

5.2 Seafarers should, where possible, avoid climbing over unguarded moving machinery or ropes and riggings under tension.

5.3 The wearing of loose clothing is a significant hazard when working around running machinery.

5.4 It is important that vessel operators conduct thorough risk assessments and identify and control all hazards that could result in harm.

6 Data summary
Whakarāpopoto raraunga

Vehicle particulars

Name:	*Boy Roel*
Type:	Danish seine fishing vessel
Class:	Fishing
Limits:	Bay of Plenty, Auckland and Barrier inshore limits
Length:	15.24 metres
Breadth:	5 metres
Gross tonnage:	45 tonnes
Built:	1971
Propulsion:	126 kw Gardner 8LXB diesel engine driving a single fixed-pitch propeller
Owner/operator:	Tauranga Fishing Limited
Port of registry:	Tauranga
Minimum crew:	2

Date and time	12 December 2022 1200
Location	about 17 nautical miles east-northeast off Tauranga Harbour
Persons involved	3
Injuries	1 (serious)
Damage	nil

7 Conduct of the inquiry
He tikanga rapunga

7.1 On 12 December 2022 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.

7.2 On 13 December 2022 two investigators travelled to Tauranga. There they conducted an inspection of the *Boy Roel,* interviewed the two deckhands who were on board when the accident occurred and gathered company documents.

7.3 On 23 December 2022 one investigator travelled to Tauranga and interviewed the skipper of the *Boy Roel* at Tauranga Hospital.

7.4 On 28 June 2023 the Commission approved a draft report for circulation to three interested parties for their comment.

7.5 All three interested parties responded that they had no comment.

7.6 On 22 August 2023 the Commission approved this report for publication.

Abbreviations
Whakapotonga

MTOC	Maritime Transport Operator Certificate
MTOP	Maritime Transport Operator Plan
RCCNZ	Rescue Coordination Centre New Zealand
VHF	Very high frequency

Glossary
Kuputaka

bulwark	a solid handrail
starboard	the righthand side of a vessel when looking forward
stern	the rear of a vessel
trawl warp	a synthetic rope used to haul in trawl fishing nets
warping drum	a device that provides power to haul on a rope or cable

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 haumaru) 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 'haumaru' is 'safe' or 'risk free'.

Corporate: Te Ara Haumaru - 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: rerewhenua - 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

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MO-2021-204	Recreational vessel, capsize and sinking with three fatalities, Manukau Harbour entrance, 16 October 2021
MO-2021-205	Container vessel Moana Chief, serious injury to crew member, Port of Auckland, New Zealand, 10 December 2021
MO-2020-205	General cargo vessel, Kota Bahagia, cargo hold fire, Napier Port, 18 December 2020
MO-2021-202	Factory fishing trawler Amaltal Enterprise Engine room fire, 55 nautical miles west of Hokitika, 2 July 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-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

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