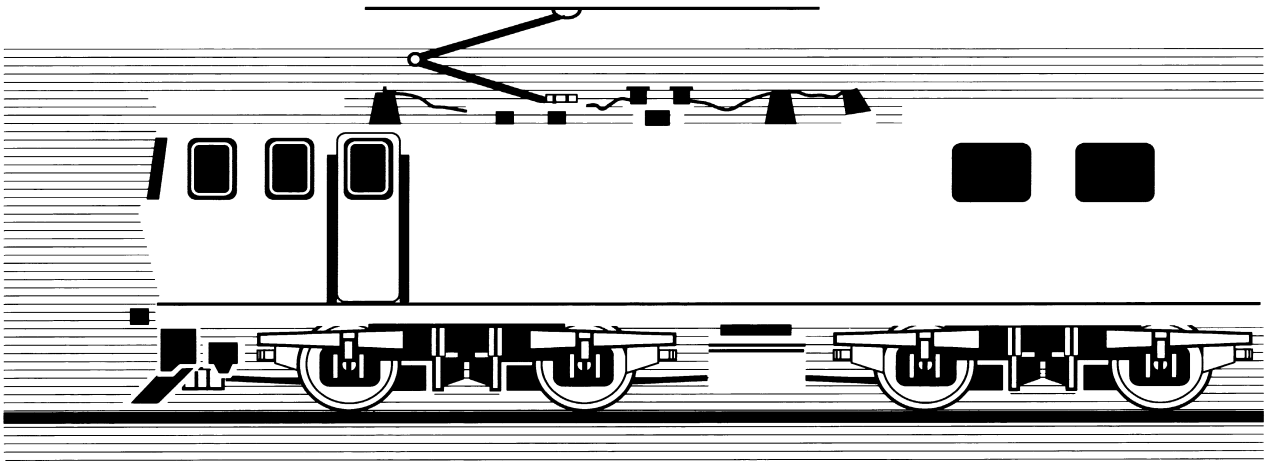
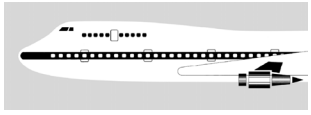
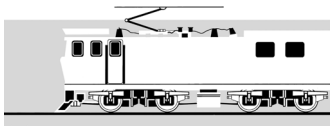


RAILWAY OCCURRENCE REPORT

03-103	hi-rail vehicle and express freight Train 142, track occupancy irregularity, Amokura	10 February 2003


TRANSPORT ACCIDENT INVESTIGATION COMMISSION
NEW ZEALAND

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.

The Commission may make recommendations to improve transport safety. The cost of implementing any recommendation must always be balanced against its benefits. Such analysis is a matter for the regulator and the industry.

Report 03-103

hi-rail vehicle and express freight Train 142

track occupancy irregularity

Amokura

10 February 2003

Abstract

On Monday 10 February 2003, at about 1305, train control authorised northbound express freight Train 142 to depart Te Kauwhata and enter a single line section of track, into which an opposing hi-rail vehicle movement had been authorised about 30 minutes earlier, thereby creating the potential for a head-on collision.

The safety issues identified included:

- the training and certification of new entrant train controllers on additional train control desks soon after their initial certification
- the lack of a structured process for area familiarisation prior to certification on a train control desk
- the manning of the Auckland train control desk by unqualified staff
- the train controller not applying adequate safety measures to protect a hi-rail vehicle movement
- the train controller not using, nor being required to use, signal "blocking commands" as a defence against authorising a train to enter a section into which a hi-rail vehicle was authorised to enter.

The mandatory use of signal blocking commands, previously recommended by the Commission, has now been implemented.

One safety recommendation addressing the issue of supervision of train controllers in training was made to the operator.

Contents

Figures

Abbreviations

CTC	centralised traffic control
ECMT	East Coast Main Trunk
HRV	hi-rail vehicle
km	kilometre(s)
NIMT	North Island Main Trunk
TCO	train control operator
Tranz Rail	Tranz Rail Limited
UTC	coordinated universal time
VDU	visual display unit

Data Summary

Rail service vehicles and number:	hi-rail vehicle and express freight Train 142
Date and time:	10 February 2003 at about 1305[1]
Location:	Amokura
Persons on board:	train : 1 hi-rail vehicle: 2
Injuries:	train : nil hi-rail vehicle: nil
Damage:	nil
Operator:	Tranz Rail Limited (Tranz Rail)
Investigator-in-charge:	D L Bevin

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

1 Factual Information

1.1 Narrative

1.1.1 On Monday 10 February 2003 at about 1245 a track maintainer called train control and requested authority for his hi-rail vehicle (HRV) to travel from Pukekohe to Te Kauwhata, to carry out a heat patrol[2], and to be clear at 1345. The patrol required the HRV to travel on the down main line from Pukekohe to Amokura, then through the single line section to Te Kauwhata.

1.1.2 The track maintainer said train control would usually give authority only to go as far as Amokura, from where he would receive new authority before entering the single line section. However, on this occasion the train controller-in-training (the train controller) who took the call gave him permission to continue through to Te Kauwhata as requested and the track maintainer, accompanied by a track ganger, on-tracked and departed from Pukekohe.

1.1.3 The track gang was delayed by work required enroute and realised they would not be clear at Te Kauwhata by 1345 as planned. The track ganger decided to call train control when they arrived at Amokura, about 13 kms from Te Kauwhata, to request more time on track to complete their patrol.

1.1.4 At about 1335, while the HRV was still 2 kms from Amokura, they saw Train 142, a Huntly to Mission Bush express freight loaded coal train, approaching them on the up main line. This surprised them, as they had not been told of any train movements by the train controller when they had requested time on-track at Pukekohe and believed that they had been authorised to travel to Te Kauwhata, including through the single line section. The train and HRV passed without incident in the double line section.

1.1.5 When the HRV arrived at Amokura No 3 points on the down main line were set in the derailing position (refer 1.2.4), so the ganger contacted train control by mobile telephone and advised of having passed an unexpected train on the up main line and that he had understood that his HRV had authority to travel all the way to Te Kauwhata. He then requested additional time on track to allow completion of their work, and that No 3 points be set for the down main line so they could enter the single line section and continue on to Te Kauwhata.

1.1.6 The train controller and his supervisor were removed from duty following the incident.

1.2 Site and signalling information

1.2.1 The North Island Main Trunk (NIMT) from Pukekohe to Amokura was double line and controlled by double line signalling.

1.2.2 The track from Amokura to Te Kauwhata was single line with a crossing loop at Whangamarino, about halfway between Amokura and Te Kauwhata (see Figure 1). The signalling through this section was remotely controlled from the train control centre in Wellington by computerised centralised traffic control (CTC). From a visual display unit (VDU) on the desk, the train controller could see points and signal indications and monitor the progress of trains as they passed through the section.

[2] A special track inspection undertaken when rail temperatures are high and there is a likelihood of track buckles.

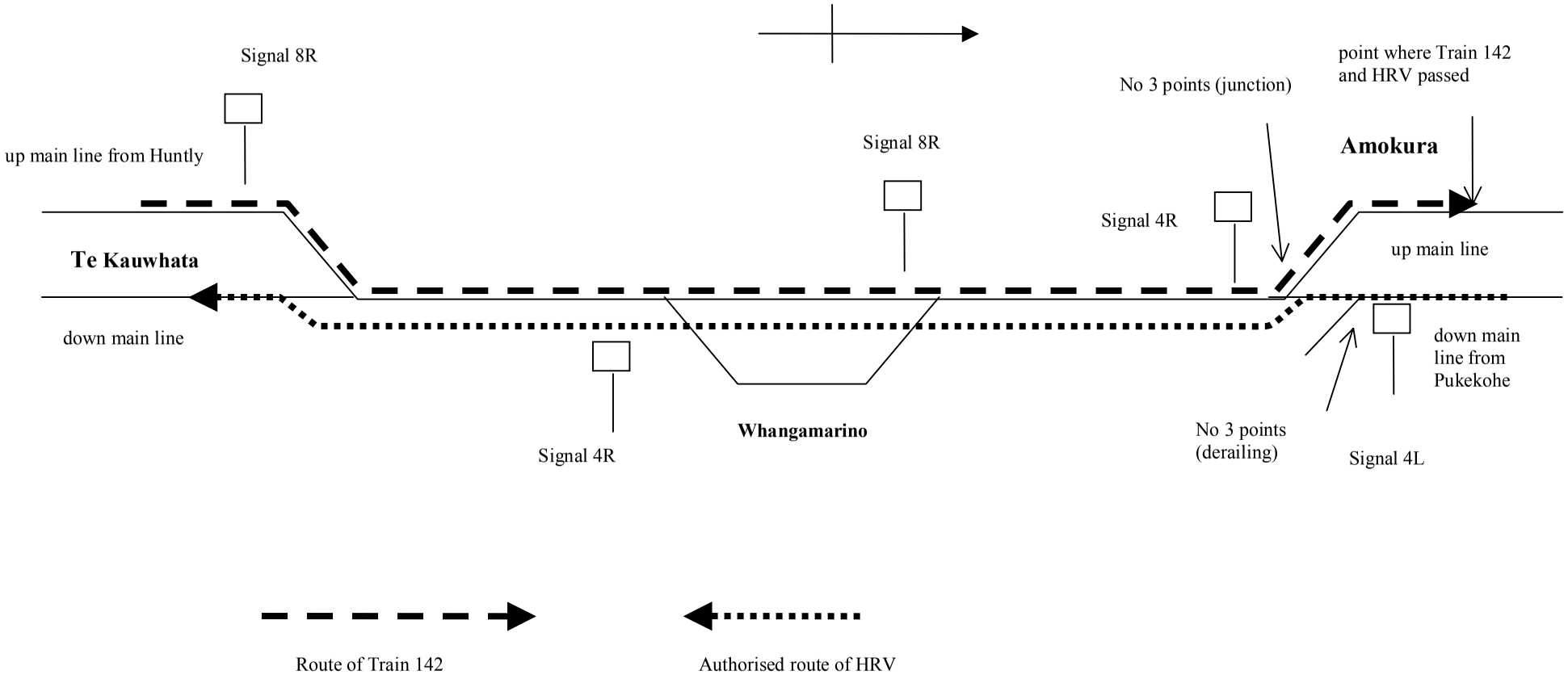


Figure 1
Track and signalling layout Amokura to Te Kauwhata (not to scale)

1.2.3 HRVs were insulated so did not activate either track circuits or signal indications and were not visible on the VDU. However, northbound trains approaching Te Kauwhata on the up main line became visible on the VDU about one km south of Te Kauwhata and there was a similar approach distance for southbound trains approaching Amokura on the down main line. Apart from this, the double line was not generally monitored on the VDU.

1.2.4 No 3 points at Amokura consisted of 2 sets of points, which worked in conjunction with each other. One set was at the junction of the single and double lines and controlled entry to and exit from the single line section. The second set was a derailing set positioned about 100 metres north of the junction on the down main line as a protection against unauthorised traffic entering the single line section. If a southbound rail service vehicle passed through Amokura while these points were set in reverse it was diverted from the down main line and would derail before it reached the junction with the single line section.

1.3 Personnel

The ganger

1.3.1 The ganger had about 30 years' experience in track maintenance activities. His responsibilities covered the NIMT from Papakura to Te Kauwhata as well as the Mission Bush Branch from Paerata to Mission Bush. He confirmed that when track workers requested track occupancy covering both the double line and single line sections, train controllers normally authorised the movement only to the boundary stations, Amokura or Te Kauwhata, and requested a second call for authority to enter the single line section.

1.3.2 The ganger was not sure when train control had set No 3 points against their HRV for the passage of Train 142 on to the up main line. They were running late when they arrived at Amokura but the route was still set for Train 142, even though they had passed Train 142 in the double line area. Had they been on time at Amokura they would have found the points set against them and would have had to call train control as they could not have got past No 3 derailing points.

The track maintainer

1.3.3 The track maintainer had about 3 years' track maintenance experience. He said that when he requested time on-track, the train controller had not advised him of any planned train movements.

The train controller

1.3.4 The train controller commenced training on the Auckland desk on 21 January 2003 and was about 4 weeks into his training. At the time of the incident he had not had a field trip to the area as part of his training.

1.3.5 At about 1240, when the train controller took the call from the track maintainer at Pukekohe, he plotted a line on the train control diagram to show the planned progress of the HRV movement to Te Kauwhata.

1.3.6 At about 1305 he received a call from the locomotive engineer of Train 142 at Huntly, saying his train was ready to depart. The train controller plotted the anticipated path of Train 142 on his diagram and noticed that the plot line intercepted that of the opposing HRV between Amokura and Te Kauwhata. However, he thought that where the lines crossed was in the double line section and, as he believed that the HRV was on the down main line and Train 142 was on the up main line, he did not recognise the potential conflict.

1.3.7 Following the incident, the train controller said that he was satisfied that once he had set the points for the passage of Train 142 through Amokura there was no way the opposing HRV could have encroached on to the single line section. By setting No 3 points for the up main line,

the set of points on the down main line operated in conjunction and went to the derailing position which put in place a defence against any conflict.

1.3.8 The train controller said that the major difference between the ECMT desk, on which he had last worked, and the Auckland desk was the double line operation. He had taken some time to get used to that, especially to become comfortable with intersecting plot lines for opposing movements on the respective main lines. However, he was starting to get comfortable with this and took confidence from the fact that most requests for track movements between Amokura and Te Kauwhata included the words "through the single line". On this occasion he said the track maintainer had requested the movement on the down main line from Pukekohe to Te Kauwhata, which he plotted. When he plotted a line for Train 142 and saw that it crossed the line for the HRV movement, he was satisfied that each would be on their respective main line.

1.3.9 Following the incident it was brought to his attention that it was the practice of the train controllers working the Auckland desk not to allow track movements between double line areas and the single line section without a call prior to entering and again when leaving the single line section.

Supervision of the train controller

1.3.10 The train controller tutor who had been rostered with the train controller-in-training on the day of the incident had reported in sick, and there were no other staff available to fulfil the tutor role. Rather than amalgamate the desk with another and have the train controller lose a day's training, the train control manager decided to sit with him to provide supervision during the shift.

1.3.11 The train control manager discussed the situation with the train controller and both were comfortable with the proposed arrangements and, being a Monday, the workload was lighter than usual. The train control manager said he was there primarily to supervise the train controller and not to provide any tutoring.

1.3.12 The train control manager had considerable train control experience. He had started in the Auckland train control office in 1975 and had worked in train control offices in Taihape, Te Kuiti and Wanganui before he finished as a train controller in 1986 and moved to Wellington. He had not been recertified on the Auckland train control desk since 1975.

1.3.13 When the track maintainer requested to travel on the down main line from Pukekohe to Te Kauwhata, it did not register with the train control manager that the last part of the journey would be through the single line section. He had been following other operating activities concerning the signal box at Pukekohe at the time and felt these may have distracted him.

1.3.14 When the train control manager became aware that Train 142 was ready to depart Huntly he referred to the train control diagram. He saw the conflicting lines plotted by the train controller and asked him where the HRV movement was. The train control manager was told it was on the down main line. Although he saw the plot lines and questioned the train controller, he also did not recognise that the point where the opposing plot lines crossed was actually in the single line section.

1.3.15 The train control manager later said that once No 3 points at Amokura had been reversed for Train 142 to exit the single line section at Amokura, a potential collision situation was avoided because from that time on, the HRV could not have entered the single line section without contacting train control to have No 3 points set for the down main line.

1.3.16 A signal blocking command had not been entered into the commands for Signal 8R at Te Kauwhata to prevent it being cleared to "proceed" during the authorised occupation of the single line section by the HRV, but the train control manager confirmed that the use of this command was not mandatory in these circumstances.

1.4 Previous training and certification of the train controller

1.4.1 On 11 March 2002 the train controller commenced employment with Tranz Rail as a train control trainee after having completed a 12-module pre-employment train control correspondence course[3]. His training was preceded by a 2-week supervised induction course designed to expose trainee train controllers to the various signalling systems they would encounter and the operating environment.

1.4.2 On 6 May 2002, after completing 4 weeks at the train control school, and having passed his interim and final examinations, he started training on the combined Hawke's Bay / North Auckland desk. He attained certification for solo operation on the combined desk on 3 July 2002. His training and certification had not included an area familiarisation trip.

1.4.3 On 8 July 2002, after only 2 days solo operation on the Hawke's Bay / North Auckland desk, the train controller commenced training on the ECMT desk. After 7 weeks training, during which he had a track occupancy incident where he authorised an express freight train to enter a section of track which was already occupied by a HRV (Rail Occurrence Report 02-118), he was certified on 28 August 2002. He had not had an area familiarisation trip to the area prior to this incident but had one to both the North Auckland and ECMT areas about 4 weeks later.

1.4.4 The train controller operated solo on the ECMT desk for 20 weeks before starting training on the Auckland desk 4 weeks before this incident.

1.4.5 The first planned phase of Tranz Rail's proposal to relocate the national train control centre to Auckland was the relocation of the 3 "Northern" desks. However, because of the uncertainty of numbers of train controllers prepared to transfer, new train controllers were needed for the Northern group, which caused a training peak with insufficient shifts being available on the Northern desks for all trainees. As a result the train controller had been initially rostered to the Hawke's Bay / North Auckland desk until a training position on the ECMT desk became available.

1.4.6 Tranz Rail stated that it was not a case of providing urgent training for multi-desks but rather it was intended that the train controller would be fully trained on the ECMT desk and gain about 6 months experience before he was considered for training on another desk.

1.5 A previous incident highlighting train controller training / experience issues

Occurrence report 00-123, collision Train 3130 and 3134, Ellerslie, 28 December 2000

1.5.1 On Thursday 28 December 2000 a diesel multiple unit Train 3134 collided head on with another diesel multiple unit Train 3130 on the up main line between Penrose and Ellerslie. Train 3130 had become disabled at Ellerslie and, with the assistance of a relief diesel multiple unit, was setting back to Penrose in a wrong-line running movement on the up main line at the time of the collision.

1.5.2 On 22 May 2000 the train controller had commenced employment with Tranz Rail as a train control trainee at the train control school in Wellington.

1.5.3 On 19 June 2000, after 4 weeks training at the train control school and having passed the interim and final examinations, the train controller commenced on-the-job training on the ECMT train control desk and, after 8 weeks of training with an experienced train controller, had had been certified for solo operation of the desk on 9 August 2000. Her training and certification for the ECMT desk had not included an area familiarisation trip; instead this was undertaken about 2 weeks later.

[3] Undertaken by potential train controllers before they enter the train control school for further formal training.

1.5.4 The train controller had only 13 weeks of solo train control experience on the ECMT train control desk before commencing on-the-job training for the Auckland train control desk. There was no double line operation associated with the ECMT desk and there had not been an opportunity during the initial training period for her to view a double line operation. Therefore she did not start to gain any practical experience of double line signalling until commencing on - the-job training on the Auckland desk.

1.5.5 After 5 weeks training, the train controller was certified for solo operation of the Auckland desk. The certification process included examinations for double line operation rules and regulations and Auckland area knowledge as well as a practical observation by the train control manager but, although she was not familiar with the Auckland area, the training and certification had not included an area familiarisation trip.

1.5.6 One of the findings of that investigation was that the train controller was not sufficiently experienced in train control duties to have been certified for a second desk and that lack of experience, together with having had no area familiarisation trip, meant that she had probably not been sufficiently prepared to take charge of a second train control desk so soon.

1.5.7 As a result, the Commission recommended to the Managing Director of Tranz Rail that he:

> ensure that following initial training and certification, new entrant train controllers do not commence training on another train control desk until they have completed at least 12 months duty on their first train control desk (043/01)
>
> include an area familiarisation trip with an experienced train controller or similarly qualified person as part of the training and certification for any train control desk together with an unaccompanied field trip scheduled within an acceptable timeframe following certification as a follow up (044/01)
>
> ensure that train control trainees view the operations of the various signalling systems on the Tranz Rail network during their initial training at the train control school (045/01

1.5.8 On 22 November 2001 the Managing Director of Tranz Rail replied:

> 043/01 - Tranz Rail do not accept this recommendation in its present form. The report provides no basis for arriving at a minimum period of twelve months for a new Train Controller on their initial desk. However…Tranz Rail intends to gather information from overseas railway organisations with similar Train Control systems regarding their approach to this matter with a view of establishing a minimum period based on industry practice.
>
> 044/01 – Tranz Rail do not accept this recommendation. A recommendation that changed "…with an experienced train controller or similarly qualified person…" to "…with experienced operating and / or maintenance personnel …" would be acceptable. This suggested change is prompted by Tranz Rail's belief that Train Controllers are best to have field visits with experienced field practioners.
>
> 045/01 – Tranz Rail accept this recommendation. It is consistent with the revised induction process implemented for trainees who commenced training on Monday 24 September 2001.

1.6 National train control centre

1.6.1 The national train control function was centralised in Wellington, where train control duties were carried out from 9 separate desks in the train control centre. The control systems included networked computers for signalling commands and a computer-based radio system, which allowed train controllers to communicate verbally with locomotive engineers and other track users operating in their respective areas of control. Desks responsible for track warrant control working were also equipped with a computer for the preparation and issue of track warrants.

1.6.2 The computer-based system was designed to allow train control areas to be amalgamated or transferred between desks within the train control centre to meet workload requirements. This offered flexibility and allowed staff numbers to be reduced during periods of low activity, such as weekends and quieter periods, when those enlarged areas could be covered by fewer train controllers.

1.6.3 The Auckland train control desk covered train movements between Waitakere, Auckland and Te Rapa (Hamilton) and was part of the Northern train control roster, together with the Central (NIMT) and ECMT desks. Train controllers were rostered to work on one, 2 or 3 of the desks, depending on their current certifications and the workload.

1.6.4 At the time of this incident Tranz Rail was planning to move the national train control centre to Auckland.

1.6.5 Tranz Rail advised that the train control manager was responsible for determining in which areas train controllers were trained. The factors used to determine this selection included, but were not limited to:

- an individual's willingness to learn a new area
- external factors that may impact on training (family, study etc)
- an individual's operating history and risk
- communication skills
- job performance
- experience in the train control role
- operating knowledge
- geographic knowledge
- relationship between the new and existing area/s certification is held for (existing controllers)
- length of time spent operating in the existing territory
- competency in the existing territory

1.7 Train control diagram

1.7.1 The train control diagram showed the timetables of all scheduled trains printed in green. The train controller plotted the anticipated movement of each train in pencil and the actual movements of the trains were plotted in red and compared to the scheduled and anticipated movements.

1.7.2 The train control diagram showed the scheduled departure time of Train 142 from Huntly as 1405, but the train actually departed at 1305. Departure times for coal trains from Huntly were influenced by the arrival times of empty inbound services and by the point of loading within the Huntly area. As a result, variations from the scheduled departure times were not uncommon.

1.7.3 Nothing on the train control diagram differentiated the single line section between Te Kauwhata and Amokura and the double line areas either side of it.

1.8 Planning of train movements

1.8.1 Tranz Rail's Operating Code Section 6 Instruction 3.3 Forward Planning stated in part:

> All train movements and crossings must be anticipated for some hours ahead and be plotted in pencil on the diagram. This forward planning is vital to good train controlling.

It enables the Train Controller to sum up the situation quickly and avoids the necessity for hasty decisions as problems can be foreseen earlier. Particular emphasis should be placed on the accuracy of plotting train movements as the operation of motor trolleys, Hi-Rail vehicles and track maintenance work can be vitally affected.

1.9 Train control procedures for handling track user inquiries

1.9.1 Tranz Rail's Operating Code Section 6 Instruction 15.0, Inquiries from Maintenance Workers, Hi-Rail Vehicle and Trolley Users stated in part:

15.1 Accurate and Up-dated Information

The necessity for absolute accuracy when dealing with inquiries from trolley, Hi - Rail vehicle users and maintenance staff working on or near the track is vital. There is no margin for error, oversight or indifferent approach concerning the movement of trains, Hi-Rail vehicles, or trolleys when handling enquiries from these members. Their safety depends on the accuracy of information supplied by the Train Controller and there should be no possibility of misunderstanding by the inquirer. Abbreviated speech or short cuts in procedure must not be adopted by a Train Controller when handling these inquiries.

The following matters must be watched carefully by a TCO when dealing with the movement of Hi-Rail vehicles, trolleys and maintenance work:

15.1.1 Summary of Procedures – Track Occupancy Rules 908 & 915

Once track occupancy request details have been established the authorisation process is:

- Plot the movement on the train control graph.
- Execute required protection and safety buffer.
- Give the correct time using the phrase "The time is"
- Repeat back, advise and authorise:
    - the on and off tracking locations and stations between.
    - the last known location of the next train conflicting with the occupation.
    - other track occupations that may conflict.
    - the designated time to be clear.
- Obtain an acknowledgement the track user has understood this information.

15.1.2 Pre Authorisation check and use of Train Control Diagram for Track Occupancy

Before an occupation is authorised the Train Controller must establish positively whether any conflict exists with either existing occupations, track maintenance machinery or trains within any part of the area requested.
All movements and work authorised MUST be plotted on the Train Control Diagram in black ink. This will establish if it is safe to authorise the occupation.

The Train Controller MUST establish by reference to these plot lines that:

- There is no conflict with a train or trains for any part of the area covered by the plot line that is about to be authorised.
- There is no conflict with occupations already in effect for any part of the area covered by the plot line which is about to be authorised.

Should a conflict with an existing occupation or track maintenance machine exist the caller must be advised so that the arrangements can be made to pass through the area concerned.

15.1.3 Designated Time -Safety Buffer

For occupations the designated time **MUST** include a minimum safety buffer of fifteen minutes before the anticipated arrival time of the next train **EXCEPT** where physical protection is established. i.e. conditional stop boards, detonators, signals held at stop…

The Train Controller must provide the caller with the most up to date information in regard to the next train or trains (when it is unsure which will arrive first).

A Train **MUST NOT** be dispatched into an area inside the 15 minute buffer unless "off track and clear" has been received from the Track User.

1.9.2 Tranz Rail's Engineering Rule 915 (d) stated:

> If, after authorising an on track movement circumstances alter which would allow a train to conflict with the agreed designated time, Train Control must arrange to hold back that train, until the person in charge has advised the movement is clear of the line or the designated time has elapsed.

1.10 Protections available within CTC

1.10.1 The computerised CTC signalling system included a "signal blocking" feature that could be used to prevent a train controller inadvertently clearing signals governing the entry of trains into sections that were already occupied. This feature allowed the operator to prevent commands being sent to a specific control point and could be used to prevent signals from clearing, points from being moved or switchlocks being released. However, the use of this facility was not mandatory when handling track occupancy requests.

1.10.2 The Commission's Rail Occurrence Report 00-101 covered 5 incidents of HRVs and trains occupying the same section of track between 17 December 1999 and 5 September 2000, of which 2 could probably have been avoided by the use of the "control blocking" feature that was available in the CTC system at the time. On 17 January 2001, as a result of these incidents, the Commission recommended to the Managing Director of Tranz Rail that he:

> as a matter of urgency make the use of signal blocking command "control tags" mandatory on signals controlling the entry of trains into sections occupied by HRVs, track maintenance gangs or other track users (125/00)

On 2 February 2001 the Managing Director advised that Tranz Rail accepted the safety recommendation.

1.11 Other relevant track occupancy occurrences investigated by the Commission

Occurrence report 00-116, HRV and Train 225 occupying the same section of track, near Te Kauwhata, 4 October 2000

1.11.1 On 4 October 2000 express freight train 225 was authorised to depart Te Kauwhata on the NIMT and enter the down main line that was already occupied by an authorised HRV movement. No collision resulted as the occupants of the HRV became aware of the approaching train and were able to off-track before the train passed.

1.11.2 Safety Recommendation 125/00 to the Managing Director of Tranz Rail was repeated in that report because one of the findings of the investigation was:

> The use of a signal blocking command was a valuable defence that could have prevented this incident, but its use was not mandatory and the train controller did not use it on this occasion.

Occurrence report 02-118, HRV and Train 484, near collision, Tauranga, 7 August 2002

1.11.3 On 7 August 2002 the same train controller who was the controller-in-training in the Amokura incident, cleared a signal to allow express freight Train 484 to depart Tauranga and enter a section of track that was already occupied by an HRV travelling towards the train. About 4 minutes later the train controller, realising that he had set up a potential collision, contacted the locomotive engineer by radio and instructed him to stop. The train stopped about 300 m from the HRV.

1.11.4 One of the findings of this investigation was:

> Although the use of the signal blocking command was not mandatory, had the train controller used it he would not have been able to signal the train to proceed, and therefore the incident would have been prevented.

1.11.5 This investigation and Tranz Rail's response to Safety Recommendation 043/01 resulted in a Safety Recommendation to the Managing Director of Tranz Rail that he:

> ensure that following initial training and certification, new entrant train controllers do not commence training on another train control desk until they have completed at least 6 months duty on their first train control desk (006/03)

On 9 July 2003 the Managing Director advised that Tranz Rail accepted the safety recommendation.

1.11.6 On 11 October 2002 Tranz Rail advised that a draft track occupancy protection process governing the movement of HRVs had been developed, which included compulsory use of track warrant and signal blocking features. Technology software changes were required before a pilot study could be started on selected routes. In view of this action no safety recommendation regarding the mandatory use of blocking commands was made.

Occurrence report 02-129, incidents of HRVs, track gangs and trains occupying the same section, Ashburton, 21 November 2002 and Lepperton, 4 December 2002

1.11.7 On 21 November 2002, a train controller cleared a signal to allow a train to enter a section of track already occupied by an HRV. A potential collision was averted when the HRV operator heard a radio conversation between the locomotive engineer and train control shortly before the train departed, and was able to interrupt and advise that he was still occupying the section.

1.11.8 On 4 December 2002 a train controller cleared a signal to allow a train to enter a section of track already occupied by a track gang working on-track to replace a broken rail. The track gang had completed their work and had off-tracked minutes before the train passed through their worksite. They had only just advised train control that they were clear of the track when the train passed them.

1.11.9 On 1 July 2003 Tranz Rail advised that enhanced track occupancy procedures had been introduced which included:

- protection by track warrant for HRV movements
- protection by signal blocking in centralised traffic control and double line automatic signalling territories for HRV movements
- protection in single line automatic signalling territory for HRV movements
- individual train protection (ITD) for authorised personnel when fouling mainlines and interlocked areas when moving on foot, making minor maintenance corrections or driving close to railway lines in these areas.

Protection methods for worksites within all 4 operating systems had been strengthened by increased requirements for Conditional Stop Boards and specific procedures for multi-work sites.

1.11.10 Tranz Rail expected these procedures to be implemented across the network by 3 November 2003 and in view of this, no safety recommendation regarding the mandatory use of blocking commands was made to the Managing Director of Tranz Rail.

2 Analysis

2.1 The train controller had been employed from outside Tranz Rail, so he did not have the benefit of a rail industry background. As a result he entered the train control school with his rail industry knowledge limited to that which he attained through the train control correspondence course. It could not be determined why the train controller had been considered ready for training and certification on a second train control desk, the ECMT desk, let alone a third desk, the Auckland desk, when he had such limited experience in the rail industry, and train control in particular. His operating history, having been involved in a previous incident while he was under training on the ECMT desk, should have ensured that he was not considered for transfer to training on the Auckland desk when a vacancy became available.

2.2 Despite Tranz Rail's stated intention that the train controller remain on the ECMT desk for about 6 months before he was considered for training on a second (really a third) desk, he commenced training on the Auckland desk after only about 5 months solo experience on the ECMT desk. That he commenced training on the Auckland desk when he did was probably driven by the need to expedite staff training in preparation for the proposed relocation of the Northern desks to Auckland.

2.3 Tranz Rail maintained that the train controller's training "was not a case of providing urgent training for multi-desks". However, it is difficult to find any other reason for subjecting an inexperienced train controller to training and certification on 3 separate train control desks in under 9 months from when he started his on-the-job training for his first train control desk. This multi-desk training was particularly inappropriate considering that the Auckland desk was potentially the busiest in the train control centre.

2.4 By rostering the train controller to commence training on the successive desks, Tranz Rail must have considered that he met their criteria for learning a new desk. The integrity and value of the criteria becomes questionable given that the train controller commenced training on the ECMT desk after only 2 days solo operation on the Hawke's Bay / North Auckland desk, and also that he commenced training on the Auckland desk after less than 6 months solo operation on the ECMT desk having been involved in an incident while in training there. His acceptance probably reflected pressurised staff training in preparation for the proposed relocation of the Northern desks to Auckland.

2.5 The train controller's inexperience in the rail industry meant that an area familiarisation trip as an early part of his on-the-job training on both the ECMT and Auckland desks should have been

given priority, especially given the similarities with the train controller involved in the collision between the 2 diesel multiple units at Ellerslie in December 2000.

2.6 The decision to allow the train controller to operate the Auckland desk under the supervision of the train control manager, who's certification for the Auckland train control desk at the time was not current, almost certainly contributed to the incident. This arrangement was probably based on the fact that the train controller was already certified on 2 other train control desks, although neither of those 2 desks had any double line operation. Had the train controller been a trainee with no previous certifications it is unlikely that such a course of action would have been taken.

2.7 The manning of the Auckland desk by an uncertified train controller, accompanied by a certified but non-current supervisor was an unacceptably, high-risk option, the consequences of which could have been much more serious. If the train controller had been accompanied by a current and certified tutor, this incident probably would not have happened.

2.8 The train control manager had 2 opportunities to monitor the plotting of the HRV movement. The first was when the call was originally received from the HRV at Pukekohe and plotted by the train controller, at which time the train control manager had been distracted by other activities, and the second was when he reviewed the plot line for Train 142. The fact that he identified and commented on the plotted point of conflict but did not recognise that it was drawn in the single line section was probably a reflection on his lack of current experience and certification on the desk. The train controller not recognising that the plotted conflict point was in the single line section was probably due to his lack of experience on the desk and the fact that he had not had a familiarisation trip through the area.

2.9 Had the train controller used the signal blocking command option on Signal 8R at Te Kauwhata, any subsequent efforts by him to clear that signal for Train 142 would have brought the presence of the opposing HRV to his attention through a message on the VDU. Although not mandatory, the use of this facility offered an effective defence by prohibiting the clearing of signals to allow trains to enter a section that was either occupied or to which authority to enter had already been given to a HRV. However, he may not have applied the signal blocking command to Signal 8R because he had not related the HRV movement to Te Kauwhata with the single line section when he took the track call from Pukekohe. The fact that the points at Amokura were still set for the up main line when the HRV arrived, even though Train 142 had cleared, showed that the train controller was not expecting to have to set the route for the HRV.

2.10 Despite having had 4 weeks training on the Auckland desk, the train controller appeared not to have recognised that the single line section started at Te Kauwhata for the northbound Train 142 and at Amokura for the southbound HRV. When he drew the plot line for Train 142 on to his train control diagram he saw that it intercepted the plot line showing the movement for the HRV at about Whangamarino, but he believed that each vehicle was on its designated main line.

2.11 Setting the route for Train 142 to travel from the double line area at Te Kauwhata and through the single line section before entering back on to the up main line at Amokura required the train controller to make 6 signalling moves on the CTC VDU, under the supervision of the train control manager. Such a signalling process should have alerted both the train controller and the supervisor to the single line section, which would have been shown on the VDU on which they were working.

2.12 When Train 142 was dispatched from Huntly at 1305, the HRV had departed Pukekohe some 25 minutes earlier and, had it been running close to its plot line, was still about 15 minutes from Amokura and the single line section. The route for Train 142 was probably set at 1305 so there was no possibility of the HRV either having entered the single line section before Train 142 did or of entering the single line section while occupied by Train 142. The late running of the HRV meant it was still in the double line area and had not arrived at Amokura when Train 142 cleared Amokura and passed it on the up main line.

2.13 A potential collision was averted only because Train 142 had entered the single line section first and the setting of its route to exit at Amokura put in place safety defences to prevent the HRV entering the same section already occupied by the train. Even if the HRV had not passed the train before reaching Amokura, the defence was such that the HRV could not have entered the single line section without the train controller cancelling No 8R signal and reversing No 3 points. Although the possibility of this happening was unlikely, it could not be completely discounted, based on the actions of the train controller in signalling Train 142 into the single line section from Te Kauwhata. If the HRV had entered the single line section before the route was set for Train 142 to enter the result could have been completely different.

2.14 Despite Tranz Rail having advised on 2 February 2001 that it accepted the safety recommendation relating to the mandatory use of signal blocking commands when dealing with track occupancy requests, this was the fifth track occupancy irregularity incident that the Commission had investigated since 5 September 2000. Had Tranz Rail implemented the safety recommendation when it accepted it in February 2001 and pending the development and introduction of its new track occupancy protection methods, 4 of these incidents, which occurred between February 2001 and the introduction of the new methods in July 2003, would probably have been avoided.

3 Findings

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

3.1 The train controller was not sufficiently experienced in train control duties to have begun training for certification for a third desk. This was not a reflection on his potential ability but, when combined with having had no area familiarisation trips, meant that he had not been sufficiently prepared to take charge of a third train control desk so soon.

3.2 Under Tranz Rail's selection criteria, the train controller's previous incident while in training on the East Coast Main Trunk desk should have precluded him from training for another train control desk at that time.

3.3 The train controller had not placed the appropriate importance on the train control diagram when planning, plotting and authorising train movements and HRV track occupations.

3.4 The use of the train control manager to supervise the train controller was not appropriate.

3.5 At the time of the incident the Auckland train control desk was being operated by 2 train controllers, neither of whom held current train control certification for the desk.

3.6 If the train controller-in-training had been accompanied by a current and certified tutor, this incident would probably not have occurred.

3.7 The use of a signal blocking command tag was a valuable defence that may have prevented this incident, but its use was not mandatory and the train controller did not use it on this occasion.

3.8 Despite Tranz Rail having accepted the safety recommendation concerning the use of signal blocking commands two years earlier, no procedures had been implemented prior to this incident.

4 Safety Recommendation

4.1 On 12 November 2003 it was recommended to the Managing Director of Tranz Rail that he:

> ensure that the supervision of on-the-job training of train controllers in training or trainee train controllers only be undertaken by qualified staff who have a current certification for that train control desk (053/03).

4.2 On 1 December 2003 the Managing Director of Tranz Rail replied in part:

> Tranz Rail accepts this recommendation.
>
> This requirement is already specified in the Rail Operating Code, Section 1, Clause 5.2.7 (page 5.23). TRL took immediate steps to investigate the incident of non-compliance and has taken further steps to ensure that the Code requirements are complied with in the future.

Approved for publication 19 November 2003

Hon W P Jeffries
Chief Commissioner

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