Transport Accident Investigation Commission

# Final report
## Tuhinga whakamutunga

***Rail inquiry RO-2025-101***
***Train 931***
***Safe working irregularity***
***553.82 km Main South Line***
***Mataura***
***12 January 2025***

**November 2025**

# 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 and incidents 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 | David Clarke |
| Deputy Chief Commissioner | Stephen Davies Howard |
| Commissioner | Paula Rose, QSO |
| Commissioner | Bernadette Roka Arapere |

## *Key Commission personnel*

| | |
|---|---|
| Chief Executive | Martin Sawyers |
| Chief Investigator of Accidents | Louise Cook |
| Investigator-in-Charge for this inquiry | David Manuel |
| Acting Commission General Counsel | Polly Leeming |

# Notes about Commission reports
# 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. 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: Two DX class locomotives on a train in the South Island (not the incident train)**
(Credit: frankship.com)

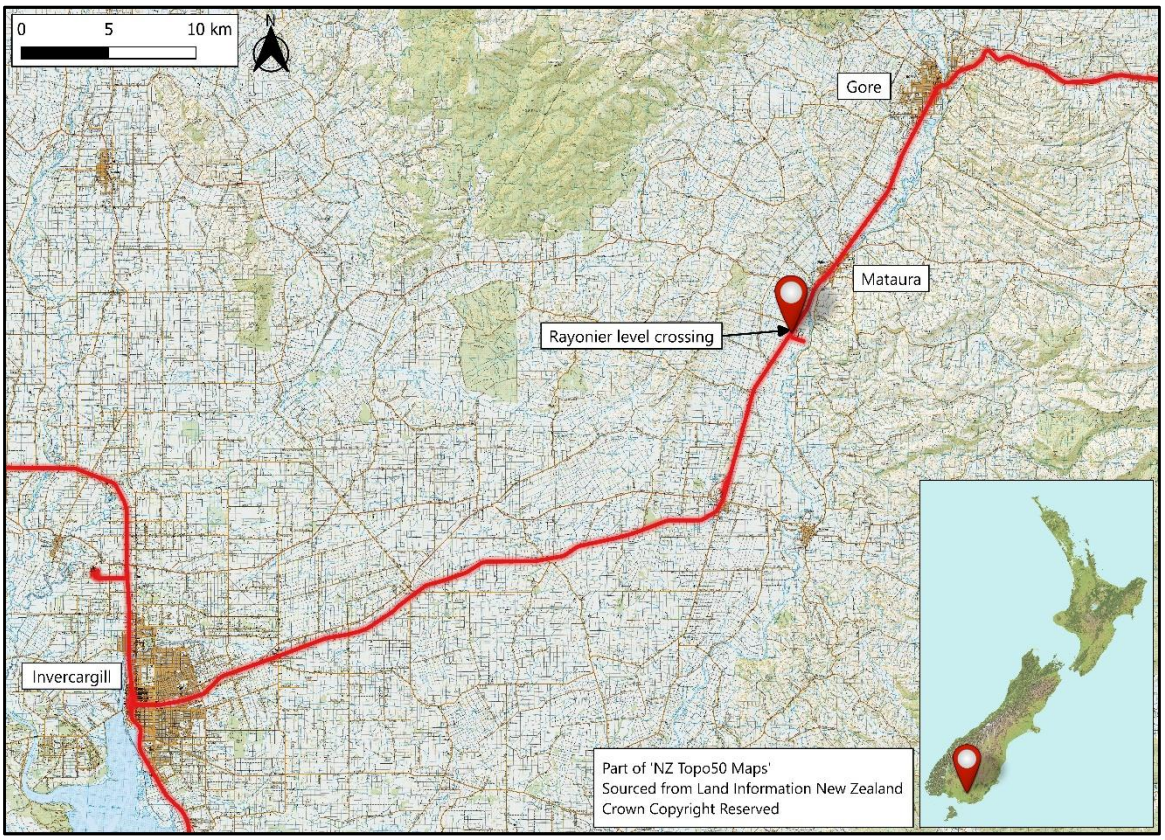


**Figure 2: Location of accident**

(Credit: Toitū Te Whenua Land Information New Zealand)

# Contents
## Rārangi take

## Figures

# 1 Executive summary
## Tuhinga whakarāpopoto

### *What happened*

1.1. At about 1040[1] on 12 January 2025, a signals technician[2] called train control[3] to request a 10-kilometre-per-hour (km/h) Temporary Speed Restriction (TSR) be placed on Rayonier Crossing (the crossing) near Mataura to carry out signals maintenance work.

1.2. The signals maintenance work included carrying out testing of bonding wires[4] in a cabinet close to the rail line and the crossing (*see* Figure 3).

1.3. The train controller[5] acknowledged the call and carried out administrative tasks required to impose the TSR.

1.4. At about 1149, Train 931, heading towards North Edendale siding, passed through Mataura, approximately 2.5 kilometres (km) north of the crossing.

1.5. The locomotive engineer[6] (LE) of Train 931 was unaware of the 10 km/h speed restriction and, at 1151, travelled through the crossing at 77 km/h.

1.6. Both signals technicians, alerted by the train's horn, heard the train approaching and were clear of the railway track when the train went past.

1.7. No one was injured and no damage occurred.

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[1] Times in this report are New Zealand Daylight Time and are expressed in the 24-hour mode.

[2] A person qualified in repairing and maintaining railway signalling equipment, including signals and points. Of the two technicians referred to in this report, one specialised in signals maintenance while the other was a communications specialist who was assisting the signals technician. For the purposes of this report, both are collectively referred to as signals technicians as that was the nature of the work being performed.

[3] The National Train Control Centre is in Wallaceville, Upper Hutt. Train control is responsible for track authorisations and the safe movement of rail traffic.

[4] Used to create an electrical connection between two or more conductive parts. They are commonly used in grounding, electrical enclosures and electronic components.

[5] A person qualified to authorise rail movements and track access. Train controllers operate in a train control centre.

[6] Mainline train drivers are referred to by KiwiRail as locomotive engineers to reflect the required qualifications of the role.


**Figure 3: Signalling cabinet located near track at the crossing**

## *Why it happened*

1.8. The train controller annotated the train control graph but did not advise the single train in the area of the speed restriction because they were waiting for the LE to call at Mataura.

1.9. The LE did not call train control immediately when they had cleared Mataura station limits and went through the crossing before train control advised them of the TSR.

1.10. The work at the crossing was unplanned and not listed on the daily information bulletin (DIB).[7]

1.11. The initial call by the signals technician to train control to establish the TSR was made by telephone rather than over the radio. This meant an opportunity was missed for other rail workers in the area to gain important information over an open radio channel.

## What we can learn

1.12. Compliance with safe working rules and procedures is necessary to protect all rail workers. Non-compliance can lead to near misses, incidents or accidents.

## Who may benefit

1.13. Any staff involved in safety-critical[8] activities and their managers may benefit from the findings in this report.

[7] A memorandum provided to users of KiwiRail's network that contains information about train running and track maintenance activities for that day.

[8] Activities that, if not performed correctly, could lead to serious harm or injury.

# 2 Factual information
## Pārongo pono

## *Background*

### Track Warrant Control

2.1. Train 931 was a scheduled freight train running from Dunedin to North Edendale siding on the Main South Line (MSL) in New Zealand's South Island. It was scheduled to detach and uplift freight from North Edendale siding before returning to Dunedin as Train 932.

2.2. This area of the MSL operates under a signalling system known as Track Warrant Control (TWC).

2.3. TWC is used on rail lines with relatively low numbers of train movements per day to protect trains, equipment and personnel operating on the main line. Train control issues written instructions (track warrants) to 'addressees', authorising the occupancy of defined sections of track. The written instruction is referred to as a Mis.88 (*see* Figure 4).

2.4. Before issuing a track warrant, a train controller must:

- positively establish the exact purpose for which the authority is to be issued and the limits that will be applied
- carry out checks to establish that it is safe to issue the track warrant
- plot the movement on the train control diagram
- prepare the track warrant
- transmit the track warrant to the addressee and listen for a correct repeat
- record the time the track warrant is read back correctly.

2.5. Safe operations under TWC are achieved by permitting only one movement to occupy a defined section of the main line at any one time, except where the regulations make special provision for shared occupancy.

2.6. Train controllers use a Track Warrant Assisted Computer System (TWACS)[9] to ensure that no conflicting warrants are issued. Because train controllers have no real-time visibility of the location of trains within the TWC area, compulsory calling locations are identified within the warrant. This ensures contact is maintained with the train at regular intervals. Compulsory calls to train control are listed at clause 10 on the Mis.88 form.

[9] A computer-based system used by train controllers to prepare and issue track warrants safely. It does so by checking against previous prepares, issues and cancellations to ensure that conflicts do not exist.

KiwiRail

Mis. 88

**Track Warrant**

Track Warrant Number _____ day _____ (Date)

To Driver / Locomotive Engineer / Operator / Rail Protection Officer*
(Designation, Name, Train, etc.)

At _____

1. ☐ Track Warrant Number _____ is cancelled
2. ☐ After *departure / arrival of _____ *from / at _____
3. ☐ Proceed from _____ to _____
4. ☐ Work between _____ and _____
5. ☐ Enter _____ at _____ *to cross _____
6. ☐ Main line reported clear *(except for _____)
7. ☐ No other warrants issued between these limits after _____
8. ☐ Verify _____ is clear of _____ before acting on this warrant
9. ☐ Not in use
10. ☐ Call Train Control at _____
11. ☐ Clear main line before _____ hours
12. ☐ Other instructions _____

Train Controller

Repeat correct at _____ hours

| Locomotive Engineer use only | ☐ DAS Target Location set to |
|---|---|
| | ☐ DAS Not in Use |

| RPO use only | All locked off in Safe Place and Work Site Clear at _____ hrs |
|---|---|

Limits reported clear by
Driver / Locomotive Engineer / Operator / Rail Protection Officer* at _____ hours

(Mark "X" in box for each item instructed) (*Delete words not required)

June 2015

**Figure 4: Blank track warrant form Mis.88 – addressee's copy**

## The crossing

2.7. The crossing is located along Pioneer Highway between Mataura and North Edendale, 553.82 km along the MSL (*see* Figure 5). It is a rail crossing over a private road that provides access to a medium-density fibreboard (MDF) plant, about 2.5 km south of Mataura.

2.8. There is no public thoroughfare, and most of the road traffic using the crossing is heavy truck and trailer units carrying either logs into, or product from, the plant.


**Figure 5: Aerial view of the crossing**

2.9. The crossing is protected by flashing lights and alarm bells to provide active protection[10] for road users (*see* Figure 6).

[10] Active protection includes all level crossing warning devices that are activated by an approaching train, including flashing lights, bells and barriers. It is contrasted with passive protection, which warns users of level crossings but does not alter this warning when trains are approaching.

**Figure 6: Protection devices in place at the crossing**

## *Narrative*

### Train control

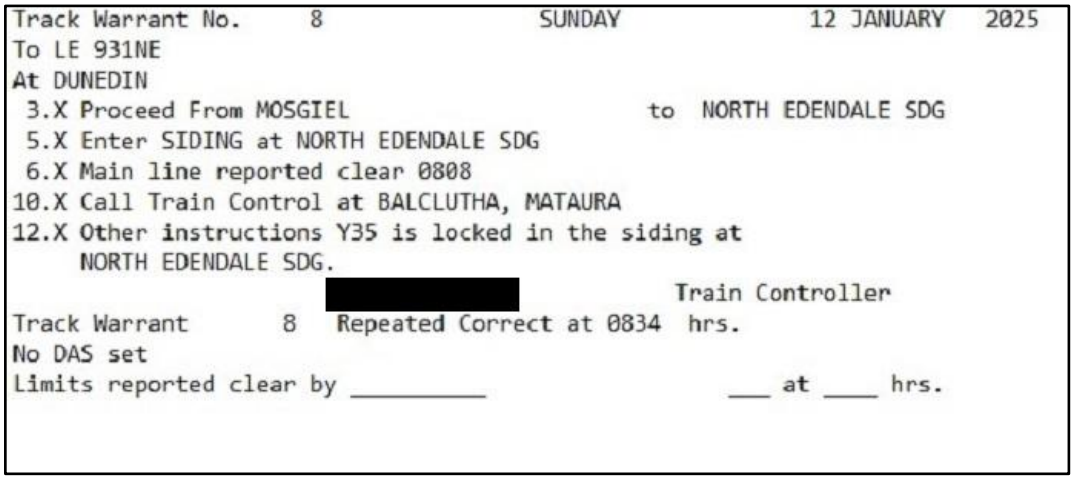
2.10. At 0535 on Sunday 12 January 2025, the train controller commenced their shift on the MSL after receiving a handover from the night shift train controller. It was the train controller's second shift back after returning from 10 days of annual leave. The scheduled eight-hour shift was due to finish at 1400 that afternoon.

2.11. The train controller was tasked with controlling two separate areas of the South Island: the Studholme-Invercargill area of the MSL, and the Rolleston-Stillwater-Ngākawau area of the Midland line. They were more senior than a second train controller on shift and so provided them with some supervision.

2.12. Due to it being a Sunday, both areas were relatively quiet. The main rail traffic was local shunts, and the TranzAlpine and Taieri Gorge passenger trains. Train 931 was the only mainline freight train operating on the MSL before the incident.

2.13. At about 0830, the locomotive engineer (LE) of Train 931 called train control to request a track warrant in preparation for a scheduled departure of 0855.

2.14. At 0834, a track warrant was issued to the LE of Train 931 at Dunedin (*see* Figure 7). The instructions were to proceed from Mosgiel (the start of the track warrant territory) to North Edendale siding (clause 3) and enter the siding (clause 5). Clause 6 informed the LE that the main line was clear, and clause 10 instructed that compulsory calls must be made to train control at Balclutha and Mataura. Clause 12 informed the LE that there was another train at North Edendale siding.



Track Warrant No. 8 SUNDAY 12 JANUARY 2025
To LE 931NE
At DUNEDIN
3.X Proceed From MOSGIEL to NORTH EDENDALE SDG
5.X Enter SIDING at NORTH EDENDALE SDG
6.X Main line reported clear 0808
10.X Call Train Control at BALCLUTHA, MATAURA
12.X Other instructions Y35 is locked in the siding at NORTH EDENDALE SDG.
[redacted] Train Controller
Track Warrant 8 Repeated Correct at 0834 hrs.
No DAS set
Limits reported clear by _____ ___ at ____ hrs.

**Figure 7: Track warrant issued to the locomotive engineer**

2.15. The track warrant came into effect at 0834, when the LE correctly repeated it back to the train controller. Once a track warrant is in effect it cannot be altered or amended. Instead, it must be cancelled and a new warrant issued.

2.16. Once the track warrant was issued, the train controller confirmed the route was set for Train 931 to depart. Train 931 departed Dunedin at 0854 and entered TWC territory after passing through Mosgiel at 0910.

2.17. Track warrant-controlled areas are considered 'dark territory' as the train controller usually has no visibility of train movements and is reliant on information from the LE to ascertain a train's location. However, because of legacy signalling arrangements on this section of the MSL (where signals remained in place after a siding at Clinton was closed down) the train controller was able to see the train pass through Clinton Station on its journey south towards North Edendale siding. The LE also made a compulsory call at Balclutha, which identified the train's location to train control (*see* Figure 8).

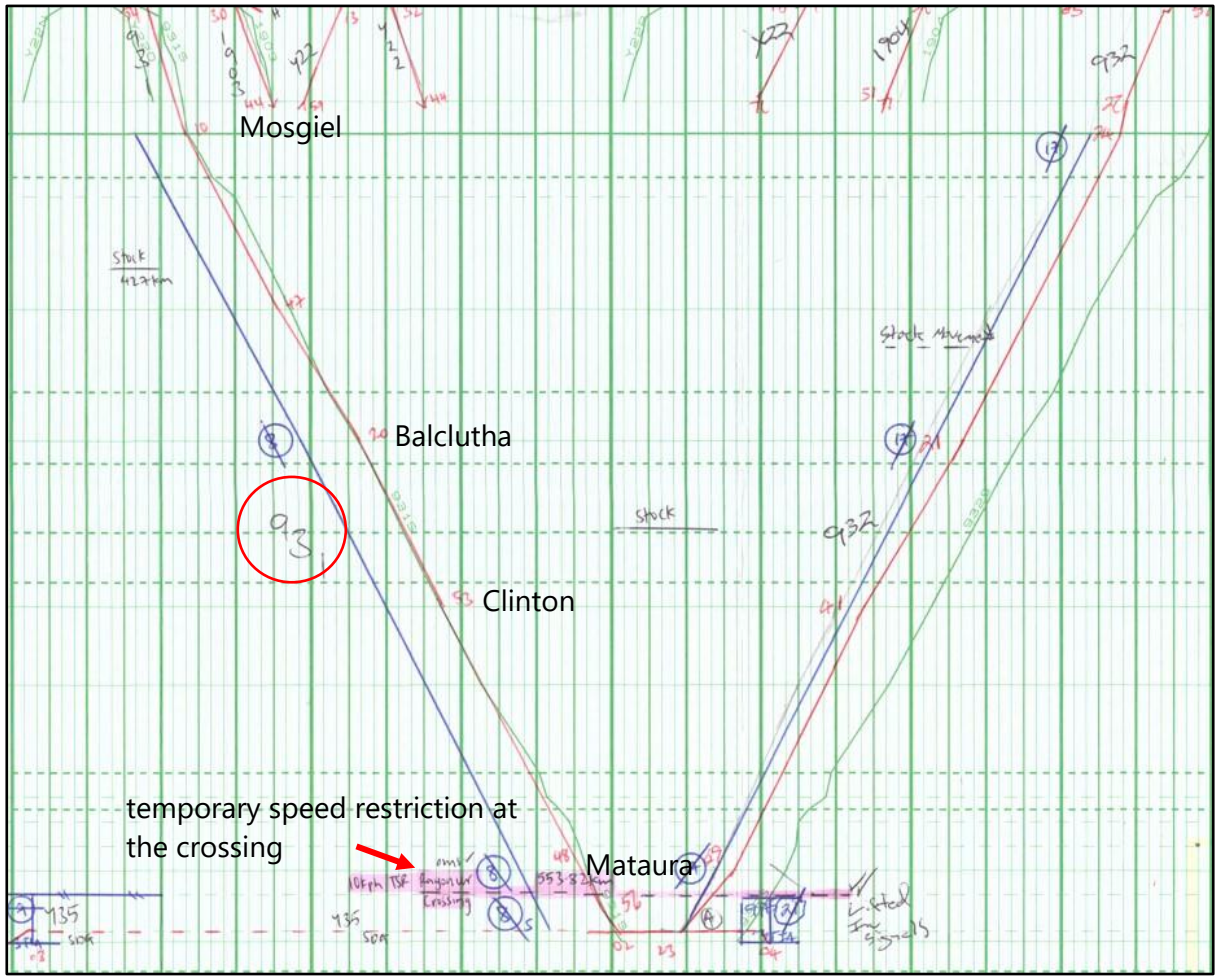



**Figure 8: Train control graph illustrating journey of Train 931**

(Credit: KiwiRail – cropped and labelled for clarity by TAIC)

2.18. The train controller annotated the graph[11] when they became aware of Train 931 passing through locations – Mosgiel at 0910, Balclutha at 1020 and Clinton at 1053. The green lines on the graph depict a train's scheduled running time. The blue lines depict the limits of a track warrant once it has been issued, while the red line shows the actual journey time taken by that train. The red line may vary considerably from the blue and green lines because of delays en route.

2.19. At about 1040, a signals technician called train control by telephone to advise that they were working at Rayonier Crossing, 553.82 km MSL, and that they required a 10 km/h temporary speed restriction to be established at that location. The signals technician also asked the train controller if Trains 931 and 932 were running, and the train controller confirmed that they were.

2.20. The work at Rayonier Crossing was not included in the daily information bulletin (DIB) and was not planned work. The train controller did not ask the signals technician for further details about the nature of work being carried out, if speed boards[12] were required, or whether the work would be clear of the track. This is discussed further in the analysis section (*see* Section 3).

[11] A diagram used by train controllers to record all train movements and track occupations over a 24-hour period.
[12] Trackside equipment displaying the maximum speed for that section of track.

2.21. Following this telephone call, at about 1047, the train controller called Train 848 at Arthur's Pass on the Midland line and issued an operating instruction[13] for that train over the train control radio.

2.22. At about 1052, Train 931 was approaching Clinton on the MSL, and the LE could see that the signals ahead were red (stop). The LE selcalled[14] train control. This selcall alerted the train controller that Train 931 was near Clinton. The train controller broadcast over the radio that lights were coming up as they changed the signals at Clinton to proceed.

2.23. This was the last communication the train controller had with Train 931 before it travelled over the crossing at 1151.

### Signals technicians

2.24. Two signals technicians commenced work in the Invercargill depot at about 0730 that morning. They discussed work that needed to be done at the level crossing into Southland Phosphate rail siding south of Invercargill. After arriving at that location, they couldn't gain access to the necessary equipment. They decided to change their plan and travelled to Rayonier Crossing near Mataura to carry out some required maintenance instead.

2.25. The pair arrived at the crossing at about 1030 and, after consideration of what would be required, one of the signals technicians rang train control on their mobile phone.

2.26. A short conversation took place over the phone between the signals technician and the train controller to establish a 10 km/h Temporary Speed Restriction (TSR) over the crossing at the 553.82 km mark on the MSL.

2.27. Once the train controller had acknowledged the required TSR details, the signals technician completed the call, and both technicians commenced work at the crossing.

2.28. The signals technicians were working under KiwiRail's Rail Operating Rules and Procedures, Rule TS10.4 – Individual Train Detection (ITD) (*see* paragraph 3.29). The use of ITD allowed work to be carried out near the track without other forms of protection under a limited set of circumstances.

2.29. The work being carried out was maintenance on bonding wires in the signalling cabinets close to the track. This required disconnecting batteries that provided secondary backup power to the bells and flashing lights that formed the protection at the level crossing.

2.30. Disconnecting the secondary backup power supply meant that if there was an interruption to the commercially supplied mains power (a power cut) the flashing lights and bells would not activate to warn road users a train was approaching the level crossing.

2.31. The application of a 10 km/h TSR to the crossing was to mitigate the risk to road and rail users in the event of the crossing protections not activating.

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[13] A method of authorising a train journey for use only on the Midland line.

[14] A function of KiwiRail's radio system that sends an audible alert and caller identifying information to a train control radio display. When radio traffic is busy, this function allows the train controller to prioritise the order of communication and selectively call back as required.

2.32. The two signals technicians carried out their work until about 1148, when they were alerted by an approaching train's horn.

2.33. The pair then stopped working in the cabinets and took position on the road either side of the level crossing to warn any approaching road traffic.

2.34. When Train 931 went through the level crossing at 1151 it was at a much higher speed than the signals technicians were expecting. This prompted one of the signals technicians to call the LE of Train 931 by radio and ask if they were aware of the 10 km/h TSR.

2.35. The LE replied that they were not aware of the TSR. At 1153, the signals technician contacted train control by radio to inform the train controller that the train had traversed the crossing at apparent line speed.[15]

2.36. The train controller acknowledged the signals technician's call and at 1155 contacted Train 931 by radio.

2.37. At 1156, the LE of Train 931 answered the train controller, advising that the train was clear of Mataura, and that they were now aware of the 10 km/h TSR at the crossing.

### Locomotive engineers

2.38. Train 931 was crewed by two staff that morning: an LE qualified to instruct trainees and a trainee LE. The trainee LE was driving the train under direct supervision of the instructor LE.

2.39. Both staff had commenced their shift at 0750 that morning. They carried out administrative tasks and locomotive preparation before the scheduled departure of Train 931 at 0855.

2.40. The trainee LE carried out all rail driving duties, including obtaining the track warrant from train control prior to departure.

2.41. Train 931 journeyed south without incident. Both LEs recalled that it was a quiet day without the usual track activity that would be encountered on a weekday.

2.42. After calling train control on approach to Clinton and receiving proceed signals, there was no further communication with train control.

2.43. On approach to Mataura, the trainee LE slowed Train 931 to around 50 km/h as a precaution while travelling through the built-up residential area.

2.44. Once the train was nearing the southern outskirts of Mataura township, the trainee LE began accelerating towards the line speed of 80 km/h.

2.45. The trainee LE was aware of the compulsory call to train control and was calculating when the train would be clear of the final station limit board before making the call.

2.46. Before this could occur, both LEs saw two people wearing high-visibility clothing standing on either side of the track at the crossing. The trainee LE sounded the train's horn.

[15] The maximum allowable speed for a section of track. In this case line speed was 80 km/h.

2.47. At 1151, satisfied that the people were clear of the track and that the level crossing warning devices were operating correctly, the trainee LE maintained a speed of 77 km/h as the train travelled over the crossing.

2.48. A short time after the train had cleared the crossing, the trainee LE received a call over the radio from one of the signals technicians to enquire whether they were aware of the 10 km/h TSR. The trainee LE replied that they were not aware.

2.49. At 1155, the train controller contacted Train 931 by radio and gave the trainee LE details of the TSR.

## Personnel information

2.50. The train controller held all current certifications to operate the train control areas. The train controller underwent drug and alcohol testing post-incident and provided a negative (clear) result.

2.51. The two signals technicians held senior qualifications and were both qualified to carry out their roles. They were also qualified to take out track protection with train control when required.

2.52. The instructor LE was a senior LE and qualified to instruct trainees. They held all current certifications for their role.

2.53. The trainee LE had been under instruction for about eight months, under supervision of the instructor LE.

## Train information

2.54. Train 931 was 418 metres long and weighed 306 tonnes. It was powered by two DX class locomotives.

## Meteorological information

2.55. The weather was sunny with good visibility.

## Train data recorders

2.56. The Commission obtained Tranzlog[16] data from KiwiRail about locomotive DXC 5287 on Train 931.

## Organisational information

2.57. KiwiRail Holdings Limited (trading as KiwiRail) is the infrastructure owner and the employer of all personnel involved.

[16] The train's 'black box' data recorder.

## Previous occurrences

### RO-2023-103 Safe-working irregularity Johnsonville line[17]

2.58. At 1241 on Thursday 4 May 2023, two KiwiRail track workers entered the rail corridor at Crofton Downs without permission and walked alongside the rail line towards Tunnel 5 (the tunnel). On arrival at the northern end of the tunnel, one of the track workers contacted train control by telephone and requested time to conduct work on the Johnsonville line.

2.59. The train controller went through the usual procedure for allocating track time and putting protection in place for the track workers before they began making their way through the tunnel.

2.60. However, the required protection from rail traffic, in the form of track signals being held at red (stop), was established by the train controller at locations different from where the track workers were intending to work.

2.61. As there was no protection in place at the correct locations, a Transdev passenger train entered the section of track that the track workers thought was blocked for their work.

2.62. The train controller authorised the track occupancy to the track worker over the telephone rather than the radio.

2.63. The use of incorrect procedures to establish protection, and ineffective communication between the train controller and the track worker indicated that non-technical skills were not being adequately utilised during a safety-critical task.

2.64. KiwiRail carried out an internal investigation, which in part concluded:

> Cell phone use as method of communicating with Train Control circumvents safety assurance features such as call-capture, or the opportunity for improving safety awareness for other rail operators in the area, and therefore effectively compromises safe working conditions on the Rail Network.

2.65. A key lesson of this inquiry was that all personnel undertaking safety-critical roles should adhere to the principles underlying the application of non-technical skills to ensure that they share the same mental models and have a clear understanding of what is required of themselves and others to complete tasks safely.

[17] https://www.taic.org.nz/inquiry/ro-2023-103

# 3 Analysis
## Tātaritanga

### *Introduction*

3.1. A series of missed opportunities for information sharing contributed to this incident. The following section analyses the circumstances surrounding the event to identify factors that increased the likelihood of the event occurring or increased the potential severity of its outcome. It also examines any safety issues which have the potential to adversely affect future operations.

### *Events that contributed to the incident*

***Safety issue: Safety-critical information was not shared in time for an effective and timely response. This resulted in Train 931 travelling through a worksite with a 10 km/h speed restriction at 77 km/h.***

#### Communicating with train control by telephone

3.2. A simple analogy to describe the function of train control is that the role acts as a referee between all parties that require access to the track. This ensures safe separation and prevents conflicts between rail traffic and other rail traffic or track workers.

3.3. To do this, train controllers work in what is sometimes an extremely high-workload environment. There is often constant radio traffic from workers requesting track access and rail traffic requesting movement authorisations over the same territory. A train controller must prioritise and action these requests without error.

3.4. The requirement for prioritisation means that people needing to talk to train control either use the radio selcall function and wait for a response or wait for a gap in radio traffic to voice call the controller.

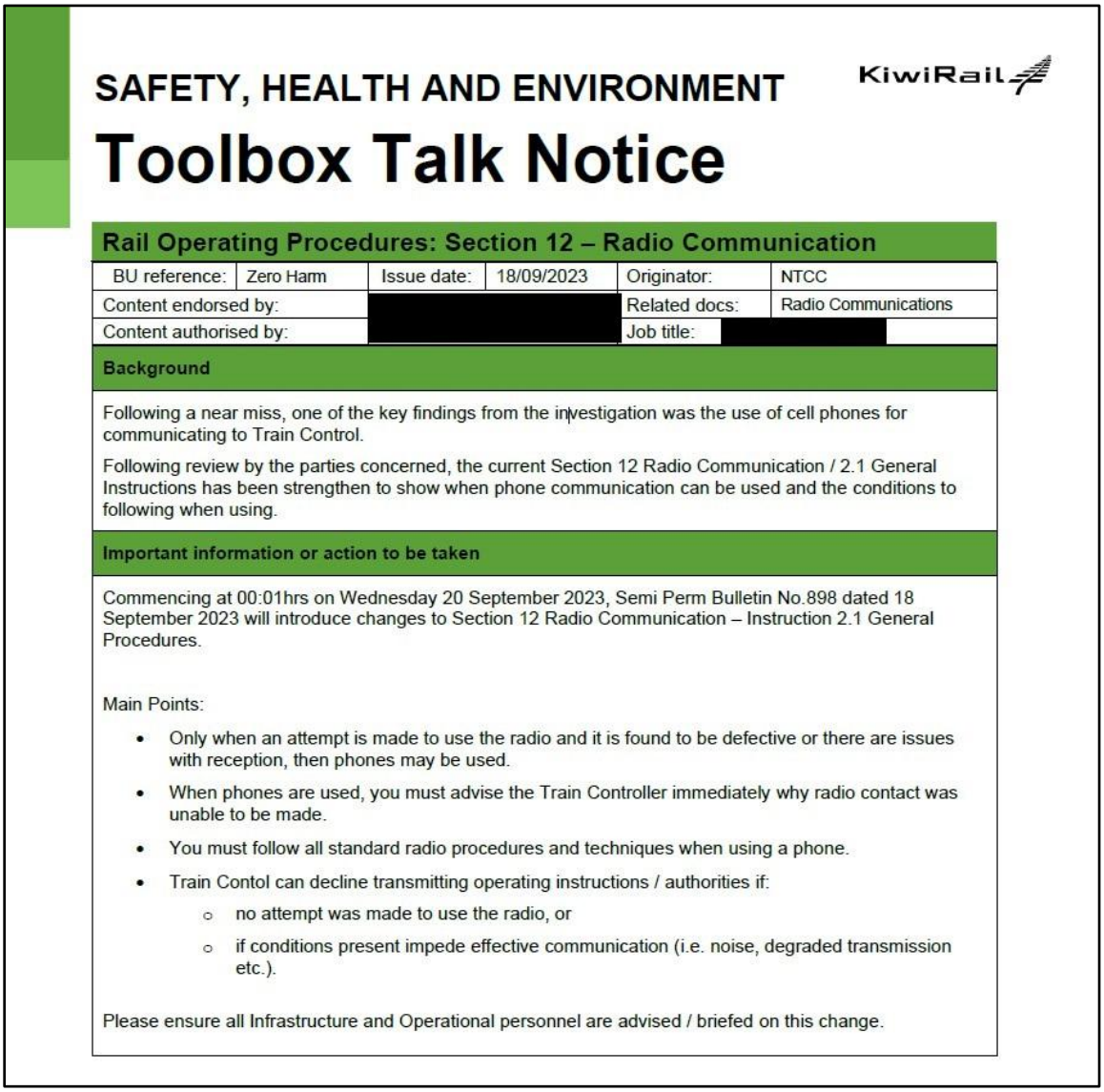
3.5. A response time may be several minutes or longer, depending on how busy the controller is with more urgent activities.

3.6. Before the early 2000s, when mobile phones became widely available, almost all contact with train control was via radio. Landline train control phones were used for administrative enquiries or emergency calls.

3.7. Not using the radio can mean that safety-critical activity is conducted between only two parties and not broadcast to all rail workers. This may lead to critical information not being shared.

3.8. On 18 September 2023, in part as a response to findings in Commission investigation RO-2023-103, KiwiRail sent out a Safety, Health and Environment (SHE) Toolbox Talk Notice (*see* Figure 9) giving notice of the activation on 20 September 2023 of Semi-Permanent Bulletin 898. This Semi-Permanent Bulletin introduced changes to safe working rules that governed contacting train control by radio.

3.9. As part of the roll-out of the rule change, KiwiRail conducted briefings with affected rail staff, including the signals technicians, about the SHE Notice and what the expectations were for rail staff.



SAFETY, HEALTH AND ENVIRONMENT

KiwiRail

# Toolbox Talk Notice

## Rail Operating Procedures: Section 12 – Radio Communication

| | | | | | |
|---|---|---|---|---|---|
| BU reference: | Zero Harm | Issue date: | 18/09/2023 | Originator: | NTCC |
| Content endorsed by: | [redacted] | | | Related docs: | Radio Communications |
| Content authorised by: | | | | Job title: | [redacted] |

**Background**

Following a near miss, one of the key findings from the investigation was the use of cell phones for communicating to Train Control.

Following review by the parties concerned, the current Section 12 Radio Communication / 2.1 General Instructions has been strengthen to show when phone communication can be used and the conditions to following when using.

**Important information or action to be taken**

Commencing at 00:01hrs on Wednesday 20 September 2023, Semi Perm Bulletin No.898 dated 18 September 2023 will introduce changes to Section 12 Radio Communication – Instruction 2.1 General Procedures.

Main Points:

- Only when an attempt is made to use the radio and it is found to be defective or there are issues with reception, then phones may be used.
- When phones are used, you must advise the Train Controller immediately why radio contact was unable to be made.
- You must follow all standard radio procedures and techniques when using a phone.
- Train Contol can decline transmitting operating instructions / authorities if:
  - no attempt was made to use the radio, or
  - if conditions present impede effective communication (i.e. noise, degraded transmission etc.).

Please ensure all Infrastructure and Operational personnel are advised / briefed on this change.

**Figure 9: KiwiRail Toolbox Talk Notice dated 18/09/23**

(Credit: KiwiRail)

3.10. The rule change to Section 12 Radio Communication, 2.1 General Instructions was superseded in 2024, when KiwiRail changed to an online rulebook application known as 'Shield'. However, the wording remained unchanged.

3.11. The relevant section in Shield stated in part:

> 1.2 Train Control Radio System
>
> Rail Personnel
>
> You must only use the Train Control Radio System to communicate information to the Train Controller about essential rail activities and emergencies. When the radio is in operation, you must use this as the primary means of communication for transmitting particulars of operating instructions and authorities.
>
> Only when you attempt to use the radio and
>
> - it is found to be defective, or
> - there are issues with reception,
>
> then you must use the phone. When you use the phone to contact the Train Controller, you must:

- immediately advise the Train Controller the reason why radio contact was unable to be made
- follow all radio procedures and techniques…

Train Controller

You have the authority to decline transmitting any operating instructions and authorities if:

- no attempt has been made to use the radio, or
- conditions are present that impede effective communication (e.g., noise or degraded transmission) …

3.12. KiwiRail implemented this rule to ensure that safety-critical information was broadcast over an open radio channel. This creates an opportunity for other rail workers to listen to the information and take any necessary actions, including intervention, if a conflict is identified.

3.13. After the signals technicians arrived at the crossing, they made contact by mobile phone to establish the TSR. No attempt to contact train control by radio was made although radios were available to the signals technicians, and recordings of train control activity that morning indicated that radio traffic was minimal.

3.14. When the signals technician was talking with the train controller, the only question asked about rail activity was whether Train 931 was running that day. There was no information exchanged about the location of the train, or indeed any other rail activity that might have been taking place that would be affected by the TSR.

3.15. Establishing a TSR to mitigate the risk of a potentially safety-compromised level crossing should have been recognised by both the signals technician and the train controller as 'essential rail activity'. It therefore should have been discussed and put in place over an open radio channel.

## Communicating the TSR

3.16. At the time the TSR was being arranged, Train 931 was approximately 6 km north of Clinton and 60 km north of the crossing. This meant that a different radio channel was being used to that in the area the signals technicians were working. However, locomotive radios are able to scan all available channels and may still have picked up a radio conversation, had it taken place.

3.17. Had the LEs on board Train 931 heard radio conversations about a TSR being implemented along their journey, they could have taken note of the location and/or contacted train control for further details.

3.18. Instead, the train controller took down the details of the TSR over the phone and annotated the train control graph without informing Train 931.

3.19. KiwiRail's Rail Operating Rules and Procedures, Rule TO10 Network Line Speeds, stated in part:

**5. Temporary Speed Restrictions**

**Competent Worker**

You must impose temporary speed restrictions whenever work or conditions affect track or structures to the extent that the maximum line speed must be reduced.

**Train Controller**

You must:

- tell the Operators of all trains and MTMVs[18] which will pass over the defective line about the restriction until printed advice is provided, and
- record the temporary speed restriction information on the train control diagram and in the Access Provider's Speed Restriction System…

3.20. During interview, the train controller stated that they were waiting for Train 931 to call through Mataura before providing details of the TSR to the LE. This was because the train was still some distance away from the TSR location, and the train controller considered that it would be irrelevant information to the LE at that stage of the journey.

3.21. About 10 minutes after the train controller had completed the call with the signals technician, Train 931 approached red lights at Clinton and the LE sent a selcall to train control. The train controller transmitted over the radio that the lights were coming up and went back to other tasks. This was a missed opportunity to inform the LE of the newly established TSR, instead of waiting for the train to call clear through Mataura in about an hour's time.

3.22. Clause 10 requirements under the TWC rules stated in part:

When Clause 10 of a track warrant specifies that a call is to be made at a location, you must:

- ensure that all rail vehicles are clear of that location, and
- contact the Train Controller and advise the location from where the call is being made, and
- upon acknowledgement from the Train Controller, confirm the location and terminating limit of the track warrant held…

3.23. Mataura is located at 549.92 km MSL and the crossing is 3.9 km south of Mataura at 553.82 km MSL. To ensure a train was clear of a location, it was usual practice for LEs to allow an extra 200 m safety buffer over the known train length before contacting train control to report the train as being clear. Train 931 was 306 m long, and adding an extra 200 m onto the train length meant that the length increased to around 500 m. Consequently, the distance between Mataura and the crossing shortened to 3.4 km. The time for the train to cover this distance travelling at 77 km/h was two minutes and 39 seconds. This did not allow sufficient time for the LE to respond to the TSR information and safely bring the train's speed down to 10 km/h before traversing the crossing.

3.24. Had the LE been informed of the TSR at any stage before Train 931 reached Mataura, they would have had the opportunity to reduce speed to 10 km/h before traversing the crossing.

[18] Mobile Track Maintenance Vehicles are large self-propelled machines that travel along the rail line to conduct maintenance work.

## *Non-contributory factors*

### Individual Train Detection (ITD)

3.25. Both signals technicians were senior 'leading hands' who were used to working in the semi-autonomous environment of the Southland location and had often worked together. Their manager was based in Christchurch and had recently taken over that role.

3.26. The signals technicians had planned to work at a different location that morning, but due to access issues had decided to relocate to the crossing.

3.27. Since the work at the crossing was not planned, it had not been included in the DIB shared with staff working on the MSL. This meant that no one besides the signals technicians was aware of the nature of the work taking place at the crossing, or the reason for the 10 km/h TSR.

3.28. The signals technicians were working under ITD. KiwiRail's Track Safety rule 10.4 (TS10.4) stated in part:

> ***TS10 Individual Train Detection***
>
> **4. Individual Train Detection Safety Check (Mis.70R App)**
>
> **Competent Worker**
>
> When using Individual Train Detection, you must complete the Mis.70R app before encroaching within 2.5 metres from the centre of the nearest running line and produce it when requested.
>
> When one or more of the conditions on the Mis.70R app cannot be complied with, you must not:
>
> - use ITD
> - encroach within 2.5 metres from the centre of the nearest running line unless using an approved protection method.
>
> You must complete a new Mis.70R when:
>
> - your designated safe place is no longer suitable
> - conditions of the completed Mis.70R can no longer be met.
>
> **Note:** Signals Maintenance Representatives carrying out routine inspections and testing of level crossing alarms which involves crossing the railway corridor over the formed roadway or pedestrian pathway, are not required to complete a Mis.70R.

3.29. The signals technicians did not fill out a Mis.70R before commencing the work under ITD, relying on the exception for signals maintenance representatives in the note to TS10.4. However, the exception in the note related to workers carrying out routine inspections and testing of level crossing alarms.

3.30. The work the signals technicians were carrying out was not a routine inspection or testing. Rather, it was maintenance that had the potential to cause the level crossing alarms to fail had there been a mains power cut. The signals technicians had already assessed the risk of this occurring to be high enough to require a 10 km/h TSR.

3.31. While a Mis.70R should have been filled out, ITD was not reliant on a TSR being in place and it is **very unlikely** that non-completion of the Mis.70R contributed to the incident.

### Job Plan Book

3.32. KiwiRail also provided a Job Plan Book for track workers to fill out before commencing work on or near the track. It contained information and prompts to ensure risks had been considered and mitigated before any work commenced. Each plan contained five pages:

- Job Plan Form and Pre-Start Meeting Record
- Work Site Register (form TS90)
- Worksite Plan
- Job Safety & Environment Analysis
- Job Plan Debrief.

3.33. On this occasion, the Job Plan Book was not completed prior to work commencing. The signals technicians had moved to the location at short notice in response to their originally planned location being unavailable.

3.34. As the signals technicians had undertaken a partial risk assessment that resulted in establishing the TSR, it is **very unlikely** that non-completion of the Job Plan Book contributed to the incident.

# 4 Findings
## Ngā kitenga

4.1. Establishing a TSR to mitigate the risk of a level crossing failure should have been recognised by both the signals technician and the train controller as 'essential rail activity'. It therefore should have been discussed and put in place over an open radio channel.

4.2. Had the LEs on board Train 931 heard radio conversations about a TSR being implemented along their journey, they could have taken note of the location and/or contacted train control for further details.

4.3. Had the LEs been informed of the TSR at any stage before Train 931 reached Mataura, there would have been an opportunity to reduce the speed to 10 km/h before traversing the crossing.

4.4. While, under these circumstances, a Mis.70R should have been completed, ITD was not reliant on a TSR being in place. It is **very unlikely** that non-completion contributed to the incident.

4.5. As the signals technicians had undertaken a partial risk assessment that resulted in establishing the TSR, it is **very unlikely** that non-completion of the Job Plan Book contributed to the incident.

# 5 Safety issues and remedial action
## Ngā take haumaru 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.

***Safety issue: Safety-critical information was not shared in time for action to be taken in response to it. This resulted in Train 931 travelling through a worksite with a 10 km/h speed restriction at 77 km/h.***

5.3. Establishing the TSR took place via a phone call between the signals technician and the train controller. There was then a delay in the train controller providing that information to the LE, resulting in Train 931 traversing the crossing near line speed.

5.4. Opportunities were missed to provide the LE with critical information to take action and lower the speed of Train 931.

5.5. KiwiRail has taken safety action to address this issue by reminding personnel of their obligations in adhering to safe working rules and procedures.

5.6. The Commission welcomes this safety action. While a recommendation was not considered necessary for this incident, the Commission notes the limited effectiveness of reminders in relation to safety issues.

# 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, and 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. No new recommendations were issued.

# 7 Other safety lessons
## Ngā akoranga matua

7.1. Compliance with safe working rules and procedures is necessary to protect all workers. Non-compliance can lead to near misses or serious accidents.

# 8 Data summary
## Whakarāpopoto raraunga

### *Vehicle particulars*

| | |
|---|---|
| Train type and number: | Freight train 931 DXC 5287 |
| Classification: | Freight |
| Year of Manufacture: | 1975 |
| Operator: | KiwiRail |

| | |
|---|---|
| ***Date and time*** | 12 January 2025, 1151 |
| ***Location*** | Rayonier Crossing 553.82 km MSL |
| ***Operating crew*** | one instructor LE, one trainee LE<br>one train controller<br>two signals technicians |
| ***Injuries*** | Nil |
| ***Damage*** | Nil |

# 9 Conduct of the inquiry
## Te whakahaere i te pakirehua

9.1. On 14 January 2025, NZ Transport Agency Waka Kotahi 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. Commission investigators attended the site and conducted a site investigation.

9.3. The Commission obtained records and information that included:

- information from involved personnel
- photographic evidence
- train control recordings
- train control graphs
- Mis.88 records
- signal and interlocking diagrams.

9.4. On 30 July 2025, the Commission approved a draft report for circulation to nine interested parties for their comment.

9.5. Two interested parties provided a submission and seven interested parties replied that they had no comment. Any changes as a result of the submission have been included in the final report.

9.6. On 30 October 2025, the Commission approved the final report for publication.

# Abbreviations
## Whakapotonga

| | |
|---|---|
| DIB | daily information bulletin |
| ITD | Individual Train Detection |
| km | kilometre |
| km/h | kilometres per hour |
| LE | locomotive engineer |
| MDF | medium-density fibreboard |
| MSL | Main South Line |
| MTMV | Mobile Track Maintenance Vehicle |
| TSR | Temporary Speed Restriction |
| TWACS | Track Warrant Assisted Computer System |
| TWC | Track Warrant Control |

# Glossary
## Kuputaka

| | |
|---|---|
| Bonding wires | Used to create an electrical connection between two or more conductive parts. They are commonly used in grounding, electrical enclosures and electronic components. |
| Mis.88 | Name of form used by addressees to record details of track warrants |
| Selcall | Selective Call. A function of KiwiRail's radio system that sends an audible alert and caller-identifying information to a train control radio display. When radio traffic is busy this function allows the train controller to prioritise the order of communication and selectively call back as required. |
| Siding | A low-speed track section distinct from a running line or through route such as a main line, branch line or spur. It is used for unloading, loading, storing and reconfiguring trains and wagons. |
| Tranzlog | Name of the data recording system fitted to KiwiRail locomotives |

# 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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| RO-2022-103 | KiwiRail W6 shunt and Metro (Go Bus) Route 60 bus, near miss at Selwyn Street level crossing, Christchurch, 8 August 2022 |
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| RO-2021-106 | Derailment of Train 220, South of Hunterville, 13 December 2021 |

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