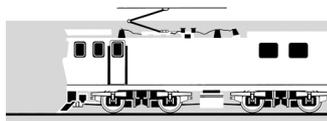
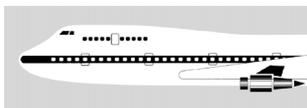


RAILWAY OCCURRENCE REPORT

05-112

hi-rail vehicle passenger express Train 200, track occupancy
incident, near Taumarunui

7 March 2005



The Transport Accident Investigation Commission is an independent Crown entity established to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future. Accordingly it is inappropriate that reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

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Report 05-112

hi-rail vehicle and passenger express Train 200

track occupancy incident

near Taumarunui

7 March 2005

Abstract

On Monday 7 March 2005 at about 1651, the Wellington to Auckland *Overlander* passenger express Train 200 departed from Taumarunui and entered the section ahead. At about 1658 the locomotive engineer was required to stop his train when he became aware of a hi-rail vehicle on the track in front of him.

The hi-rail vehicle operator had been given authority to travel by rail from Owhango to Signal 4R at Okahukura. However he off-tracked en route and travelled part of the journey by road. Unknown to the hi-rail vehicle operator he overtook Train 200 at Taumarunui and when he on-tracked at a level crossing north of Taumarunui, he did so in front of Train 200.

Safety issues identified were:

- the speed of the hi-rail vehicle while on-track between Owhango and Manunui
- the rules relating to off-tracking a hi-rail vehicle within an authorised track occupation.

One safety recommendation was made to the Chief Executive of ONTRACK.

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Abbreviations

CTC	Centralised Traffic Control
HRV	hi-rail vehicle
km	kilometre(s)
km/h	kilometres per hour
M	metre(s)
t	tonne(s)
Toll Rail	Toll NZ Consolidated Limited
Transfield	Transfield Infrastructure Services Limited
UTC	coordinated universal time

Data Summary

Train type and number:	hi-rail vehicle and passenger express Train 200
Date and time:	7 March 2005 at about 1658 ¹
Location:	near Taumarunui
Persons on board:	train crew: 3 train passengers: 85 HRV crew: 1
Injuries:	nil
Damage:	nil
Infrastructure provider:	New Zealand Railways Corporation (ONTRACK)
Operator:	Toll NZ Consolidate Limited (Toll Rail)
Investigator-in-charge:	D L Bevin

¹ Times in this report are New Zealand Daylight Standard (UTC+13 hours) and are expressed in the 24-hour mode.

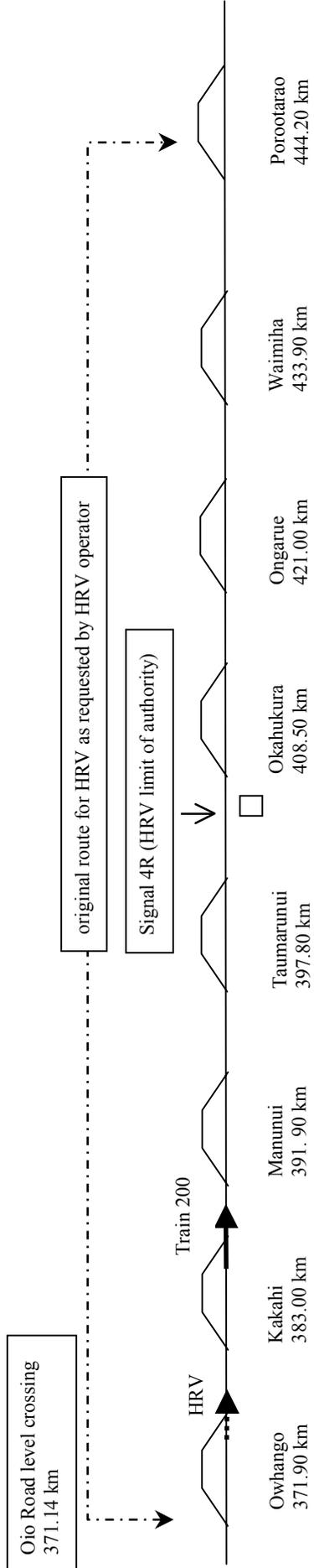


Figure 1
Relationship of Train 200 to HRV at 1625
 (not to scale)

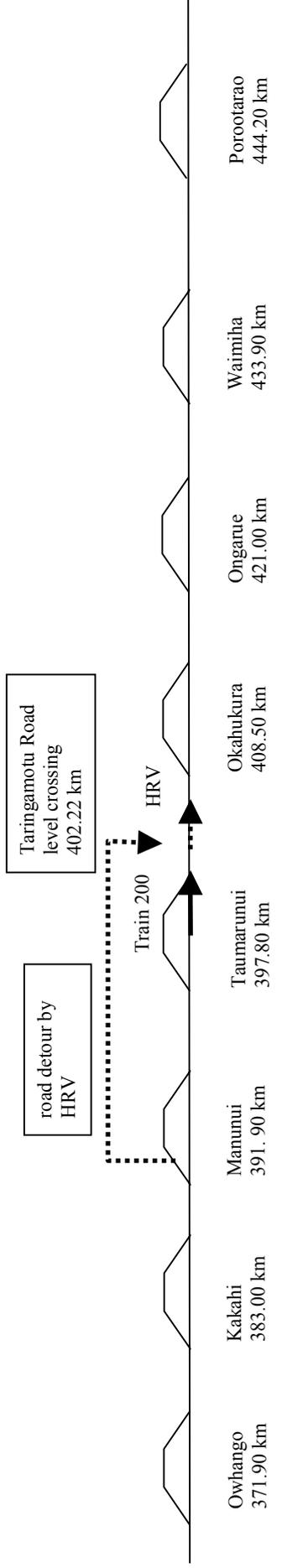


Figure 2
Relationship of Train 200 to HRV at 1658
 (not to scale)

1 Factual Information

1.1 Narrative

- 1.1.1 On Monday 7 March 2005, Train 200 was the northbound Wellington to Auckland *Overlander* passenger express. It consisted of DCP class locomotive 4611, 5 passenger carriages and a luggage van for a gross weight of 180 t and a total length of 120 m.
- 1.1.2 Train 200 was crewed by a locomotive engineer, a train manager and one train attendant, and was carrying 85 passengers. The train arrived at Taumarunui at about 1635 and departed at 1651 after the completion of passenger work at the station.
- 1.1.3 On the same day, at about 1625, a ganger radioed train control from Owhango, about 26 km south of Taumarunui, and requested authority to travel by hi-rail vehicle (HRV) north to Porootarao, a distance of about 72 km to carry out a special hot-weather track inspection (see Figure 1).
- 1.1.4 The train controller authorised the ganger to travel as far as Signal 4R only, at the south end of Okahukura, and he was given until 1715 to be clear at that location. The ganger was instructed to call train control on arrival at Signal 4R, for authority to continue on.
- 1.1.5 The ganger on-tracked his HRV but experienced some minor difficulties with the hi-rail equipment. He stopped at Manunui, about 6 km south of Taumarunui, to check the equipment then decided to off-track and travel by road to his depot in Taumarunui to collect some lubricant to free up the mechanism.
- 1.1.6 After calling at his depot, he continued north by road to Taringamotu Road level crossing between Taumarunui and Okahukura (see Figure 2) where he on-tracked his HRV. He had just started to move when he noticed Train 200 approaching from behind so he stopped.
- 1.1.7 He radioed the locomotive engineer and arranged to return to the level crossing and off-track while Train 200 passed. After the train had passed, he on-tracked and continued to Signal 4R at Okahukura from where he radioed train control for authority to continue to Porootarao. The train controller gave authority for him to continue.
- 1.1.8 Once the ganger got to an area of better cellphone coverage he rang the train controller and advised what had happened. He was told to continue but before he reached Porootarao he was contacted by his manager and told to off-track, which he did at Ongarue.

1.2 Locomotive event recorder

- 1.2.1 Train handling was not considered to have contributed to this incident so the locomotive event recorder data was not requested for analysis.

1.3 Timekeeping Train 200

- 1.3.1 Train 200 was scheduled to arrive in Taumarunui at 1620 and depart at 1622, allowing time for passengers to alight and board the train.
- 1.3.2 On this day, Train 200 was running behind schedule, arriving in Taumarunui 15 minutes late at 1635. The actual stop-over time was 16 minutes, 14 minutes longer than scheduled, and Train 200 departed Taumarunui 29 minutes behind schedule at 1651.

1.4 Special inspections

- 1.4.1 ONTRACKs Track Code required a special inspection to be carried out when rail temperatures were high, creating the possibility of track buckles.

- 1.4.2 Track that was at risk was identified on special bulletins and subjected to temporary speed restrictions as prescribed in rules documentation when the rail trigger temperature was exceeded.
- 1.4.3 Rail temperatures were measured by rail temperature sensors fitted to the track and monitored in the train control centre. If rail temperatures exceeded pre-determined levels, the sensor was activated and the train controller imposed a speed restriction of 40 km/h for passenger trains through the affected area. The train controller then arranged for Transfield Infrastructure Services Limited² (Transfield) staff to be notified and for the track to be inspected.
- 1.4.4 There was one rail temperature sensor between Kakahi and Porootarao, at 404.90 km between Taumarunui and Okahukura and another at Puketutu, about 27 km north of Porootarao.

1.5 Track occupancy rules and procedures

- 1.5.1 In the Centralised Traffic Control (CTC) operating system, where fixed signals were controlled by a signalman (train controller), the track occupancy process was designed around the principle of holding signals at stop (blocking) to prevent opposing or following train movements from conflicting with HRV movements. The purpose was to give track authority to HRVs at the exclusion of any other movements.
- 1.5.2 Track occupancy rules allowed for HRV users to vacate the track when required to work around on-track worksites. In such cases, the train controller would give information to the HRV user regarding the location of relevant worksites enroute, and the type of protection in effect, at the time of authorising the movement.
- 1.5.3 While it was accepted that train movement information could be of value to the HRV user, it was not part of the track occupation authorisation process under the CTC operating system. However, the HRV user was at liberty to request such information to assist with planning his track occupancy.
- 1.5.4 Track occupancy request details included the name and location of the caller, the limits of the occupation being requested and the nature of the work being undertaken. Once these had been established, the authorisation process required the train controller to:
- plot the movement on the train control graph
 - execute required protection or safety buffer as provided for in the relevant track occupancy rules, for example in CTC institute signal blocking
 - give the correct time
 - authorise the occupancy in accordance with the relevant track occupancy rules.
- 1.5.5 Before a track occupation was authorised the train controller was required to establish positively whether there was any potential conflict with other existing occupations. If there was such a conflict, the person requesting the track occupation was advised so that arrangements could be made to pass safely through the area concerned.
- 1.5.6 Track occupancy protection rules required that the person in charge of a track occupation must advise train control when they were clear of the track to enable signal blocking to be released. In this context an HRV movement was considered a track occupation.

² Transfield Infrastructure Services Limited was the infrastructure maintenance service provider to ONTRACK.

1.6 Personnel

Ganger

- 1.6.1 The ganger had been employed in track-related duties with Transfield and its predecessors for about 30 years. He was responsible for the maintenance of, and special inspections on, 83 km of track between Owhango and Kopaki. He had been dealing with train control for track occupations, including track inspections, for about 29 years.
- 1.6.2 On Monday 7 March 2005, he was notified that the heat sensors in his area had activated. At 1625 he called train control from Owhango and requested permission to on-track and undertake a special inspection through to Porootarao. He said the train controller, who he thought was a trainee, had authorised him to travel to Signal 4R at Okahukura only and to be off track by 1715.
- 1.6.3 The ganger said that the maximum authorised speed for HRVs on track was 50 km/h but this reduced to 30 km/h when inclement weather or other conditions could impact on the braking capabilities of the vehicle. The ganger said that on the day of the incident the driving conditions were good and, because he knew the track, he had probably exceeded the authorised speed limit as he travelled from Owhango to Manunui.
- 1.6.4 He off-tracked at Manunui and travelled by road to Taumarunui where he called briefly to his depot to collect the lubricant before he continued by road to Taringamotu Road level crossing. The ganger said he had not seen Train 200 pass through before he on-tracked at Owhango, and had not seen the train at the station at Taumarunui as he drove past. He had noticed track maintenance machinery stabled on tracks in the yard between the road and the station platform and these had obstructed his view, but he was driving so could not really take his eyes off the road.
- 1.6.5 On arrival at Taringamotu Road level crossing, the ganger had on-tracked his HRV and then lubricated the hi-rail equipment on the vehicle. The start of a 40 km/h heat restricted speed section was about 200 m south of where he on-tracked so he planned to reverse to that spot and then run forward through the section as part of his inspection.
- 1.6.6 He had just started to reverse when he saw in his rear vision mirror Train 200 approaching so he stopped his vehicle. After talking to the locomotive engineer he moved forward and off-tracked so Train 200 could pass, after which he continued his inspection.
- 1.6.7 The ganger said that he had not been advised by train control of the presence of Train 200 ahead of him when he had made his initial request to on-track at Owhango. Had he known this, he said he would probably have made a check call to train control for an update before he had on-tracked at Taringamotu Road level crossing.
- 1.6.8 Although the Puketutu rail temperature sensor was located outside his area of responsibility he usually responded to the sensor's alerts because of its close proximity to his track section.
- 1.6.9 The ganger said that he had always believed that once he was permitted to on-track, the section for which he was authorised was his for the agreed time. He therefore saw no problem with off-tracking en route and going to his depot and then returning to his authorised track occupation and on-tracking again without consulting with train control. However, he said it was unusual for him to leave the track once he had received authority for on-track time, although sometimes it was necessary to enable him to get around work sites en route. In these cases, he would call the person in charge at the work site and act on his instructions.

Train controllers

- 1.6.10 There were 2 train controllers on duty on the Central North Island train control desk³ at the time of the incident. The first, TC1, had 7 months experience as a train controller on the East Coast Main Trunk desk and was in training on the Central North Island desk under the supervision of TC2 who had been a train controller for 7 years and had been certified to operate the Central North Island desk for about 5 years.

Train controller 1 (TC1)

- 1.6.11 TC1 had been operating the desk when the ganger radioed from Owhango. TC1 could not remember the time but recalled that the ganger had requested permission to travel by rail through to Porootarao, and because Train 200 was at Taumarunui at the time had authorised the ganger to travel only to Signal 4R at Okahukura⁴.
- 1.6.12 TC1 said that the ganger had not been told that Train 200 was ahead of him because it was so far ahead. However, when he contacted TC1 from Signal 4R at Okahukura, the ganger had said that Train 200 was now ahead of him and he requested a new authority to continue on-track to Porootarao.
- 1.6.13 The train controller thought the ganger's comment was strange as Train 200 had always been ahead of him. However, his request for additional time on track was approved and both train controllers were unaware of any incident until the network control manager came to discuss with them a reported near miss between Train 200 and an HRV.
- 1.6.14 TC1 later found out that the ganger had off-tracked en route, run around Train 200 by road and on-tracked again in front of it. TC1 said that neither the ganger nor the locomotive engineer of Train 200 had advised train control directly of what had happened.

Train controller 2 (TC2)

- 1.6.15 TC2 said that the ganger had not been authorised to proceed beyond Signal 4R at Okahukura when he originally requested track occupation because of the number of track occupations in effect north of Okahukura at that time.
- 1.6.16 TC2 said that once the ganger was authorised to travel to Signal 4R at Okahukura, he never thought anything other than that the ganger would proceed on-track all the way. He had experienced track users vacating the track en route during their authorised time, but they had always advised him of this and he had never had, nor heard of, a situation where anyone vacating the track had on-tracked again at a different location within the authorised track occupation, without first contacting train control.
- 1.6.17 TC2 said that changes to the track occupancy rules had removed the requirement for train controllers to advise track occupancy applicants of the presence of trains within the area. However, it was generally accepted amongst train controllers that if a train was in the immediate vicinity at the time, its location would be given.
- 1.6.18 TC2 said he was confused when the network control manager talked of a near miss between the HRV and Train 200, because the HRV had always been behind Train 200. He said that he considered that if the ganger decided to off-track en route, he had changed from what was originally authorised, and TC2 would have expected the ganger to contact train control and advise of the change.

³ The Central North Island desk was responsible for train movements between Whangarei and Otiria on the North Auckland Line, Hamilton and Marton on the NIMT and the Stratford to Okahukura Line.

⁴ The train control diagram showed that Train 200 was still 10 minutes away from Taumarunui when the train controller received the call from the ganger.

Locomotive engineer Train 200

- 1.6.19 The locomotive engineer had been employed by Toll Rail and its predecessors for 26 years. He had been a locomotive engineer for 21 years, 16 of those as a grade 1 locomotive engineer. He had driven Train 201, the Auckland to Wellington southbound *Overlander* passenger express, from his home depot of Hamilton to Ohakune, where he had changed over to Train 200.
- 1.6.20 He was aware that 40 km/h speed restrictions were in effect as he travelled between Owhango and Taumarunui on Train 200, and he heard on his radio the ganger requesting time on-track for a special inspection. The train controller had authorised the request and the locomotive engineer was aware that the ganger was following his train.
- 1.6.21 The locomotive engineer said he thought that Train 200 had stopped at Taumarunui for between 5 and 10 minutes before he departed on proceed signals, thinking that the HRV was still behind him.
- 1.6.22 He said that about 3 km north of Taumarunui, his train rounded a limited visibility curve and he saw an HRV on the track in front of him. He was travelling at about 40 km/h because of the temporary speed restriction, which he considered had enabled him to stop clear of the HRV.
- 1.6.23 The ganger then contacted him by radio and said he believed he had on-track time to Okahukura and requested the locomotive engineer to follow him. However, the locomotive engineer suggested instead that the HRV off-track again at Taringamotu Road level crossing and allow Train 200 to pass.
- 1.6.24 After the HRV had off-tracked, Train 200 passed and continued north.

Technical manager track and structures

- 1.6.25 Transfield's Technical Manager Track and Structures (the manager) said that following the incident there had been a meeting among area co-ordinators⁵. At that meeting, concern was expressed that the ganger had not been informed of the presence of Train 200 ahead of him. It was felt that this created a potential risk in that the HRV could have run into the back of the train.
- 1.6.26 The meeting confirmed that the ganger's actions in leaving the track and later rejoining it while still within his authorised track occupation time, and without consulting the train controller, was not contrary to rules that were current at the time.
- 1.6.27 The manager had arranged a separate telephone conference call involving track inspectors from around the country, the subject of which was off-tracking and on-tracking again while still within the authorised track occupation time. He said the general consensus was that this would usually only happen when a HRV encountered a conditional stop protection work site en route requiring the HRV to off-track and detour around the site before on-tracking at another location. Such movements were usually undertaken under the direction and authority of the person in charge of the work site, rather than the train controller.
- 1.6.28 The manager expressed concerns about the limited amount of information given by train controllers to track users regarding train movements. He also felt there was reluctance among gangers to seek more information from train controllers. He likened this to a hierarchical structure where the gangers may feel uncomfortable questioning train controllers.

⁵ The area coordinator was responsible for the day-to-day management of work teams responsible for infrastructure engineering services.

2 Analysis

- 2.1 At the time the ganger radioed train control for authority to on-track at Owhango, Train 200 was about 20 minutes and 18 km ahead of him. Even though Train 200 was running at reduced speed as a result of the blanket 40 km/h speed restriction, the train controller would not have expected the HRV to catch up, and the decision not to provide information regarding the train to the ganger was probably understandable. Also, at the time the ganger was authorised to on-track at Owhango, TC1 would not have been expecting Train 200 to stop at Taumarunui for an extended time, which thereby increased the opportunity for the HRV to catch up. TC1 was also not expecting the HRV to off-track and travel part of the distance by road.
- 2.2 There was no requirement for TC1 to provide information to the ganger relating to train movements in the area at the time, other than those which might be in conflict. The safety defence for track occupancy in the CTC operating system was blocking or holding the signals at stop to prevent opposing or following train movements from conflicting with track occupations such as HRV runs. This defence had been applied by the train controller and confirmed with the ganger at the time the track occupation was authorised and there was therefore no chance of any other train or HRV entering the track occupation. However, the HRV was following Train 200 and, although not expected to, caught up with and passed Train 200.
- 2.3 The potential value of train movement information to HRV users was acknowledged by the track occupancy process, which provided for a HRV user to request such information to assist with planning of the track occupancy. If the ganger had requested this information he would have been aware of Train 200 ahead of him at the time he on-tracked, even though it was a significant distance ahead. It was therefore likely that he would have remembered the presence of Train 200 and enquired about its progress before he on-tracked at the level crossing. There was anecdotal evidence that in many cases track users were reticent about requesting train movement information when requesting on-track authorisation from train control. A safety recommendation reinforcing this responsibility has been made to the to the Chief Executive of ONTRACK.
- 2.4 Had the ganger not exceeded the maximum authorised on-track speed⁶ and continued on to Taumarunui by rail, instead of off-tracking at Manunui, he would have arrived at Taumarunui at about 1658, some 7 minutes after Train 200 had departed. The HRV would then not have caught up to Train 200 before it cleared Okahukura, which was the limit of the ganger's initial on-track authority.
- 2.5 Alternatively, at the restricted speed of 40 km/h, Train 200 would have taken about 7 minutes to travel the 4.5 km from Taumarunui to Taringamotu Road level crossing and would have cleared the level crossing at about 1658⁷. Had the ganger maintained the maximum authorised speed he would have off-tracked at Manunui and continued on by road at about 1651, the same time as Train 200 was departing Taumarunui. The HRV would then have arrived at Taringamotu Road level crossing at about 1703, some 5 minutes after Train 200 had cleared, and again would not have caught the train before it cleared Okahukura.
- 2.6 Had the ganger maintained the maximum authorised on-track speed he would probably not have caught up with Train 200 at Taumarunui. That he did so suggested that he had probably exceeded the authorised speed between Owhango and Manunui. This, together with the extended stop of Train 200 at Taumarunui, meant he not only caught up with the train but he actually passed it while it was at Taumarunui, although he did not see it because he was travelling by road. He then arrived at Taringamotu Road level crossing at about 1655, 3 minutes ahead of the train and long enough for him to have on-tracked and lubricated the hi-rail equipment before the train arrived.

⁶ Calculations regarding speed and time are based on the HRV maintaining the maximum authorised on-track speed of 50 km/h and do not include an allowance for deceleration and /or acceleration where appropriate.

⁷ The train control diagram confirmed that Train 200 had cleared Okahukura, about 7 km further north, at 1710.

- 2.7 Regardless of the HRVs speed, if Train 200 had not made an extended stop at Taumarunui, the HRV could not have caught it. However, unexpected delays are part of railway operations and, although the extended stop of Train 200 at Taumarunui enabled the HRV to catch up and pass, the delay did not, in itself, contribute to the incident.
- 2.8 Train 200 was probably at the platform at Taumarunui when the ganger passed. As he was concentrating on driving his vehicle on the road, and track maintenance machines berthed in the rail yard obscured his view, it was not surprising that he had not seen Train 200. He was unaware of the presence of Train 200 so would not have been looking for it, and it would therefore not have featured in his plans when he on-tracked at the level crossing to continue on to Okahukura.
- 2.9 The requirement for track staff to notify train control once they had off-tracked was ambiguous and open to interpretation. While the majority of track staff and train controllers spoken to during the investigation were of the opinion that except when working around work sites the requirement applied every time track staff off-tracked, the requirement could also be interpreted to mean the final off-tracking at or near the time limit of the track occupation. However, ONTRACK acknowledged this possibility by issuing Semi-permanent Bulletin 292 dated 29 April 2005 to clarify the situation. In view of this no safety recommendation covering this issue has been made.

3 Findings

Findings are listed in order of development and not in order of priority.

- 3.1 The ganger caught and passed Train 200 because the HRV had travelled in excess of the maximum authorised speed between Owhango and Manunui.
- 3.2 The ganger was unaware of the presence of Train 200 until it arrived at Taringamotu Road level crossing after he had on-tracked his HRV.
- 3.3 The extended stop of Train 200 at Taumarunui did not in itself contribute to the incident but, together with the excessive speed of the HRV, and the fact that the HRV operator had off-tracked, allowed it to overtake the train.
- 3.4 The train controller was not required to provide the HRV operator with train movement information when authorising his track occupation and, given the distance that Train 200 was ahead, could reasonably have expected that there was no possibility of a conflict between the train and the HRV.
- 3.5 The actions of the train controller did not contribute to the incident.
- 3.6 The potential for a collision was reduced because Train 200 was probably not exceeding the 40 km/h temporary speed restriction that was in force.
- 3.7 Train 200 was being correctly handled at the time of the incident and the actions of the locomotive engineer did not contribute to the incident.
- 3.8 The requirement for personnel off-tracking to notify train control was ambiguous and the ganger interpreted that requirement to mean when off-tracking at the end of the track occupancy authorisation.
- 3.9 There may be reluctance on the part of some intending track users to request train movement information from train controllers to assist with planning their track occupations.

4 Safety Actions

- 4.1 Following the incident ONTRACK promulgated a new rule, Rule 916 (n) and distributed it by Semi-permanent Bulletin No 292 dated 29 April 2005. The rule stated that:

Should a hi-rail vehicle “off track” within the authorised occupation limits or before the authorised time has expired, the driver must NOT again occupy the line within the authorised limits until further authority has been obtained from train control.

5 Safety Recommendation

- 5.1 On 12 December 2005 it was recommended to the Chief Executive of ONTRACK that he:

reinforce with track users that they request relevant train movement information from the train controller when seeking on-track authorisation, where this information would assist them with the planning of their track occupation (112/05).

- 5.2 On 20 December 2005 the Chief Operating Officer of ONTRACK replied in part:

ONTRACK accepts this recommendation. This should be implemented by the second quarter of 2006.

Approved on 16 December 2005 for publication

Hon W P Jeffries
Chief Commissioner



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