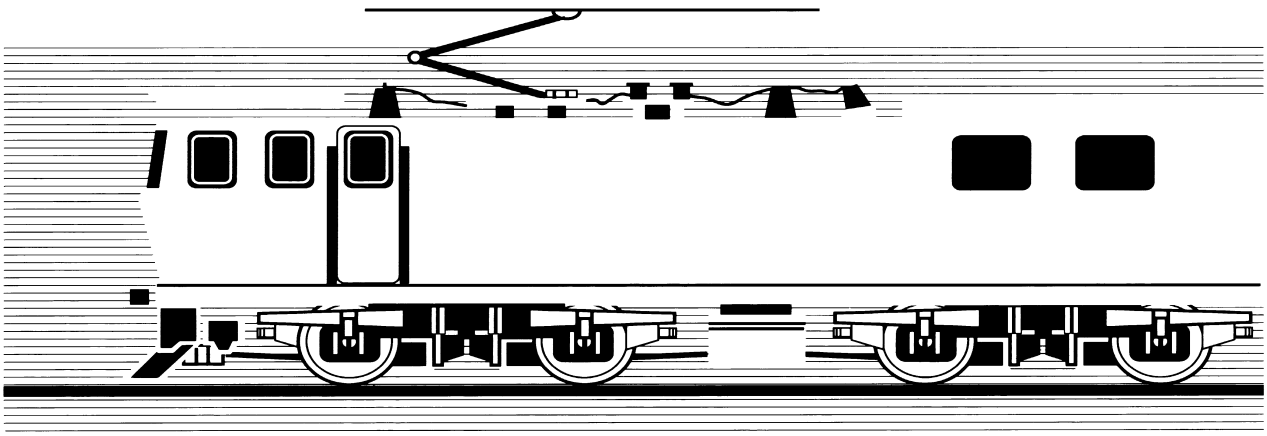
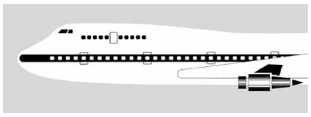
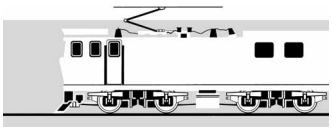


RAILWAY OCCURRENCE REPORT

03-113 **diesel multiple unit passenger Train 3366, passed conditional stop board without authority, Glen Innes** **30 October 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 03-113

diesel multiple unit passenger Train 3366

passed conditional stop board without authority

Glen Innes

30 October 2003

Abstract

On Thursday 30 October 2003 at about 1445, Train 3366 a Tranz Metro[1] Papakura to Britomart diesel multiple unit passenger train passed a conditional stop board, between Tamaki and Glen Innes, without authority. The train stopped at Glen Innes station for waiting passengers before continuing on to Britomart. There were no injuries.

Safety issues identified included:

- the quality of the Channel 1 radio reception near Tamaki
- the radio procedures for communication between locomotive engineers and the person in charge of the worksite
- the presentation of the conditional stop boards
- the frequency of other similar incidents being reported.

One safety recommendation was made to the Chief Executive of New Zealand Railways Corporation to address these issues.

[1] Tranz Metro was the group within Tranz Rail with the responsibility for the operation of suburban train services in Auckland.

Contents

Figures

Abbreviations

AWB	advanced warning board
CSB	conditional stop board
CSP	conditional stop protection
DMU	diesel multiple unit
hr	hour(s)
kg/m	kilograms per metre
km/h	kilometres per hour
LEMU	locomotive engineer multiple unit
m	metre(s)
NIMT	North Island Main Trunk
PIC	person in charge
t	tonne(s)
Toll NZ	Toll NZ Consolidated[2]
Tranz Rail	Tranz Rail Limited
Transfield	Transfield Infrastructure Services Ltd

[2] New owner of Tranz Rail, effective 5 May 2004.

Data Summary

Train type and number:	diesel multiple unit passenger Train 3366
Date and time:	30 October 2003, at about 1455[3]
Location:	Glen Innes
Persons on board:	crew: 3 passengers: 16
Injuries:	nil
Damage:	nil
Operator:	Tranz Rail Limited (Tranz Rail)
Investigator-in-charge:	P G Miskell

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

1 Factual Information

1.1 Narrative

1.1.1 On Thursday 30 October 2003, Train 3366 was a scheduled 2-car diesel multiple unit (DMU) passenger service from Papakura to Britomart Station (see Figure 1). The train departed Papakura at 1418 and was crewed by a trainee locomotive engineer multiple unit (LEMU), a locomotive engineer "minder driver[4]" and a train manager.

1.1.2 At about 1450, Train 3366 stopped at Panmure for passenger work. The trainee LEMU said that while the train was stationary, he used the cab radio to call the person in charge (PIC) of a Glen Innes worksite to request permission to pass the conditional stop board (CSB) erected between Tamaki and Glen Innes. As the train moved away from the station he made a second call to the PIC.

1.1.3 When the trainee LEMU had not received an acknowledgement from the PIC, he said that he looked down at the cab radio and realised that it was switched off. As he approached Tamaki he again called the PIC and received, what both the trainee and his minder driver understood was, authority to pass the CSB.

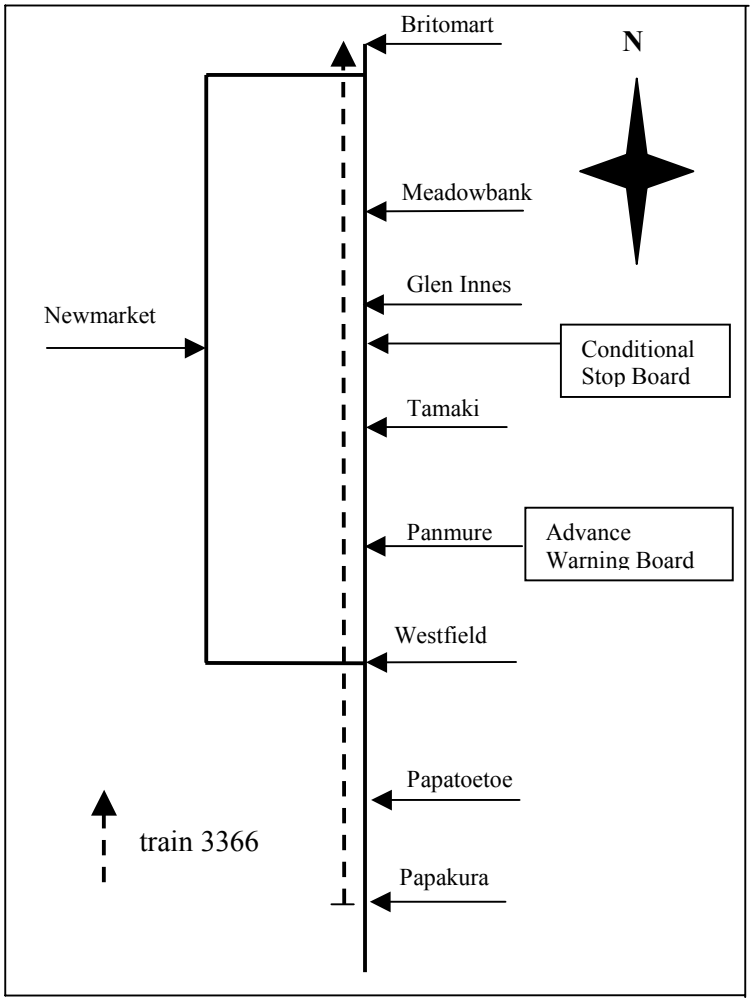


Figure 1
Schematic of Train 3366 journey from Papakura to Britomart station (not to scale)

[4] The minder driver was an experienced locomotive engineer responsible for the practical training of the trainee LEMU.

1.1.4 There were 16 passengers on board when Train 3366 stopped at Glen Innes. After completing passenger work, the trainee LEMU received the "right away" signal from the train manager and was about to depart from the station when the PIC came to the cab and challenged the train crew as to why they had passed the CSB. The trainee responded by saying that he did receive authority to pass the CSB, but the PIC denied giving such authority.

1.1.5 Train 3366 departed Glen Innes at about 1455 and continued its journey to Britomart.

1.2 Site evidence

1.2.1 Glen Innes station was an island platform with up and down main lines on either side of the platform. Britomart-bound trains berthed on the up main line and trains from Britomart berthed on the down main line.

1.2.2 The station platform and passenger facility was being upgraded. The construction area was contained within a steel security fence (see Figure 2).

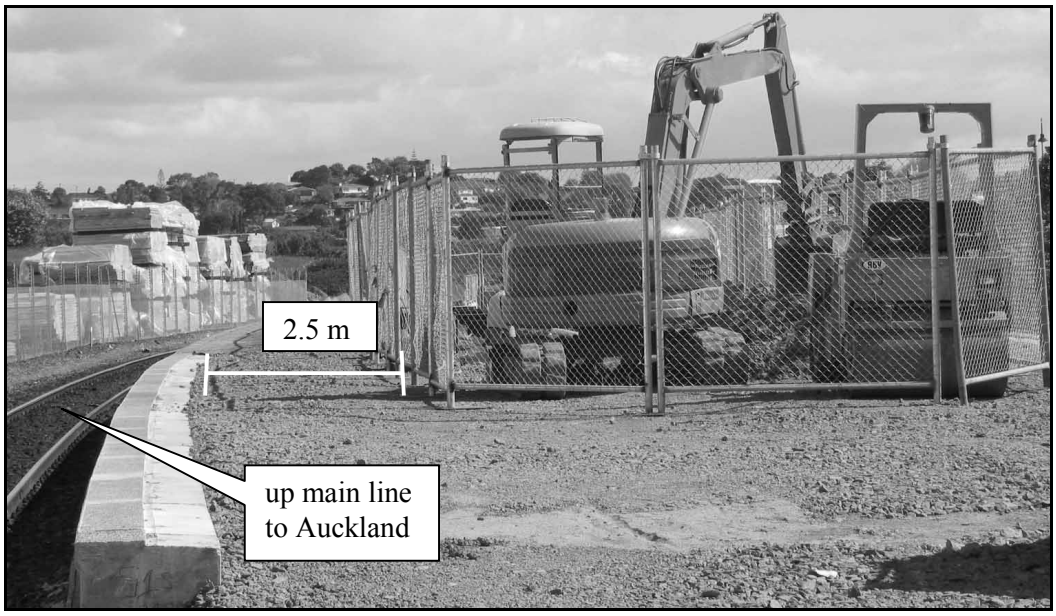


Figure 2
Construction work at Glen Innes Station

1.2.3 There was no construction activity on the up main side of the platform when Train 3366 approached the platform. Passengers waiting to board the train had about 2.5 m of usable platform between the security fence and the platform edge.

1.2.4 The PIC maintained regular contact with the construction supervisor to ensure all plant and equipment was kept clear of the track before he gave authority for each train to pass the CSB. About 40 trains were authorised to pass the CSBs between the hours of 0800 and 1700 each day of the working week.

1.3 Information bulletins

1.3.1 Information bulletins were dated, unnumbered documents, prepared by the Network Control Centre in Wellington and issued the day before they were due to come into effect. Each bulletin applied to a specified section of track for one day of operation only, and included details of track maintenance carried out under conditional stop protection (CSP).

1.3.2 Information bulletins formed part of the documentation held by the locomotive engineer of every train passing through the affected track section. A copy of the bulletin was also made available to track staff working in that track section.

1.3.3 The information bulletin issued for 30 October 2003 described track work protection arrangements for all lines north and east of Te Rapa and included:

Work Area: Between either **Metrages, Stations and or Signals**	**Rule**	**Type of Work / Person in Charge**
672.59 to 672.99 Tamaki - Meadowbank Up & Down lines	905	Protect contractors 0730 – 1730 [Name of PIC] 025 291 2615 Call sign: Foxtrot Uniform

1.4 Conditional stop protection

1.4.1 Tranz Rail Track Occupancy Protection Rule 905 referred to CSP and stated in part:

> **(a) Information Bulletin**
>
> When Conditional Stop Protection is used this must be authorised by Bulletin.
>
> The Person in Charge is responsible for confirming channel 1 radio coverage prior to submitting the application to use Conditional Stop Protection. If channel 1 radio coverage is not available the Person in Charge must advise how communications will be managed.
>
> **(b) When to use Conditional Stop Protection**
>
> Conditional Stop Boards and Advance Warning Boards must be used whenever planned work is going to involve breaking the track or will interfere with the safe operation of the trains…
>
> **(c) Positioning of Stop Signals and Boards**
>
> Danger Stop Signals, Advance Warning Boards and Conditional Stop Boards must be placed on the side of the line which will give Locomotive Engineers the best view of them.
>
> In double-line sections they should generally be placed on the left hand side of the line facing in the normal direction of travel on the line affected. A second Stop Signal or Board should be placed on the right hand side midway between the lines at a level such that it does not project more than 850 mm above the rail level.
>
> **(d) Establishing Protection**
>
> Before work starts:
>
> - establish that no trains are closely approaching
> - erect Advance Warning Boards [a minimum] 1500 metres in advance of the outer limits of the work area
> - erect Conditional Stop Boards [a minimum] 200 metres in advance of the outer limits of the work area.

(e) Permission to Obstruct Line

Work involving obstruction of the line must only be carried out between the hours shown in the bulletin. The person in charge must personally obtain permission from Train Control before the line is obstructed and agree on specific check times to ensure there is minimal disruption to trains.

If the line is to be cleared temporarily for train movements the Person in Charge will, once the train is clear of the work site and if it is safe to do so, authorise work to resume.

(f) Line to be Cleared before Train Due (see Rule 902)

Advance Warning and Conditional Stop Boards are not to be removed when the track is cleared temporarily for train movements.

(g) Conditional Stop Board not to be Passed Unless Authorised

Trains must not pass a Conditional Stop Board until authorised by the Person in Charge of the work.

The Locomotive Engineer must contact the Person in Charge for authorisation to pass the Conditional Stop Board.

(j) Radio call signs

The Person in Charge will be allocated a special call sign on the information bulletin. This is to be used for all communications between the Person in Charge, Locomotive Engineers and Train Control.

1.4.2 The CSB has a reflectorised white background with reflectorised red circle and matt black type (see Figure 3).

Figure 3
Conditional Stop Board

1.4.3 Section L1 of Tranz Rail's Working Timetable contained special instructions for the erecting of Advanced Warning Boards (AWBs) and CSBs in the Auckland suburban area and stated in part:

> **2.9 PROTECTION ARRANGEMENT FOR WORK ON THE LINE AUCKLAND SUBURBAN AREA**
>
> To allow work on the line between trains the following protection arrangements may apply.
>
> **Engineering Rule 905(b) Conditional Stop Protection**
> **Permanent posts for the attaching of Advance Warning Boards (AWB) and Conditional Stop Boards have been erected in the Auckland suburban area. The metrages as shown in the accompanying table relate to the positions where the Conditional Stop Boards will be located.**

NIMT UP MAIN

670.000	In old Panmure platform	Between Panmure and Tamaki Stations
671.255	In old platform at Tamaki	Between Panmure and Tamaki Stations
672.72	In old Glen Innes platform	Between Glen Innes & Meadowbank

NIMT DOWN MAIN

676.209	In old Meadowbank platform	Between Meadowbank and Glen Innes
672.720	In old Glen Innes platform	Between Meadowbank and Glen Innes

1.4.4 The PIC erected AWBs and CSBs to protect the work site at Glen Innes (see Figure 4).

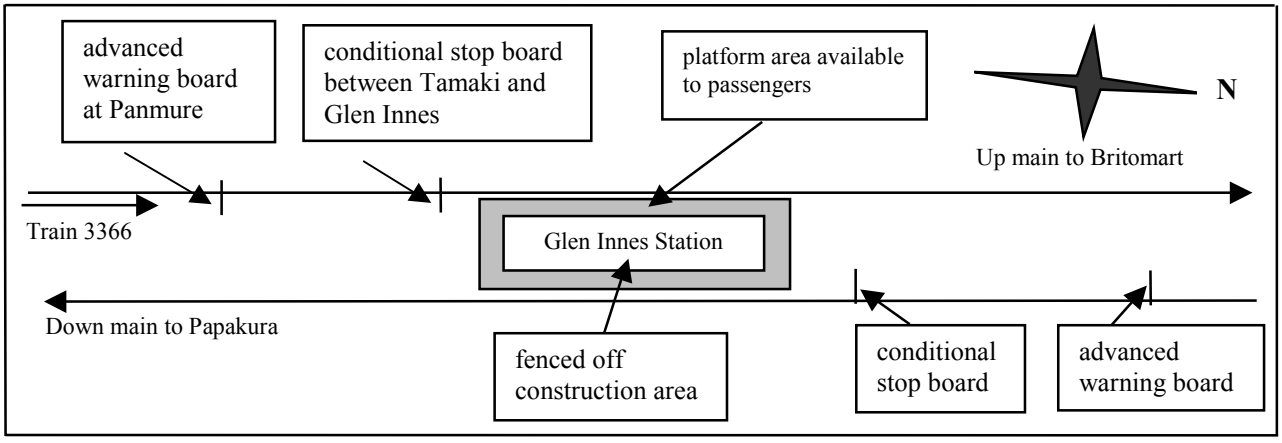


Figure 4
Location of Advance Warning Boards and Conditional Stop Boards (not to scale)

1.5 Radio communication

1.5.1 Section L1 of Tranz Rail Working Timetable stated in part:

> **2.2 RADIO COMMUNICATION: AUCKLAND SUBURBAN AREA**
>
> **DMU Radios**
> **Remember once a radio transmission has been completed on a manually selected channel return the selector switch to the automatic/scan mode.**
>
> DMU's fitted with new T2020 radios will scan channels 1, 4 and 5 and can communicate directly on channel 1 between Signal Boxes, Maintenance staff and Main Line locomotives.
>
> **Maintenance Staff**
> Channel 1 is to be used by Maintenance staff (Track and Structures, Signals etc) for communication with DMU's and other mainline trains. The DMU's will need to manually select channel 1 to transmit to maintenance staff.
>
> Should Maintenance staff be unable to communicate with a DMU then Train Control must be called to obtain permission to talk to the DMU.
>
> Channel 5 on the Maintenance radio can only be used to talk to another Maintenance radio but will not be able to transmit to the DMU's on that channel.
>
> **Main Line Locomotives**
> If channel 1 is unavailable, Locomotive Engineers on main line locomotives that wish to contact a DMU, may be required to pass on messages either through Train Control or request Train Control to ask the DMU concerned to set that radio to channel 1 to receive a transmission.
>
> **Tamaki**
> There is poor radio coverage in Tamaki Station limits to Auckland Signalpanel on Channel 1 and 5. When there is a need to call the Signalpanel from the area between the mainline points at each end of the station then use a cellphone (09 270 5416 Ext 98416) or ask Train Control if you can speak to the Signalpanel on the Train Control radio system.

1.5.2 Channel 1 was a point-to-point radio communication system that was used for local coverage only. Transmissions on Channel 1 were not recorded.

1.6 Locomotive event recorder

1.6.1 The DMU fleet was not equipped with locomotive event recorders, so data regarding the handling of Train 3366 as it approached the work site at Glen Innes was not available.

1.6.2 Under National Rail System Standard effective 12 July 2004, existing DMUs operating within Auckland suburban limits on 30 June 2004, must be equipped with a data logger or event recorder by 30 June 2007.

1.7 Personnel

Locomotive engineer multiple unit (LEMU) in training

1.7.1 The trainee LEMU had successfully completed the initial 15-week formative training programme that covered:

- formal induction and structured riding on a DMU
- operating rules and regulations
- local instructions from the Working Timetable
- familiarisation with Signals and Interlocking Diagrams
- instructions from Rail Operating Code
- knowledge of the air brake system on a DMU
- practical training

1.7.2 In order to gain LEMU certification a trainee was required to undertake a minimum of 250 hours On the Job Training (OJT) under the direct supervision of a "minder" driver, then a minimum of 30 OJT trips on the North Auckland Line and 20 trips on the NIMT.

1.7.3 Up to the day of the incident, the trainee LEMU had completed about 60 hours of OJT. He commenced his shift at 1205, at his home depot of Westfield. After reading the current work orders that included the daily bulletin, he took over the running of Train 3358 and drove it to Britomart.

1.7.4 Train 3358 was authorised to pass the CSB at Glen Innes at about 1251 and it arrived at Britomart about 18 minutes later. After a 2-minute stopover, the trainee LEMU drove Train 3069 to Papakura via Newmarket[5], arriving on time at 1359.

1.7.5 His next assignment was Train 3366, the 1418 Papakura to Britomart via Glen Innes DMU passenger service. After departing Papakura, the train passed through a CSP protected worksite at Papatoetoe. The trainee LEMU commented to the PIC that he had difficulty in understanding the radio transmission because of the amount of static. The PIC at Papatoetoe attributed the poor transmission from his portable radio to the wet weather and the likelihood that water had entered his radio.

1.7.6 The trainee LEMU said that when the train arrived at Panmure, the last passenger stop before Glen Innes, he saw the AWB for the Glen Innes worksite. He said that he initiated a Channel 1 radio transmission to Foxtrot Uniform, the call sign allocated to the worksite at Glen Innes. He identified himself as the driver of Train 3366, approaching the CSB on the up main.

1.7.7 When no acknowledgement was received, he put the train into first gear and moved slowly away from the platform and repeated his transmission. He then glanced down at his cab radio and saw that it had been inadvertently switched off sometime after passing through the CSP worksite at Papatoetoe.

1.7.8 He said that he switched the radio back on as the train was nearing Tamaki, and repeated his radio transmission, "Foxtrot Uniform from driver 3366 on the up, approaching your Conditional Stop Board. Over". He said that a short while later he said he heard, "Foxtrot Uniform [static] my boards [static] permission [static] normal speed".

[5] There are 2 alternative routes to travel from Westfield to Britomart Station. One via Glen Innes and the other via Newmarket.

1.7.9 The trainee LEMU said he took the response from the PIC as the authority for Train 3366 to pass the CSB. He said he transmitted back to the PIC, "Driver of Train 3366 on the up main, I understand I have permission to pass your boards at normal speed, roger". The trainee LEMU said he did not receive a response from the PIC to the repeat back. The train passed the CSB at walking speed because of his scheduled passenger stop at Glen Innes.

Locomotive engineer minder driver

1.7.10 The locomotive engineer "minder driver" was the person in charge of the train.

1.7.11 He had been employed by Tranz Rail and its predecessors for 44 years and had held certification to drive diesel locomotive hauled freight and passenger trains for about 35 years. He had driven DMU passenger trains for the previous 18 months.

1.7.12 He was assigned to the trainee and had supervised all 60 hours of the trainee's OJT prior to the incident. He had no previous experience in this role.

1.7.13 He described the transmission from the PIC of the Glen Innes worksite as scratchy at best, and was able pick up "6, [static] clear normal speed". He recalled that his trainee responded with, "Driver 3366, message understood, OK to pass your boards, clear for normal speed, roger". However, no response to this transmission was received from the PIC and the train continued past the CSB.

Person in charge of the Glen Innes Station worksite

1.7.14 The PIC of the worksite at Glen Innes was an employee of Transfield Infrastructure Services Ltd (Transfield)[6]. He had 27 years' experience with Tranz Rail and its predecessors. Although his usual workplace was at Otahuhu rail weld depot, he had previously carried out rail welding and general track maintenance throughout Auckland and Northland. His certification to protect a worksite was current, and he carried out such duties on a regular basis.

1.7.15 He had been the PIC at Glen Innes the previous day, so was familiar with the train schedule and the extent of the construction work being undertaken. He said he was confident and felt comfortable working away from his normal workplace.

1.7.16 On arrival at Glen Innes at about 0700, he went about his routine tasks of contacting train control, holding a safety briefing with the construction supervisor and staff and checking the battery strength on his Channel 1 portable radio. Because he did not hold a spare radio, he called locomotive engineers of passing trains to confirm the quality of his radio transmission.

1.7.17 Having completed these tasks, he again contacted train control and was given permission to erect the AWBs and CSBs. Firstly, he went south to erect the AWB for up trains at Panmure and the corresponding CSB between Tamaki and Glen Innes. He then went north to erect the AWB at Meadowbank and the CSB for trains on the down main line.

1.7.18 Once all boards were in place the PIC advised train control, and commenced authorising trains to pass through the worksite. He recorded the train number and the time that he authorised each train to pass the CSB on a separate sheet for each main line. The special call sign "Foxtrot Uniform" and the times that he agreed to make a "Check Call" to train control were also recorded. The first trains authorised through the worksite on the up and down mains were both recorded as 0836.

1.7.19 The Tranz Metro timetable had both an up train and a down train arriving at Glen Innes about 10 minutes before the hour. The PIC was expecting up Train 3366 and down Train 3375 to arrive at their respective CSBs at about 1450.

[6] Transfield was responsible for the inspection, maintenance and renewal of the rail infrastructure.

1.7.20 The PIC denied giving Train 3366 authority to pass the CSB on the up main. He said he heard "Fox" on his radio, to which he queried, "Who is calling Foxtrot Uniform, who is calling Foxtrot Uniform?" After making the second request he looked up and saw that Train 3366 had arrived at Glen Innes.

1.7.21 Down Train 3375 was kept waiting for about a minute before it was authorised to pass the CSB, while the PIC was conversing with the trainee LEMU on Train 3366.

1.8 Other similar incidents where a train passed a CSB without authority but not investigated by the Commission

10.1 km NIMT, between Kaiwharawhara and Takapu Road, 4 September 2003

1.8.1 On Thursday 4 September 2003, track maintenance work was planned to take place between Kaiwharawhara and Takapu Road on the NIMT, up main. The PIC had erected the AWB at 5.30 km, between Tunnel 1 and Tunnel 2 and the CSB at 10.1 km, in the body of the curve about 300 m past the north portal of the 4.5 km long Tunnel 2.

1.8.2 The track work had not started when Train 6242, an electric multiple unit (EMU) passenger service, passed the CSB without authority. The train was travelling at about 65 km/h when the LEMU sighted the CSB board and made a full service brake application that stopped the train about 90 m past the CSB. There were no injuries.

1.8.3 Channel 1 radio communication between the PIC and the LEMU was not possible while the train was travelling through Tunnel 2. Had the CSB been erected about 80 m further south, at the start of the curve, the LEMU may have sighted the CSB after exiting Tunnel 2 and stopped. On the other hand, because the CSB was more than 5 km past the AWB due to the 2 intervening tunnels, the LEMU may have already lost situational awareness.

679.044 km NIMT, Auckland, 30 September 2003

1.8.4 On Thursday 30 September 2003, track maintenance work was carried out on the down main line between Britomart and Orakei. The information bulletin authorised the use of a CSB without an AWB. The CSB was erected about 400 m past a controlled signal that was not held at stop.

1.8.5 Train 3375, a Britomart to Papakura DMU passenger service, passed the CSB without authority from the PIC. The LEMU sighted the board at the last minute and stopped the train about 50 m past the CSB but short of the worksite. There were no injuries.

1.8.6 Had the CSB been placed at the controlled signal and the signal been held at stop, in accordance with Tranz Rail operating rules, the incident may not have happened.

2 Analysis

2.1 CSP was an appropriate method of protection for contractors working on Glen Innes platform because of the need for heavy machinery to occasionally interfere with the safe operation of trains. The daily bulletin for the work had adequately identified the limits of the worksite as well as the phonetic call sign of the PIC for communication purposes.

2.2 AWBs and CSBs were sited at specific locations as determined by the Working Timetable to minimise disruptions to suburban train operations. The boards were located at stations so that LEMUs had unobstructed view lines from their approaching train. In most cases, the commuter passenger trains would be approaching stations at slow speed preparing to stop for passenger work.

2.3 The construction work at Glen Innes Station had been underway for some months, so LEMUs were familiar with the procedure of requesting permission to pass the CSB. The trainee LEMU on Train 3366 had correctly followed the procedure some 2 hours earlier when driving Train 3358 from Westfield to Auckland so he was aware of the requirements of CSP.

2.4 The trainee LEMU made his first attempt to contact the PIC at Glen Innes from the AWB at Panmure while his train was stationary. After the second unsuccessful attempt he realised that his radio had been switched off. Why the radio had been turned off before the train arrived at Panmure could not be determined.

2.5 CSP regulations in place at the time allowed LEMUs to contact the PIC while their train was on the move, or from any location up to the CSB. However, in the Auckland suburban area the radio transmission was generally made at the AWB while the train was stationary for passenger work or while the train was on the move somewhere between the AWB and the CSB. While a train remains stationary, the LEMU can direct all his attention to his transmission and the PIC's response without being distracted by other driving duties.

2.6 The trainee finally made contact with the PIC when the train was at "old[7]" Tamaki Station, a location that has long been recognised by Tranz Rail as a site where there was poor Channel 1 radio coverage and this was documented in the Working Timetable. Channel 1 radio transmissions were not recorded in the manner that radio transmissions between train control and track users were. As a result, there was no opportunity to review the content of the transmission between the trainee LEMU and the PIC. Had this been possible, the words spoken and the quality of the radio reception and its impact on this incident may have been determined. A safety recommendation to address this issue has been made to the operator.

2.7 Both the trainee LEMU and his minder driver confirmed that, because of the extent of background static noise on the radio, they had difficulty in hearing the full response from the PIC. Because of the poor quality of radio coverage, the minder driver as the person responsible for the safe operation of the train should have satisfied himself beyond doubt that authority to pass the CSB had been given before doing so. The absence of a response from the PIC to the trainee LEMU's repeat back should not have been assumed to be authority to pass the CSB, rather the train should not have passed the CSB until a positive response had been received.

2.8 The minder driver had more than 35 years' experience driving freight and passenger trains and in that role most likely would have known, and controlled his trains in accordance with, the rules surrounding CSBs. However, he was new to the tutoring role in which he had to monitor and supervise the actions of a trainee driver, balancing the needs of allowing the trainee to control the train and knowing when to intervene. A more experienced tutor might possibly have not allowed the trainee to pass the CSB without clear authority.

2.9 Although not authorised, the continuation of Train 3366 to Glen Innes platform was carried out in relative safety because:

- the LEMU had stopped at the up main platform some 2 hours earlier and was aware that all the construction activity was on the down main side of the station platform
- the PIC was expecting a train to arrive on each main line and had ensured the track was safe for the passage of those trains
- the train was approaching the platform at slow speed preparing to stop for passenger work.

[7] Tamaki Station is no longer a designated passenger stop for suburban rail passengers.

2.10 The PIC maintained that he was still attempting to enquire as to who was calling Foxtrot Uniform when Train 3366 approached the platform to pick up waiting passengers. In the absence of a recording of the transmission the Commission was unable to resolve the differing accounts. However, the meticulous records maintained by the PIC that included the train number and time that authority was given to pass the CSB, would indicate that authority had probably not been given for Train 3366 to pass the CSB.

2.11 CSP was reliant on the correct use of radio procedures and clear communications. In particular site identification, train numbers, speeds, metrages and phonic call signs must be transmitted clearly and repeated back before a train was authorised to pass a CSB. The radio transmission made from Tamaki station was from a location where Channel 1 radio coverage was known to be poor and identified as such in Tranz Rail's Working Timetable. Had the train been required to stop at the CSB, where there was satisfactory Channel 1 radio coverage, the LEMU would probably have received a clear transmission and the incident been averted.

2.12 Tranz Rail's operating rules and regulations required trains to stop at all signals displaying a red aspect or for red flags and wait until authority is received to pass that signal or flag. Although the CSB displayed a reflectorised red circle, it was also marked with the word "conditional", and Tranz Rail's rules at the time permitted the CSB to be passed without having to stop short of the board, if permission had been granted. To use a roading analogy, because of the red circle, the signage represented a compulsory stop. However, the operating rules treated the CSB as if it was a give way and permitted, with authority from the PIC, the CSB to be passed without the need to stop. In view of the amendment made to Tranz Rail's Rule 905 (g) requiring trains to stop at CSBs and the locomotive engineer to contact the PIC for authorisation to pass the CSB, 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 Conditional Stop Protection was appropriate for the work being undertaken at Glen Innes Station.

3.2 The Conditional Stop Boards and Advanced Warning Boards were erected at appropriate locations in accordance with documented procedures.

3.3 The LEMU of Train 3366 had passed through the worksite without incident on another train some 2 hours earlier.

3.4 The known poor performance of the Channel 1 radio system in the Tamaki area contributed to the incident.

3.5 Train 3366 entered the work area without the train crew clearly establishing that they had proper authorisation to do so.

3.6 Although at the time of the incident Train 3366 was being driven by a trainee LEMU, the minder driver was responsible for the safe operation of the train.

4 Safety Actions

4.1 A Tranz Rail analysis of incidents involving the use of Conditional Stop Protection for the quarter ending 30 September 2003 identified the following categories:

- trains passing CSBs without authority
- authority being given to pass CSBs before the worksite was safe
- conditional authority to pass CSBs being given when a portion of the line remained obstructed
- misunderstandings because of the use of incorrect radio procedures
- CSBs erected at the wrong location
- CSBs left in place after the work was completed
- incorrect method used to protect a worksite.

4.2 In October 2003, Tranz Rail established a joint working party to review the Conditional Stop Protection Method. The working party included personnel representing Tranz Rail, Transfield Infrastructure Services and Rail and the Maritime Transport Union.

4.3 The review resulted in a number of amendments to the Conditional Stop Protection Rule that was implemented on 19 April 2004 (see Appendix 1).

4.4 Tranz Rail conducted a series of radio focus weeks between 30 October 2003 and 19 April 2004 for staff to refresh their knowledge of correct radio procedures. Audits were held to measure compliance with documented procedures.

5 Safety Recommendation

5.1 On 16 November 2004 the Commission recommended to the Chief Executive of New Zealand Railways Corporation that he:

> draft an amendment for the approval of the Executive of National Rail Safety System that requires all locomotives and self propelled rail vehicles to be equipped with a facility to record voice communication on the local radio channel (currently Channel 1 and Channel 5). (079/04)

5.2 On 30 November 2004 the Chief Executive of New Zealand Railways Corporation replied:

> Further work is required by New Zealand Railways Corporation (NZRC) before deciding whether to implement this recommendation, based on the following. NZRC considers that a risk review is necessary to determine the policy that should apply for the provision of a voice recording facility on a Rail Service Vehicle (RSV), before any amendment is proposed to the relevant NRSS standard.
>
> This review would obviously consider the risks and timeframes to apply for various types of RSV's in use on the National Rail System. For example the risks are different for Trains vs Mobile Track Maintenance (MTMV) and High Rail Vehicles (HRV).
>
> The cost of implementation of voice recoding facilities is significant, and any implementation programme needs to be weighed up against other priorities for investment in safety migration projects, that may provide greater risk reduction.

Approved on 22 November 2004 for publication

Hon W P Jeffries
Chief Commissioner

Appendix 1

Network Operations

WELLINGTON

BULLETIN NO. 227 (6 pages)
(Semi-permanent)

TRANZ RAIL

9 April 2004

C A N C E L L A T I O N

*Bulletin No.44 (Semi-permanent) dated 16 January, 2004, re special instructions for Conditional Stop Protection is **cancelled** at 0001 hours on Monday 19 April 2004.*

NOTE: Where a paragraph is marked with a vertical line and the print is italic this indicates either it is a new instruction or if it was a previous change, a further change has been made.

Commencing at 0001 hours on Monday 19 April 2004 and continuing until further advised the following instructions will operate. The relative Rules are modified accordingly.

Engineering Rules and Extract Track Occupancy Protection Rules
(changes to present instructions)

Conditional Stop Protection

Following recent incidents involving Conditional Stop Protection it will now be necessary for Locomotive Engineers to **STOP** trains at Conditional Stop Boards and then observe the following procedure:-

- Once the train is stopped the Locomotive Engineer will initiate contact with the Site Protector using the radio call sign allocated for the work on the Information bulletin.

- The Locomotive Engineer will obtain from the Site Protector:-
  - authority to pass the Conditional Stop Board
  - any associated instructions regarding speed through the work site.

This procedure aligns with that used for authorising passing of Signals at "Stop" where the train must be stopped at the Signal concerned.

905. Conditional Stop Protection
Note: The advance warning and conditional stop boards described in this rule are not to be used. New boards as described herein must be used

(b) When to use Conditional Stop Protection (replaces existing instruction)
Conditional Stop Protection must be used whenever planned work involves breaking the track, or will interfere with the safe operation of trains, e.g.

- welding
- rerailing (including short closer rails)
- maintenance with heavy tools and/or equipment

Planned work (which includes other work of more than 90 minutes duration) which is planned at least one day in advance must be advised to the Authorities office the day before so that the appropriate bulletin can be arranged. Emergency situations and work of an urgent nature that is arranged on the day will be added to the appropriate bulletin by Train Control and Locomotive Engineers advised accordingly.

BULLETIN No. 227 - continued WELLINGTON 09.04.04
(Semi-permanent)

905. Conditional Stop Protection continued

(c) Positioning of Stop Signals and Boards (replaces existing instruction)

Advance Warning Boards, Inner Warning Boards and Conditional Stop Boards must be placed on **each** side of the line opposite each other. The minimum side clearance is to be 2.15m from the centre line of track. In double-line sections smaller boards may be used on the right hand side midway between the lines. They should not project more than 850 mm above rail level.

The Metrages shown on bulletins indicate where the Conditional Stop Boards will be located. In Double Line Automatic Signalling areas where the Conditional Stop Board is erected on one line only, a metrage indicating the termination of the work site will be shown on the bulletin.

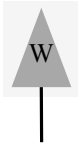
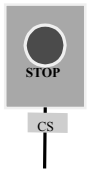
Note: Some of the lines leading to the work area may include an exit from a yard or siding where it may not be possible to erect Inner Warning Boards or Advanced Warning Boards. These circumstances must be notified on the bulletin.

(d) Establishing Protection (replaces existing instruction)

Before work starts: -

- Establish no trains are closely approaching
- Erect Advance Warning Boards *2000* metres in advance of the outer limits of the work area.
- Erect Inner Warning Boards *800* metres in advance of the outer limits of the work area.
- Erect Conditional Stop Boards *500* metres in advance of the outer limits of the work area.

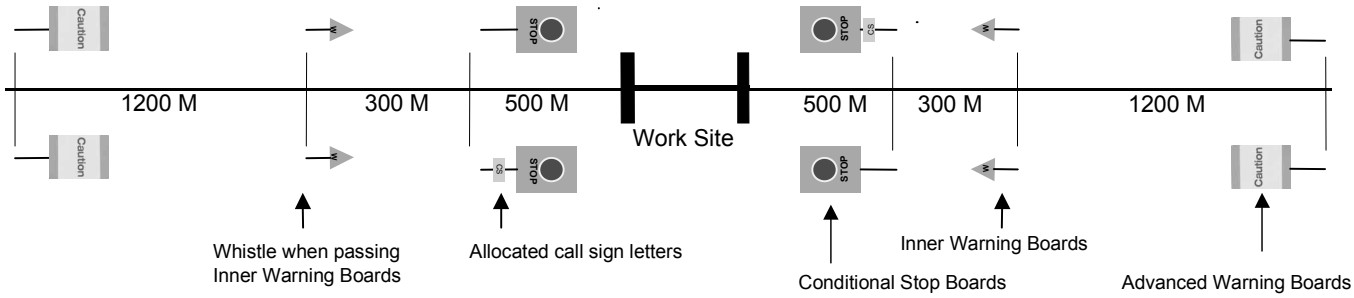
The metrages where the Conditional Stop Boards are erected will be shown on the bulletin.

ADVANCE WARNING BOARD	INNER WARNING BOARD	CONDITIONAL STOP BOARD
		
SIGN: Reflectorised yellow/green with reflectorised orange strip top and bottom	SIGN: Reflectorised orange with letter **W** in centre (W denotes "Whistle")	SIGN: Reflectorised orange with reflectorised red centre circle
Meaning: Caution, prepare to Stop at Conditional Stop Board ahead	Meaning: Sound whistle, prepare to Stop at Conditional Stop Board ahead	Meaning: STOP, obtain authority from Person in Charge to pass

Note: In Single line the right hand Conditional Stop Board will display the letters denoting the allocated call sign below the board.
In Double line the left hand Conditional Stop Board will display the letters denoting the allocated call sign below the board.

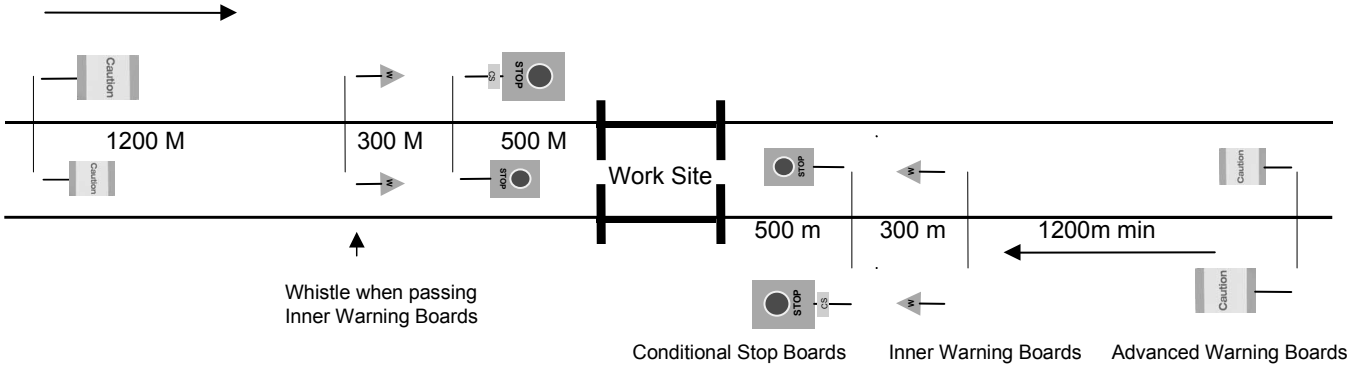
Locomotive Engineers must sound the locomotive whistle when approaching the Inner Warning Board

Example of Single Line protection



- Minimum side clearance to all boards to be 2.15m from track centre line
- Protection to be provided in each direction from the work area

Example of Double Line protection - both lines protected



- Boards to be erected between main lines to be placed centrally and must not project more than 850mm above rail level.
- Protection to be provided in normal direction of travel approaching the work area
- If both lines affected, protection to be provided on both lines
- If wrong line running or a setting back movement is required on the obstructed line protection must be provided on both sides of the work area.

(g) Conditional Stop Board not to be Passed unless Authorised (replaces existing instruction)

- Trains **must stop** at Conditional Stop Boards.
- Once stopped, the Locomotive Engineer must then contact the Person in Charge (Site Protector) for authorisation to pass the Conditional Stop Board.

(i) Temporary Speed Restrictions over Work Site (replaces existing instruction)

When it is necessary to restrict the speed of trains over work sites, the Person in Charge will advise temporary speed restrictions to Locomotive Engineers. Inner "C" and "T" boards are to be used to identify the commencement and termination of each restriction.
NOTE: Boards do not need to be used when the speed restriction is to apply for the entire work area.

BULLETIN No.227 – continued WELLINGTON 09.04.04
(Semi – permanent)

(j) Radio call signs (replaces existing instruction)

The Person in Charge will be allocated a special call sign on the information bulletin. This is to be used for all communications between the Person in Charge, Locomotive Engineers and Train Control. This call sign will be displayed on one Conditional Stop board

Radio procedures for passing Conditional Stop Boards:

This instruction replaces the radio procedures card currently on issue

AUTHORITY TO PASS THROUGH WORKSITE

LOCOMOTIVE ENGINEER (initiates call)

- **(Phonetic call sign)** This is (train number), en route for (location) (* on the **up/down line**). I am stopped at your "Conditional Stop Board".
- **Over**

INFRASTRUCTURE Acknowledgement

- (Train number), This is **(Phonetic call sign).**
- You are authorised to pass my "Conditional Stop Board" (* on the **up/down line**) and proceed through the worksite at **(speed)** km/hr.
- **Over**

LOCOMOTIVE ENGINEER

- **Roger – (Phonetic call sign)** Pass your "Conditional Stop Board" (* on the up/down line) and proceed through the worksite at **(speed)** km/hr.
- **Over**

INFRASTRUCTURE Acknowledgement

- **Roger -** that is correct **(Phonetic call sign)**
- **Out**

***** use up/down line where appropriate

(L) Missing Boards – (new instruction)

When boards are not sighted at expected positions Locomotive Engineers must stop their train and establish contact with the Person in Charge. The Person in Charge will advise on what action to take.

907. Variations to Location of Stop Signals and Boards

(a) Obstruction near Tunnel – **Danger stop signals and detonators, Advanced warning boards, Inner warning boards and Conditional Stop boards must be placed at least 400 meters beyond the tunnel where Locomotive engineers will have clear and distant sighting. Boards must not be erected in tunnels.**

(e) Where a **station** intervenes between where the Advance Warning Boards and Conditional Stop Boards are erected:

Single Line Crossing station

- The Inner Warning Boards are to be erected adjacent to the Departure signals or Trailing Indicators/Starting signals.

Double Line Interlocked Station

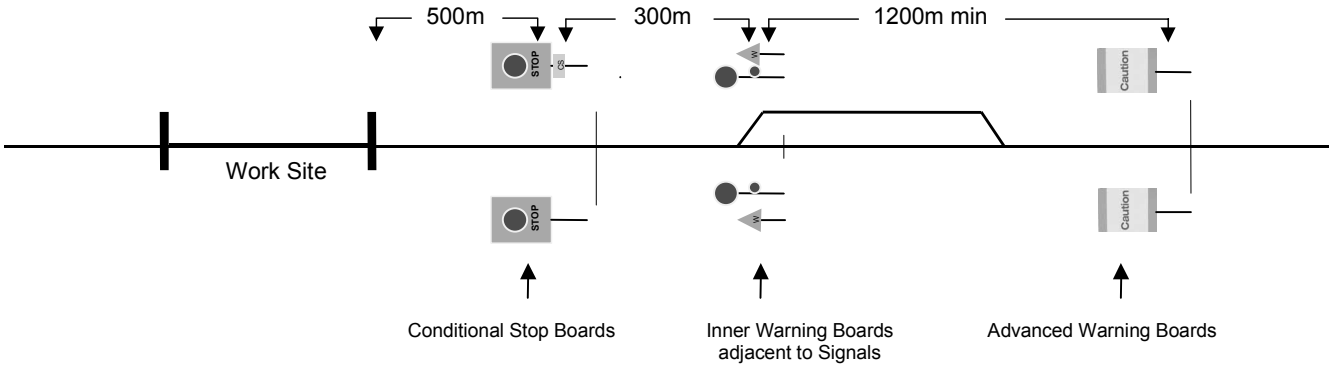
- The Inner Warning Boards are to be erected adjacent to the Starting signals.

Passenger Stop, Metro areas

- The Inner Warning Boards are to be erected in a position where the Locomotive Engineer of a train stopped at the station platform will have a clear view of the boards.

When planning protection near stations the Person in Charge must refer to the above conditions and advise Authorities on the Bulletin application where the Inner Warning Boards are to be erected at stations. This information will be included on Bulletins.

Example of CSB protection arrangements - Single line crossing station intervenes between Advance Warning Board and Conditional Stop Board



If there is a variation to these distances this should be highlighted on the bulletin

909. Work Within Station Limits and Sidings

(b) Non Interlocked Area (additional instruction)

The hi-viz, orange in colour cover (sock) referred to in this clause is made to a Tranz Rail Ltd standard (Drawing No.15011005).

BULLETIN No.227 – continued WELLINGTON 09.04.04
(Semi – permanent)

912 Temporary Reduction of Line Speed

Track/Signals maintenance crews now carry new miniature outer and inner speed boards and poles in their vehicles.
Conventional boards will replace the miniature boards within 72 hours of the restriction being applied.

(b) Implementing Restrictions (additional instructions)

When it is necessary to temporarily reduce the speed of trains due to an unplanned event; e.g., automatic crossing alarm failure, track problem etc, the following arrangements apply: -

- Train Control may immediately be required to apply a speed restriction.
- Immediately on arrival at the defective place the Person in Charge must contact Train Control.
- Train Control will advise when the temporary speed restriction boards should be erected after taking account of anticipated train movements.
- Train Control must be advised when the boards are in place.

(e) Erection of Speed Boards (additional instructions)

Outer Speed Boards

(i) Miniature Board (new style) - Facing side consisting of a fully reflectorised yellow background. Maximum speed to be run shown thereon by black numerals. Reverse side bare aluminium.

(ii) Conventional Board (new style) – Facing side painted yellow with reflectorised border. Maximum speed to be run indicated thereon by black numerals shadowed in yellow reflecting material. Reverse side painted white with reflectorised border.

Inner Speed Boards

(i) Miniature Board (new style) – Facing side at commencement of the speed restriction; white reflectorised background with letter ”C” facing side at the termination of the speed restriction area; white background with the letter “T”. Used in conjunction with Outer Speed boards.

(ii) Conventional Board - Facing side painted white. Lettered “C” at the commencement and “T” at the termination of the speed restriction area. Used in conjunction with Outer Speed boards.

NOTE: A reflectorised plate is used on the “C” face of some inner Speed boards and this may show a rectangular shape by night.

The 24-hour arrangement for non-erecting of speed boards as referred to in the Rail Operating Code Section 7 and Track Code Instruction G93 will no longer apply; the G93 instruction has been modified on Infrastructure SIN G.013.

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

03-113	diesel multiple unit, passenger Train 3366, passed conditional stop board without authority, Glen Innes, 30 October 2003
03-112	diesel multiple unit Train 2153, collision with truck, St Georges Road level crossing, Avondale, 28 October 2003
03-110	express freight Train 337, derailment, Kaimai Tunnel west portal, 9 August 2003
03-109	passenger express Train 804, Tranz Alpine, stalled and slid back, Otira Tunnel, 28 March 2004
03-104	express freight Train 380, derailment, Taumarunui, 16 February 2003
03-103	hi-rail vehicle and express freight Train 142, track occupancy irregularity, Amokura, 10 February 2003
03-102	hi-rail vehicle 67425, derailment, near Fordell, 10 February 2003
03-101	express freight Train 226, person injured while stepping down from wagon, Paekakariki, 7 January 2003
02-130	express freight Train 220, derailment, Rukuhia, 18 December 2002
02-127	Train 526, track warrant overrun, Waitotara, 17 November 2002
02-126	hi-rail vehicle 64892, occupied track section without authority, near Kai Iwi, 18 November 2002
02-122	express freight Train 215, derailments, Hamilton and Te Kuiti, 18 October 2002 express freight Train 934, derailment, Sawyers Bay, 25 March 2003
02-120	electric multiple units, Trains 9351 and 3647, collision, Wellington, 31 August 2002
02-118	express freight Train 484, near collision with hi-rail vehicle, Tauranga, 7 August 2002
02-117	express freight Train 328 signal passed at stop, Te Rapa 31 July 2002
02-116	express freight Train 533, derailment, near Te Wera, 26 July 2002
02-112	passenger fell from the Rail Forest Express, Tunnel 29, Nihotupu Tramline, Waitakere, Saturday 4 May 2002

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Price $ 24.00 ISSN 0112-6962