Inquiry 11-105: Freight Train 228 wrong-routed, into closed section of track
Wiri Junction, South Auckland, 12 November 2011

Final Report

Rail inquiry 11-105
Freight Train 228 wrong-routed into closed section of track

Wiri Junction, South Auckland
12 November 2011

Approved for publication : December 2013

Transport Accident Investigation Commission

About the Transport Accident Investigation Commission

The Transport Accident Investigation Commission (Commission) is an independent Crown entity responsible for inquiring into maritime, aviation and rail accidents and incidents for New Zealand, and co-ordinating and co-operating with other accident investigation organisations overseas. The principal purpose of its inquiries is to determine the circumstances and causes of occurrences with a view to avoiding similar occurrences in the future. Its purpose is not to ascribe blame to any person or agency or to pursue (or to assist an agency to pursue) criminal, civil or regulatory action against a person or agency. The Commission carries out its purpose by informing members of the transport sector, both domestically and internationally, of the lessons that can be learnt from transport accidents and incidents.

Commissioners

Chief Commissioner	John Marshall, QC
Deputy Chief Commissioner	Helen Cull, QC
Commissioner	Howard Broad, CNZM

Key Commission personnel

Chief Executive	Lois Hutchinson
Chief Investigator of Accidents	Captain Tim Burfoot
Investigator in Charge	Vernon Hoey

Email	inquiries@taic.org.nz
Web	www.taic.org.nz
Telephone	+ 64 4 473 3112 (24 hours) or 0800 188 926
Fax	+ 64 4 499 1510
Address	Level 16, 80 The Terrace, PO Box 10 323, Wellington 6143, New Zealand

Important notes

Nature of the final report

This final report has not been prepared for the purpose of supporting any criminal, civil or regulatory action against any person or agency. The Transport Accident Investigation Commission Act 1990 makes this final report inadmissible as evidence in any proceedings with the exception of a Coroner's inquest.

Ownership of report

Citations and referencing

Information derived from interviews during the Commission's inquiry into the occurrence is not cited in this final report. Documents that would normally be accessible to industry participants only and not discoverable under the Official Information Act 1980 have been referenced as footnotes only. Other documents referred to during the Commission's inquiry that are publicly available are cited.

Photographs, diagrams, pictures

Unless otherwise specified, photographs, diagrams and pictures included in this final report are provided by, and owned by, the Commission.

Train 228 stopped on the closed northbound track at Puhinui

Contents

Figures

Tables

Glossary

block entry board	an operating demarcation point in lieu of a signal that defines the wrong-line-running entrance into, or exit from, a block section that extends between 2 stations equipped for the crossing of trains
compulsory stop boards	a protection system that applied to the open southbound track to ensure that members working on the closed track were clear of the open track when any train was to travel between Papakura and Westfield
control blocking	a method of track protection by holding a signal at "stop" to prevent trains from entering a section of track
northbound track	the left-hand track in direction of travel from Papakura to Westfield. KiwiRail defined the northbound track as the Up main line
person-in-charge	the person designated to take overall charge of track workers and machines on the closed track
rail protection officer	the person designated to ensure safety between train movements on the open track and track workers and machines on the (mostly parallel) closed track
special bulletin	a document detailing train service alterations and planned infrastructure work information. Bulletins are distributed to train controllers, signallers, train drivers and infrastructure maintenance staff
southbound track	the right-hand track in direction of travel from Papakura to Westfield. KiwiRail defined the southbound track as the Down main line
train control	the national train control centre in Wellington, which directs the movement of all trains and authorises all levels of track occupations on the controlled network
Train 228	an overnight northbound express freight service scheduled to run on the North Island Main Trunk from Wellington to Westfield (KiwiRail's principal domestic freight distribution terminal for Auckland)
Wiri/Wiri Junction	a temporary track layout that provided a defined boundary between a new signalling system north of Wiri Junction and an old signalling system south of Wiri. Special instructions were in place for the working of trains over the short distance between the adjoining stations and between the 2 signalling systems

Data summary

Date and time	12 November 2011 at 1213
Location	Wiri Junction, 658.40 kilometres, North Island Main Trunk
Persons involved	KiwiRail train controller and train driver
Injuries	nil
Damage	nil

1. Executive summary

1.1. On Saturday 12 November 2011 major rail infrastructure and maintenance work was underway on the section of track between Papakura and Westfield in South Auckland. One of the 2 tracks was closed for the works (the northbound track). A train controller in the national train control centre in Wellington was managing the flow of trains through the work area using the adjacent southbound track. Metropolitan passenger train services had been cancelled for the weekend to relieve congestion through the work area, but the freight train schedule was maintained.

1.2. At about 1100 freight Train 228 was travelling north from Papakura to Westfield on the adjacent southbound track. The train was operating under an exemption from the train controller to travel in the wrong direction for that track as far as Westfield, a process called "wrong-line-running".

1.3. However, the train controller mistakenly set the route for the train to cross back over to the closed northbound track at Wiri Junction (before Westfield). The train driver did not question the train controller on the apparent change in plan. Around the corner from Wiri Junction, a mobile crane was straddling the northbound track as it worked on removing a pedestrian overbridge. The train crossed over to the closed northbound track, and as it rounded the corner the driver saw the crane blocking the track ahead. He immediately applied the brakes and stopped his train 97 metres from the crane.

1.4. The train controller was supposed to have applied "control blocking" to all signals and/or points where trains could potentially enter the closed work area, but he did not do this. Control blocking the signals/points was a process designed to prevent the train controller inadvertently setting the route for a train to enter the work area.

1.5. The Transport Accident Investigation Commission (Commission) could not identify the reason why the train controller made the errors. However, safety-critical systems should be safeguarded against one person's error resulting in an incident or an accident.

1.6. The Commission identified 3 safety issues that either contributed to, or could have prevented, the incident:

- the KiwiRail rules did not require a cross-check confirmation that appropriate control blocking had been applied to protect the section of track closed for maintenance work
- the train driver was reluctant to, and did not, challenge the train controller when he was given an instruction that he thought was not correct
- the information provided in special work bulletins was not clear.

1.7. KiwiRail immediately addressed the first safety issue. The Commission has made recommendations in previous inquiries which have addressed the other 2 safety issues. These 2 recommendations are still open, awaiting the completion of corrective actions from the NZ Transport Agency and KiwiRail. No new recommendations have been made.

1.8. Key safety lessons arising from this incident include:

- rail work areas must be fully protected from all other rail activities before work begins, and there must be a positive confirmation between train controllers and persons in charge of work areas that the appropriate protections have been put in place
- all rail staff must communicate properly and be prepared to challenge other staff, including perceived and actual superiors, if the plan is not proceeding as they understand it should
- The KiwiRail Visitor Procedure Policy is an appropriate policy to protect the responsibilities of train controllers. KiwiRail should reinforce the importance of compliance with the Visitor Procedure Policy with train control employees.

2. Conduct of the inquiry

2.1. On Monday 14 November 2011 the NZ Transport Agency notified the Commission of the incident under section 13(4) of the Railways Act 2005. The Commission opened an inquiry under section 13(1) of the Transport Accident Investigation Commission Act 1990 to determine the circumstances and causes of the incident, and appointed an investigator-in-charge.

2.2. On 16 and 17 November 2011 the investigator-in-charge travelled to Wiri, Wiri Junction and Puhinui and examined the accident site. He interviewed the train driver and the person in charge of the work sites.

2.3. The train controller was interviewed in Wellington on 18 November 2011.

2.4. The Commission also obtained and reviewed a number of records and documents from KiwiRail including:

- KiwiRail general Rule 24 and track safety Rules 900 to 918 inclusive
- the special bulletin
- the written work permit for the closed track and the wrong-line-running authority for Train 228 issued by the train controller
- training and personnel records, including the results of previous performance assessments for both the train controller and train driver
- the roster, hours of work and operating incident history for both the train controller and the train driver
- data downloads from the train control voice recording system, the event recorder from locomotive DL9066 on Train 228 and the Wiri Junction signalling system. This data was used to determine the sequence of events that occurred prior to and during the movement of Train 228 from Papakura to Puhinui.

2.5. On 23 October 2013 the Commission approved a draft final report on the incident for distribution to interested parties for comment.

2.6. On 17 December 2013 the Commission reviewed the submissions and changes to the draft report were made where appropriate. The Commission approved the final report for publication on the same date.

3. Factual information

3.1. Events before the incident

3.1.1. Significant rail track development and maintenance work had been underway in the Auckland metropolitan (metro) area. The next stage of the work was planned for the weekend of 12 and 13 November 2011.

3.1.2. The planned work meant the closure of the **northbound** rail track from Papakura to Westfield to provide uninterrupted access for machines and workers at several work sites along a 17.5-kilometre section of track. A person-in-charge was delegated to oversee all the work sites on the closed section of track. One of the work sites involved removing an old footbridge at Puhinui station, between Wiri Junction and Westfield. It was necessary for a mobile crane to straddle the northbound track to complete the work.

3.1.3. All north and southbound trains were required to use the **southbound** rail track for the period of the works. All metro passenger trains were cancelled for the weekend to alleviate congestion. The usual freight train schedule was, however, maintained.

3.1.4. The work on the closed northbound track and the special train running and associated protection arrangements for the open southbound track were detailed in a 7-page special bulletin issued by KiwiRail on 10 November 2011 (refer Appendix 1).

3.2. Narrative

3.2.1. The KiwiRail train controller started his shift at the national train control centre in Wellington on 12 November 2011 at 0650. He was controlling trains and authorising track occupations in the Auckland metro area and down as far as Hamilton.

3.2.2. The train controller had been briefed by the outgoing train controller during the change of shift about a work permit that was required to be issued at 0800 to formally close the northbound track from Papakura to Westfield. The train controller acknowledged the closure limits and confirmed that everything would be running on the southbound track.

3.2.3. At 0810 the train controller filled out the work permit document, drew its limits on the train control diagram and issued the permit to the person in charge of the work site. KiwiRail rules governing the work permit process required the train controller to protect the entry points to the closed section of track. However, the rules did not require a confirmation with the person-in-charge that the protection arrangements had been applied.

3.2.4. There were 3 entry points to the closed section of track that required protecting:

- at the Papakura end (within the Papakura signal box area)
- at the Westfield end
- at the 1851 crossover points at Wiri Junction.

3.2.5. The train controller ought to have arranged for the signals to be control blocked at each of the **entry** points to the work area[1]. He did not do this. Instead he arranged control blocking on the signals controlling rail vehicles **leaving** the work area at Papakura and Westfield and did not apply blocking on the 1851 crossover points at Wiri Junction.

3.2.6. At about 1020 the train controller plotted the path for the next northbound freight Train 228 (the freight train) from Papakura to Westfield on the train control diagram. He plotted it travelling from Papakura to Wiri Junction only. From there he intended to route the freight train back to the northbound track, where, unbeknown to the train controller, the crane was straddling the track at Puhinui.

[1] KiwiRail Rule 24, Mis.60 procedures.

3.2.7. The train controller verbally issued a wrong-line-running authority[2] to the signaller at the Papakura signal box. This authority allowed the freight train to enter the southbound track.

3.2.8. At 1053 the train controller changed the setting of the 1851 crossover points at Wiri Junction to route the freight train from the open track to the closed northbound track (see Figure 1).

3.2.9. At 1110 the freight train arrived at Papakura. At 1121 the train controller verbally issued the driver with his copy of the wrong-line-running authority through to Westfield. The driver repeated the authority back to the train controller and a few minutes later the freight train left Papakura and crossed over to the open southbound track.

3.2.10. At 1133 the train controller answered a mobile phone call from a family member. He then left the cubicle and returned 9 minutes later with a group of unauthorised visitors[3].

[2] KiwiRail SWA 01.
[3] It was against KiwiRail policy for unauthorised visitors to enter the train control cubicles.

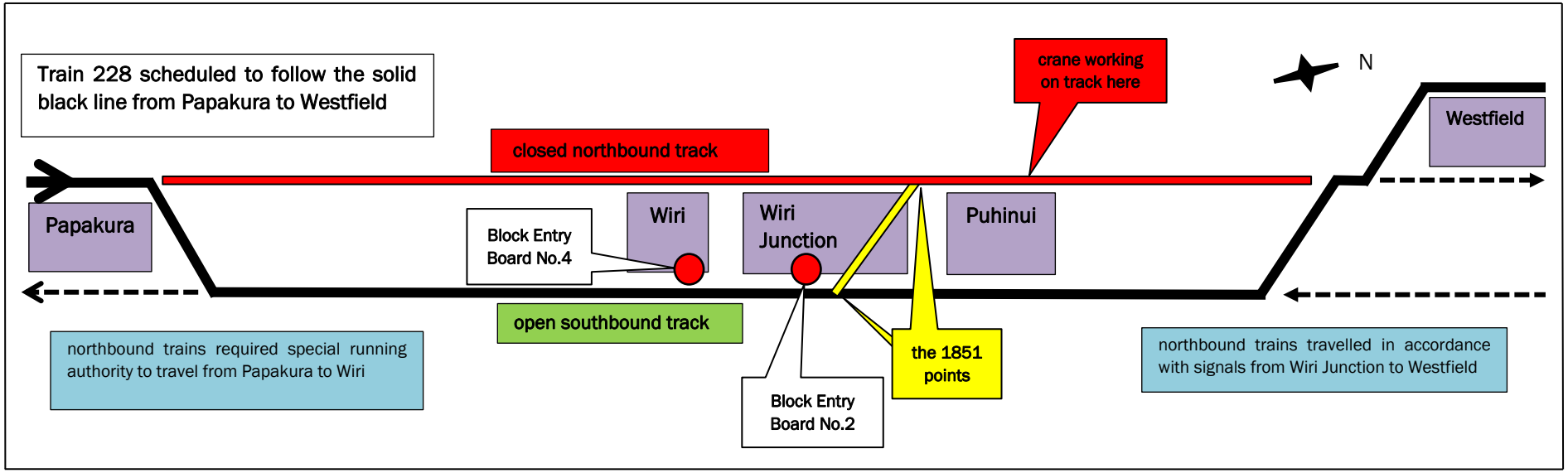

Figure 1
Track layout between Papakura and Westfield (not to scale)

3.2.11. At 1203 the driver stopped his freight train at a red signal at Wiri[4] and called the train controller, asking for permission to pass the signal at "Stop". The train controller granted permission and also gave verbal authority for the driver to pass Block Entry Board No.4[5], which was up ahead. The train controller requested the driver to call him when stopped at Block Entry Board No.2 further ahead at Wiri Junction.

3.2.12. At 1204 the unauthorised visitors left the train control cubicle.

3.2.13. At 1207 the driver stopped his freight train at a compulsory stop board and requested permission from the rail protection officer to pass the board. The board had been placed there to protect the track maintenance workers working on the adjacent closed track, just in case any equipment or personnel were obstructing the open track. The rail protection officer gave the driver permission to pass the compulsory stop board and continue travelling on the southbound track to Westfield.

3.2.14. The freight train moved off and soon arrived at Block Entry Board No.2, where the driver stopped his train and requested the train controller's authority to proceed (see Figure 2). The train controller verbally authorised the freight train driver to pass the board and told him that the route was set for him to travel from the southbound track to the northbound track.

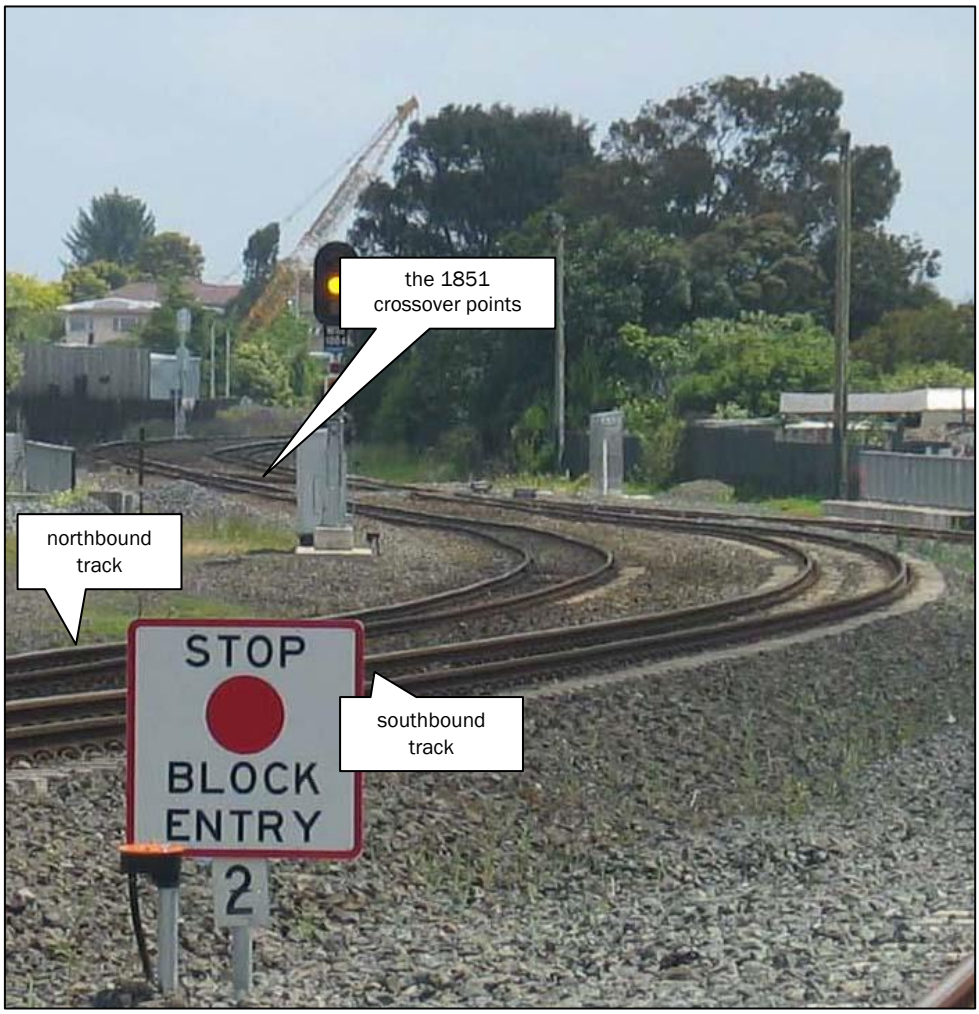

Figure 2
Wiri Junction with a crane working off-track at Puhinui in the background

[4] Signal 21A.
[5] A marker point at which trains running wrong-line are required to stop and obtain specific train control authority.

3.2.15. The driver was surprised by the instruction from the train controller because he understood the northbound track was closed all the way to Westfield and his authority was to travel wrong-line all the way to Westfield. He was expecting to continue along the southbound track. The driver did not challenge the train controller because he believed the train controller had the authority to deviate from the plan.

3.2.16. The freight train moved past Block Entry Board No.2 at 1213 and reached a speed of 23 kilometres per hour through the 1851 crossover points, and onwards to Puhinui on the closed northbound track. A site protector radioed the driver to stop at the same time that he (the driver) saw the crane straddling the track in front of him at Puhinui. He stopped the train at 1216 hours.

3.2.17. The freight train had travelled about 750 metres from Block Entry Board No.2 and stopped 97 metres short of the crane. The driver radioed the train controller to inform him of the incident.

3.2.18. Both the train controller and the freight train driver were relieved of their duties pending an internal KiwiRail investigation.

3.3. Personnel information

3.3.1. Both the train controller and train driver were experienced in their respective roles. Both were appropriately qualified and held current licences to operate. Following the incident both underwent post-incident drug and alcohol testing. Both returned negative results.

3.3.2. The following table shows the hours worked by the train controller and train driver during the week leading up to the incident:

Table 1: Hours worked by train controller and train driver in week before incident

Date: November	Train controller's hours worked	Train driver's hours worked
Sunday 6	off duty	off duty
Monday 7	0640 to 1450	off duty
Tuesday 8	0640 to 1450	0001 to 0845
Wednesday 9	0640 to 1450	0001 to 0845
Thursday 10	0640 to 1450	off duty
Friday 11	off duty	0220 to 1145
Saturday 12	0650 to 1900	0220 to 1145

The previous weeks' rosters for both the train controller and train driver were unremarkable.

4. Analysis

4.1. Introduction

4.1.1. The train controller made errors that resulted in his wrong-routing the freight train from the open southbound track across to the closed northbound track, which was obstructed by the mobile crane.

4.1.2. Transport systems should be designed to mitigate the risk of human error. Human error is not something that can be totally eliminated.

4.1.3. In this case the train controller's errors could have been detected if in the first instance he had used control blocking of the signals that protected the closed section of track, and in the second instance if he had been required to cross-check with the person-in-charge that control blocking was in place.

4.1.4. The train driver also had the opportunity to avert the incident. He was aware that his train should have been continuing to Westfield on the southbound track, but he did not voice his concern to the train controller when the train controller told him that the route ahead had been set for his train to cross back onto the northbound track.

4.1.5. The following analysis discusses the reasons for the train controller's errors, and raises 3 safety issues:

- the KiwiRail rules did not require a cross-check confirmation that appropriate blocking had been applied to protect the section of track closed for maintenance work
- the train driver was reluctant to, and did not, challenge the train controller when he was given an instruction that he thought was not correct
- the information provided in special work bulletins was not clear.

4.2. What happened

4.2.1. The handover between the 2 train controllers was uneventful and the track closure/wrong-line-running detail was acknowledged verbally during the process. The train controller was made fully aware during the handover that the work area on the northbound track extended from Papakura to Westfield.

4.2.2. KiwiRail procedures for train control stated that before starting duty each train controller must read and understand all bulletins, instructions and information relevant to the shift. The train controllers were to show that they had done this by signing the train control diagram when they took over the shift[6]. The train controller signed the train control diagram when he accepted the shift. At that time the work area extending from Papakura to Westfield had already been marked in coloured pencil on the train control diagram.

4.2.3. When the train controller issued the permit[7] closing the section of the northbound track between Papakura and Westfield, he correctly marked in pen the limits on the train control diagram, as he was required to do. This was 2 hours and 20 minutes before he marked the intended route for the freight train up to Wiri Junction only.

[6] KiwiRail procedures for Train Control, Section 3.0 Duties of train controllers.
[7] Rule 24, Mis.60 procedures.

4.2.4. At some time during that 2 hours and 20 minutes the train controller developed a mind-set that the work area and closed section of track ended at Wiri Junction, instead of Westfield. The train controller mentioned that he had been on duty during a similar major work occupation the previous weekend. On that occasion the work area ended at Wiri Junction. It is possible that this could have influenced his thinking on the day. Nevertheless, had he been monitoring his train control diagram as he was required to do, he would have seen that the closure extended to Westfield on this occasion.

4.2.5. The special work bulletin covering the work closure also referred to Westfield as the northern limit of the work area. However, it was not clearly expressed and required interpretation by the reader to establish the overall limits. This safety issue is discussed in a following section.

4.2.6. The Commission considered whether the unauthorised visitors in train control could have been a distracting influence. The train controller had already made preparations for the freight train to re-join the closed track at Wiri Junction before receiving the unauthorised visitors in the train control cubicle. Their presence therefore is unlikely to have influenced his thinking that the work area extended only as far as Wiri Junction.

4.2.7. However, the visitors were present while he was authorising the freight train to pass signals and block entry boards shortly before informing the driver that his train was routed across to the closed track at Wiri Junction. Their presence could have prevented him from conducting a final check of the train control diagram before authorising the final movement. Regardless of their influence on the incident, it is of concern that family and members of the public were allowed to visit train control contrary to company rules.

4.3. Protection of work area – Control blocking

Safety issue: KiwiRail's general rule for track closure permits did not require a cross-check confirmation between a train controller and a person in charge of a work site that control blocking protection for the work area had been applied.

4.3.1. KiwiRail's rules require train controllers to protect against rail vehicles inadvertently entering a work area when a track closure permit is issued. Rule 24 stated in part that:

> Train control must arrange for signals at the entrance to the affected section to be held at Stop during the period the permit is in operation. If the panel is a computer based system, a control tag must be entered for the signal or station concerned.

4.3.2. For some reason the controller did not apply blocking to any of the signals controlling **entry** to the work area. Instead he applied blocking on the 2 signals controlling the **exit** from the work area at Papakura and Westfield. This meant that protection was applied to prevent vehicles within the work area from leaving at these 2 points, but not against trains entering the work area.

4.3.3. The third entry point at Wiri Junction was not protected either way. This failure to apply any kind of blocking to the points at Wiri Junction would normally be consistent with a mind-set that the work area only extended as far as Wiri Junction. However, at the same time that the train controller should have applied control blocking at Wiri Junction, he had applied control blocking at Westfield, albeit in the wrong direction. The train controller was at a loss to explain these lapses.

4.3.4. The KiwiRail "900 series of track protection rules" had been revised in November 2008 to include the requirement for the persons in charge of smaller work areas to cross-check with train control that the signals protecting their work area had been blocked. The 900 series of rules was typically used for smaller work areas that were within the local Channel one radio coverage.

4.3.5. However, Rule 24 outlined protection arrangements for larger work areas like the one involved in this incident. It had not been revised in the same way. Consequently, there was no requirement for the person in charge of the work area between Papakura and Westfield, and the train controller, to confirm that the required signals/points had been blocked. This was a serious oversight.

4.3.6. The oversight meant that an error made by one person (the train controller) went undetected for more than 2 hours until the incident occurred. Following this incident KiwiRail immediately amended Rule 24 to require the same cross-check required of the 900 series of rules (refer to Safety actions section of this report).

Findings:

1. The potential collision between the freight train and a mobile crane was the result of the train controller making 2 errors:
    - he thought that the limits of the work area and closed section of track extended only as far as Wiri Junction because he did not check his train control diagram
    - he did not apply the required control blocking to signals preventing trains from entering the work area.
2. The train controller's errors went unnoticed for more than 2 hours because KiwiRail's rules for track closure permits did not require the person-in-charge to confirm with the train controller that control blocking had been applied to protect the work area.

4.4. Crew resource management

Safety issue: The train driver did not challenge the train controller when told by him that his train was routed to cross over onto what he had known was a section of track closed for maintenance work.

4.4.1. KiwiRail described its crew resource management practices as "using available staff within a group involved with a specific task or operation to improve safety. A safe and efficient operation is one where all participants (the crew) are aware of the plan and then use all available resources to execute it safely and efficiently". Plans can and do change, which should not be an issue as long as those involved are aware of the change.

4.4.2. In this case the plan was described in the special bulletin. The train controller, the people involved in protecting the work area and the train driver all read and understood the operating arrangements around the work area. There were no changes to that original plan.

4.4.3. The train driver said later that he was "alarmed" when he was told by the train controller that the route had been set for his train to cross over to the northbound track at Wiri Junction. He was alarmed because he was expecting to continue on the open southbound track to Westfield, which had just been verified by the rail protection officer 5 minutes beforehand, when he had stopped his train at the compulsory stop board.

4.4.4. The driver later said that he did not challenge the train controller because he knew him to be a senior and experienced controller who had authority to amend the plan. A challenge at that point could well have influenced the train controller to check his train control diagram and other documents. The potential collision would have been averted.

4.4.5. The Commission has been alerting the rail industry for several years about the need to fully embrace and promote the concept of crew resource management, including good communication, as a means of improving safety across the rail industry.

4.4.6. The most recent was on 28 March 2012, when the Commission made a recommendation[8] to the Chief Executive of the NZ Transport Agency that the National Rail System Standard executive develop standards to ensure that all rail participants meet a consistently high level of crew resource management and communication that includes the use of standard rail phraseology. A standard has yet to be developed. Consequently the safety recommendation still has an open status at the time this report was published.

Finding:

3. The train driver had the opportunity to avert the potential collision between his train and the mobile crane by challenging the train controller's information that the route was set for his train to cross over to the northbound track (to enter the closed work area).

4.5. Presentation of bulletins

Safety issue: The special bulletin outlining the plan for the major infrastructure and maintenance work did not present information to maintenance and operational staff in a clear and logical format.

4.5.1. KiwiRail defined a bulletin, including special bulletins, as a document containing supplementary information to documented rules and regulations, such as some of its track safety rules in this instance.

4.5.2. KiwiRail had standards for the format, content, layout and the inclusion or otherwise of information in bulletins. KiwiRail stated that bulletins must be clearly set out, readily understood and not over-padded with information already contained in rules and regulations.

4.5.3. This special bulletin contained a lot of information for several different stakeholders:

- track maintenance staff (including maintenance vehicle operators and contractors)
- work site protection staff
- train controllers
- train drivers.

4.5.4. The instructions were not intuitive for train drivers and train controllers. The train driver said that he had to read the special bulletin several times before he understood how his train would be affected because information relevant to train operations between Papakura and Westfield "was not all together; was across several pages; and didn't flow".

4.5.5. For the train controller the information related to the wrong-line-running of trains between Papakura and Westfield was contained on several pages. The relevant instructions were on the bottom of page 2 and the top of page 4 (highlighted in Appendix 1). Information specific to signalling arrangements at Wiri and Wiri Junction was repeated 4 times on the first 4 pages of the bulletin. Without careful reading, it would be feasible for a train controller to mistake the limits of the work area as Wiri rather than Westfield.

4.5.6. In such cases it would be helpful to have a section dedicated to each of the stakeholders to avoid any confusion or ambiguity.

[8] Commission report 11-101 Papakura-Wiri, Recommendation 002/12.

4.5.7. On 5 September 2011 risk and safety management solution consultants produced a report that KiwiRail had commissioned on the matter of rail construction, safety and efficiency. The consultancy report concluded by recommending that KiwiRail reviews and updates the processes and technology used in preparing and distributing the bulletins issued by the network control centre in Wellington.

4.5.8. On 26 October 2012 the Commission made a recommendation to the Chief Executive of the NZ Transport Agency in its Tamaki rail inquiry[9] report that he ensures bulletins that convey critical information to rail participants are presented in a clear and unambiguous way.

4.5.9. The NZ Transport Agency accepted the recommendation. Joint KiwiRail and NZ Transport Agency meetings held during 2013 acknowledged that there was "a lot of information given out to staff that don't need it (such as train drivers) and it is important that information is targeted to the audience".

4.5.10. Following this incident KiwiRail took some safety action with its bulletin processes (refer to Safety actions section of this report). At the time of publication of this report the Commission's recommendation still had an "open" status.

Finding:

4. The special bulletin outlining the plan for the major infrastructure and maintenance work did not present information to maintenance and operational staff in a clear and logical format.

[9] Commission report 10-101, Tamaki, Recommendation 024/12.

5. Findings

5.1. The potential collision between the freight train and a mobile crane was the result of the train controller making 2 errors:

- he thought that the limits of the work area and closed section of track extended only as far as Wiri Junction because he did not check his train control diagram
- he did not apply the required control blocking to signals preventing trains from entering the work area.

5.2. The train controller's errors went unnoticed for more than 2 hours because KiwiRail's rules for track closure permits did not require the person-in-charge to confirm with the train controller that control blocking had been applied to protect the work area.

5.3. The train driver had the opportunity to avert the potential collision between his train and the mobile crane by challenging the train controller's information that the route was set for his train to cross over to the northbound track (to enter the closed work area).

5.4. The special bulletin outlining the plan for the major infrastructure and maintenance work did not present information to maintenance and operational staff in a clear and logical format.

6. Safety lessons

6.1. Rail work areas must be fully protected from all other rail activities before work begins, and there must be a positive confirmation between train controllers and persons in charge of work areas that the appropriate protections have been put in place.

6.2. All rail staff must communicate properly and be prepared to challenge other staff, including perceived and actual superiors, if the plan is not proceeding as they understand it should.

6.3. The KiwiRail Visitor Procedure Policy is an appropriate policy to protect the responsibilities of train controllers. KiwiRail should reinforce the importance of compliance with the Visitor Procedure Policy with train control employees.

7. Safety actions

General

7.1. The Commission classifies safety actions by 2 types:

(a) safety actions taken by the regulator or an operator to address safety issues identified by the Commission during an inquiry that would otherwise result in the Commission issuing a recommendation

(b) safety actions taken by the regulator or an operator to address other safety issues that would not normally result in the Commission issuing a recommendation.

Safety actions addressing safety issues identified during an inquiry

7.2. On 14 May 2013 KiwiRail advised that the following safety actions had been taken as a result of the incident:

- bulletins covering major work events are issued [by limited distribution] in a draft format 10 days in advance of the planned work occurring. Bulletins covering major work in the Auckland metro area are subjected to a conference call between key operating managers prior to the bulletins being finalised. Final bulletins are issued 3 days in advance of the planned work occurring to ensure the information is available in sufficient time for members to become familiar with the content. Preparatory work for the writing up of documentation in train control is now done by train controllers on previous shifts in readiness for the work occurring
- a "Safe Working Procedures for Major Work Areas" booklet, issued on 23 December 2011, requires the implementation of a secondary protection level. The booklet contains the following instruction:

  Points within the work area – securing of points during planned work

  - When planning protection, a risk assessment must be carried out to identify which points are required to be secured from movement by either:
    - Securing the points machines in accordance with a special instruction
    - Control tags being applied by the Signaller
  - When establishing protection for the work area, the rail protection officer must ensure that the points identified in the risk assessment have either been secured or the train controller has applied the control tags.
  - Before moving the points, the train controller must obtain permission of the rail protection officer.
- a full upgrade of the signalling system at Wiri/Wiri Junction was commissioned during October 2012. This action removed the temporary signalling arrangements and also the 2 block entry boards
- KiwiRail advised that in the time between the incident and the compilation of the report no further significant unauthorised train movements have occurred at Wiri, with either the old or new signalling systems.

7.3. On 28 May 2013 KiwiRail said that all bulletins are now displayed on the company's intranet website. Limited access to the website is available for some users with mobile connectivity, and online access is available for most contractors.

Safety actions addressing other safety issues

7.5. On 14 May 2013 KiwiRail advised that the following safety actions had been taken as a result of the incident:

- train control diagram conventions were updated for the plotting of wrong-line-running movements in [old] double line automatic signalling systems and reverse direction running in [new] automatic signalling areas.

8. Recommendations

General

8.1. The Commission may issue, or give notice of, recommendations to any person or organisation that it considers the most appropriate to address the identified safety issues, depending on whether these safety issues are applicable to a single operator only or to the wider transport sector.

Recommendations

8.2. There are no recommendations.

9. References

KiwiRail Q011 Rail Operating Rules and Procedures dated 10 June 2010.

KiwiRail Safe Working Procedures for Major Work Areas (trial) dated 23 December 2011.

"Impact Risk and Safety Management Solutions" report titled Rail Construction Safety and Efficiency Report for KiwiRail dated 5 September 2011.

Commission report 10-101: wrong route setting, high speed transit through turnout, near miss and signal passed at danger, Tamaki, 13 August 2010.

Commission report 11-101: wrong line running irregularity, leading to potential head-on collision, Papakura-Wiri, 14 January 2011.

Appendix 1: Special bulletin No.959

Special Bulletin No.**959**
10 November 2011 Page 1 of 7

KiwiRail

Network Operations
Wellington

(7 pages covering operations from 0300 hours on Saturday 12 to 2000 hours Sunday 13 November 2011)
The following work mentioned herein will be undertaken on the days specified.

Saturday 12 November 2011
Sunday 13 November 2011
Papakura – Westfield – Auckland – Newmarket – Waitakere

Extra Trains:

Train id	Depart	at	Arrive	at	Special Provisions
B01	Otahuhu	0645	Papakura	0725	Via Orakei, Sat, Sun
B02	Papakura	1850	Otahuhu	1920	Via Orakei, Sat, Sun

Special Instructions:

B01 and B02, empty passenger service. B01, forms the service of No.201. B02 formed by the service of No.200.
No.201 and 200, Saturday and Sunday will not run between Auckland and Papakura. Replaced by buses.

Introduction
The following pages detail the operational and protection arrangements for the planned track work and signalling activity between Papakura and Waitakere (All lines).

Sections of line will be closed progressively from the morning of Saturday 12 November 2011 in the following sections (refer to following pages for specific limits):

From 0300 Sat to 1800 Sun	Mis 60 Zone B	Westfield – Auckland, Auckland – Newmarket, Penrose – Waitakere, Onehunga Branch
From 0800 Sat to 2000 Sun	Mis 60 Zone A	Papakura - Westfield

To enable the work mentioned herein to be carried out the following arrangements will apply:-

Refer to the following S&I Diagrams:-
No.2965 for Papakura, No.2983 for Wiri, No.2995 for Westfield, No.2966 for Tamaki, No.2988 for Auckland, No.2994 for Penrose, No.2975 for Onehunga – Te Papapa, No.2957 for Newmarket, No.2989 for Morningside, No.2953 for Avondale – Henderson and No.2979 for Swanson - Waitakere.

For Veolia train arrangements refer to following pages.

KiwiRail

Papakura – Westfield – Auckland – Newmarket – Waitakere – cont'd

Papakura - Westfield: Mis 60, Zone A

Protected Work Area		Rule	Work Details
Papakura	Papakura	**908** Blocking / **914** Mobile Track Maintenance Vehicle	**Multiple Activities: Rule 910** • Protection of staff • Track maintenance • Tamper 201 & Regulator 417, (Sun) 0800 - 1800, Sat, Sun N.Amani 021 243 3423
43, signal Papakura Up line	1604ABC, signal, Westfield Up line	**24** **Mis.60** / **914** Mobile Track Maintenance Vehicle ***Zone A***	**Multiple Activities: Rule 910** • Puhinui watermain & pedestrian bridge • Track maintenance • Drainage • Hilor & Invensys work • Turnout installments • Tamper 201 & Regulator 417 0800, Sat to 2000, Sun M.Thomson, 021 243 3996

Automatic Signalling Papakura and Wiri:
During the above hours, Papakura signal panel will be switched in.
Staff will **not** be in attendance at Wiri.

Signalling and Interlocking Wiri – Wiri Junction:
No's 5, 6 and 20 points will be secured in the normal position.
After a certificate has been received that the points have been secured, Train Control may authorise Down movements past 4 and 3ABC signals.
ASR Rules 601a and 602 are modified accordingly.

Multi Line Running of Trains, Wiri Junction - Westfield
Up trains will run via the Down line between Wiri Junction and Westfield.

KiwiRail

Papakura – Westfield – Auckland – Newmarket – Waitakere – cont'd

Papakura - Westfield: Zone A; cont'd

Protected Work Area		Rule	Work Details
657.60 km Wiri Down line	647.15 km (3A, 3B, 3C, 3DE, 3F signals) Papakura All lines	**905** Compulsory Stop Protection	**Multiple Activities: Rule 910** • Protection of staff 0800 to 2000, Sat and Sun 021 243 3423 Call sign: **Oscar Golf**
Caution – Rules 905 (c) & 907 (b) applies. No Advanced / Inner Warning Board(s) exiting West and East Loops, West Road and West and East Sidings Papakura. Up Compulsory Stop Boards are erected at 3A, 3B, 3C, 3DE and 3F signals Papakura. Safety Buffer Zone reduced. **Automatic Signalling Papakura and Wiri:** During the above hours, Papakura signal panel will be switched in. Staff will **not** be in attendance at Wiri. **Signalling and Interlocking Wiri – Wiri Junction:** No's 5 and 20 points will be secured in the normal position. Train Control may authorise Up movements past 21A, signal, Block Entry Board No.4 and Block Entry Board No.2. ASR Rules 601a and 602 are modified accordingly.			
663.91 km (1637AR signal) Westfield Down line	657.60 km Wiri Down line	**905** Compulsory Stop Protection	**Multiple Activities: Rule 910** • Protection of staff 0800 to 2000, Sat and Sun 021 243 0846 Call sign: **Delta Alpha**
Caution – Rules 905 (c) & 907 (b) applies. No Advanced / Inner Warning Board(s) exiting No's 1 and 2 South Arrival / Departure Roads and 3,4,5 Roads, Otahuhu." **Automatic Signalling Wiri:** Staff will **not** be in attendance at Wiri. **Signalling and Interlocking Wiri – Wiri Junction:** No's 5 and 20 points will be secured in the normal position. Train Control may authorise Up movements past 21A, signal, Block Entry Board No.4 and Block Entry Board No.2. ASR Rules 601a and 602 are modified accordingly.			

Papakura – Westfield – Auckland – Newmarket – Waitakere – cont'd

Papakura - Westfield: Zone A; cont'd

Protected Work Area		Rule	Work Details
Papakura Down line	Wiri Junction Down line	**601** Authorisation – Block Sections	Wrong Line running of Up trains via the Down line 0800, Sat to 2000, Sun

Signalling and Interlocking Wiri – Wiri Junction:
No's 5 and 20 points will be secured in the normal position.
After a certificate has been received that the points have been secured, Train Control may authorise Up movements past 21A, signal, Block Entry Board No.4 and Block Entry Board No.2. ASR Rules 601a and 602 are modified accordingly.. Clause 6 of SWA 01 authority will not be required once this certificate is received.

Additional SWA 01 Instruction:
Train Control may authorise the passing of signals at Wiri by issuing the following instruction in clause 8 of the SWA 01 authority:
"Stop train at 21A, signal, Block Entry Board No.4 and Block Entry Board No.2, Wiri, then continue at restricted speed to the next fixed signal".

Westfield:

Protected Work Area		Rule	Work Details
Westfield	Westfield	**908** Blocking	**Multiple Activities: Rule 910** • Protect contractors piling for footbridge replacement 0800 – 2000, Sat, Sun M.Thomson, 021 243 3996

Westfield – Penrose

Protected Work Area		Rule	Work Details
Westfield	Penrose	**908** Blocking	**Multiple Activities: Rule 910** • Protect contractors 0800, Sat to 2000, Sun R.Takimoana, 021 566 684

KiwiRail

Papakura – Westfield – Auckland – Newmarket – Waitakere – cont'd

Westfield – Auckland (NIMT)
Penrose - Newmarket – Waitakere, Newmarket – Auckland: Mis 60 Zone B

Westfield (NIMT) 1535ABC, signal Up line Westfield 1533ABC, signal Down line Westfield	**Auckland** Termination Britomart Platforms All lines	**24** **Mis.60** **/ 914** Mobile Track Maintenance Vehicle **Zone B**	**Multiple Activities: Rule 910** • AEP work • Commisioning • EM80 faults • Graffiti • Drainage • Track maintenance • Hilor • Invensys • Removal of power lines • Track slew • Bridge work • Tamper 201 & Regulator 417 0300, Sat to 1800, Sun R.Takimoana, 021 566 684
Penrose 305ABC, signal Up line 303ABC, signal Down line Penrose	**Waitakere** 8LABC, signal Waitakere		
Onehunga Branch	Onehunga Branch		
Auckland – Newmarket Line	Auckland – Newmarket Line		

Level Crossing Alarms, Glenview Road
During the hours of work the level crossing alarms at Glenview Road level crossing may be placed on manual operation.

Level Crossings: Metcalfe Road and Christian Road
During the hours of work the level crossing alarms at Metcalfe Road level crossing at 29.50km and Christian Road level crossing at 32.36km will be disconnected.

Speed Over Disconnected Level Crossings, Metcalfe Road and Christian Road:
The movement of Mobile Track Maintenance Vehicles over the above level crossings will be in accordance with Rule 914 (c).
Speed restriction information will **not** be entered in Amicus.
Speed boards will **not** be erected. Rule 912 and Instruction 17, Section 10.2, Rail Operating Rules & Procedures are modified accordingly.

Certificate: On completion of work the Signals member in charge must give a certificate to Train Control that the above level crossing alarms have been restored to normal operation.

Papakura - Westfield – Auckland - Newmarket – Waitakere – cont'd

A single Mis.60 will be issued to cover all lines between between Westfield - Auckland Station limits (Strand – Quay Park Junction – Britomart Platforms), Auckland – Newmarket Line, Onehunga Branch and between Penrose and Waitakere, Saturday and Sunday.

Communications Network Testing:
Between the hours of 2300, Saturday and 0500, Sunday, Invensys Rail will carry out communication network system testing as required and as arranged with Signaller, Auckland Signal Panel / Train Control. Testing may affect "Westcad" panels.
Level Crossing Alarms
During the above hours, level crossing alarms within the respective testing areas may be placed on manual operation as arranged between Signals member in charge and Train Control.
Certificate: On completion of work the Signals member in charge must give a certificate to Train Control that the respective level crossing alarms have been restored to normal operation.
Signals member in charge, C.Draper, 0275 012 871 / N.Burton, 0276 695 869.

Note, Signalpanel, Papakura may be unattended during the Mis 60 operations, provided the signals protecting the work have been tagged and/or collared in accordance with Rule 24 and Train Control has been advised.

Vehicles Stabled on Main Line:
Maintenance vehicles may be left unattended on the main line at the work sites within the Mis.60 area between Newmarket and Waitakere provided they are secured against movement in accordance with instructions issued by the Area Manager, KiwiRail Network.

Certificates Required:

Location	For	Day & Date	By Time	Received
Wiri	No's 5, 6 & 20 points secured at Normal	Sat 12/11	0800	
Wiri	No's 5, 6 & 20 points restored to normal operation	Sun 13/11	2000	
Henderson - Swanson	Metcalfe Road and Christian Road Level crossings restored to normal operation	Sun 13/11	1800	

KiwiRail

Papakura - Westfield – Auckland - Newmarket – Waitakere – cont'd

Veolia Train Arrangements:

Saturday

Nos. 1077, 5260, 5263, 5265, 5387, 9156 and 9157 will run.
All other Veolia services scheduled to run on Saturday 12 November 2011 are cancelled.
Buses will replace trains on the Network on this day.

Sunday

All Veolia services scheduled to run on Sunday 13 November are cancelled.
Trains will be replaced by buses.

Network Authorities Specialist

Recent railway occurrence reports published by the Transport Accident Investigation Commission (most recent at top of list)

R0-2013-108	Near collision between 2 metro passenger trains, Wellington, 9 September 2013
11-106	Hi-rail vehicle nearly struck by passenger train, Crown Road level crossing near Paerata, North Island Main Trunk, 28 November 2011
11-102	Track occupation irregularity, leading to near head-on collision, Staircase-Craigieburn, 13 April 2011
R0-2013-104	Urgent Recommendations: Derailment of metro passenger Train 8219, Wellington, 20 May 2013
11-103	Track workers nearly struck by passenger train, near Paekakariki, North Island Main Trunk, 25 August 2011
10-101	wrong route setting, high-speed transit through turnout, near miss and SPAD (signal passed at danger), Tamaki, 13 August 2010
11-104	Freight Train 261 collision with bus, Beach Road level crossing, Paekakariki, 31 October 2011
10-102	collision between 2 metro passenger trains, after one struck a landslide and derailed between Plimmerton and Pukerua Bay, North Island Main Trunk, 30 September 2010
07-102	(incorporating inquiry 07-111) freight train mainline derailments, various locations on the national network, from 6 March 2007 to 1 October 2009
11-101	Wrong line running irregularity, leading to a potential head-on collision, Papakura - Wiri, 14 January 2011
08-102	Metro passenger train derailment, Sylvia Park, 14 April 2008 (incorporating inquiries 08-104 and 08-107) Diesel motor fires on board metro passenger trains, 3 June 2008 and 25 July 2008
08-111	Express freight Train 524, derailment, near Puketutu, North Island Main Trunk, 3 October 2008
08-112	Safe working irregularity resulting in a collision and derailment at Cass Station on the Midland line, 8 November 2008
09-102	Passenger fatality after falling between platform and passenger Train 8125, Newmarket West station, 1 July 2009
08-109	Passenger express Train 9113, platform overrun resulting in signal passed at danger, Fruitvale Road Station, North Auckland Line, 4 September 2008
07-114	Derailment caused by a wheel-bearing failure, Huntly, 19 October 2007, and 11 subsequent wheel-bearing failures at various locations during the following 12 month period

Price $15.00

ISSN 1178-4164 (Print)
ISSN 1179-9102 (Online)