



**Report 97-112**

**Train 1605**

**disabled**

**Rimutaka Tunnel**

**17 October 1997**

### **Abstract**

On Friday 17 October 1997, Train 1605 was conveying approximately 60 passengers from Masterton to Wellington on its scheduled service. At 1050 hours when 2.5 km into the 8.8 km long Rimutaka Tunnel the train was stopped as a result of an electrical failure in the locomotive control gear. At 1258 hours a relief locomotive was able to clear the disabled service from the tunnel. There were no injuries. Safety issues identified were the lack of any integrity check of the telephone system within the tunnel, the lack of co-ordination of emergency responses and the lack of communication which hampered prompt evacuation of the passengers and crew.

# Transport Accident Investigation Commission

## Rail Incident Report 97-112

<b>Train type and number:</b>	Passenger, 1605
<b>Locomotive:</b>	DC4591
<b>Date and time:</b>	17 October 1997, 1050 hours
<b>Location:</b>	Rimutaka Tunnel, 45.5 km Wairarapa Line
<b>Type of occurrence:</b>	Train disablement within tunnel
<b>Persons on board:</b>	Crew: 2 Passengers: approximately 60
<b>Injuries:</b>	Nil
<b>Damage:</b>	Burnt out electrical control gear on the locomotive
<b>Investigator-in-Charge:</b>	R E Howe

# 1. Factual Information

## 1.1 Narrative

- 1.1.1 On Friday 17 October 1997, Train 1605, a scheduled Tranz Rail Limited (Tranz Rail) passenger service, was operating from Masterton to Wellington. The train consist was passenger carriages A2095 and AL2073 hauled by locomotive DC4591. It was crewed by a locomotive engineer (LE) and a guard, and carried approximately 60 passengers.
- 1.1.2 After Train 1605 had entered the Rimutaka Tunnel an electrical fault<sup>1</sup> occurred to the control gear of the locomotive. As required by Tranz Rail procedures the LE made two attempts to reset the relays to overcome the problem, which were not successful. He then noticed intense fumes coming from the electrical cabinet behind him and stopped the train, shut down the engine<sup>2</sup> and vacated the cab. The locomotive stopped at 1050 hours, 2.5 km inside the Featherston end of the tunnel.
- 1.1.3 The LE stated the fumes had only a minor effect on him before he was able to vacate the cab.
- 1.1.4 The LE and the guard discussed the situation on the ground and then returned to the locomotive to ventilate the cab and establish that there was no danger of fire. The passengers were then advised of the reason for the delay and that there was no cause for concern. Emergency lighting<sup>3</sup> had been switched on and lit the carriages adequately.
- 1.1.5 With the passengers reassured the crew tried to contact Train Control by trying seven of the telephones mounted at approximately 400 m intervals along the tunnel wall. Having established that the line was inoperative they decided that the guard would walk to the northern (Featherston) end of the tunnel to obtain assistance while the LE remained with the train.
- 1.1.6 When the guard arrived at the northern portal at approximately 1135 hours he managed to obtain partial reception of transmissions on his hand-held cellphone which satisfied him that relief measures were underway, but because of the poor reception in the area he could not communicate with Train Control or the emergency services.
- 1.1.7 A passenger who had made a request to accompany the guard on the walkout elected to continue walking along the track towards Featherston and was given details of the situation in the event of him meeting the relief crews. (Tranz Rail's standard practice was to send relief from the direction in which the train had come to minimise the possibility of conflict.) Having satisfied himself that relief was on the way from the northern end, the guard then returned to the train, arriving at about 1200 hours.
- 1.1.8 Train Control had called out the ganger who had custody of the Hi-rail vehicle (HRV) at Masterton at 1115 hours. He picked up the Featherston Fire Chief and fire crew from Featherston by 1140 hours and proceeded to the tunnel on rail. While travelling to the tunnel they met the passenger who had walked out and he explained that the train had broken down 2.5 km inside the tunnel and that the telephones were not working. The passenger was not aware how many other passengers were on the train. The HRV was the first relief and it reached the train at about 1205 hours.

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<sup>1</sup> The electrical fault occurred when the traction motor field open circuited, causing a high voltage surge between two adjacent contacts on the RVR (reverser). The resulting flashover caused molten metal to burn through the insulated casing of the contactor and spill into the bus bars and power cables. The fault set off ground relay failures that disabled the traction circuit. The resultant spill of molten metal onto insulated casings filled the locomotive cab with fumes.

<sup>2</sup> In this context, the 'engine' relates to the diesel engine which provides the motive power for the locomotive.

<sup>3</sup> The lighting system in the two passenger carriages on Train 1605 had been upgraded recently from 24V to 240V, with a modern battery system for emergency backup. The new battery system gave approximately seven hours of emergency lighting compared with the one hour previously available.

- 1.1.9 After the HRV arrived at the disabled train the Fire Chief and most of his crew stayed with the train while seven passengers (five adults and two children) were evacuated by HRV to the northern portal accompanied by the guard, a fire officer and the ganger. Some passengers were chosen on the basis of their age and discomfort and the balance from passengers who elected to leave by this method. On reaching the northern portal at 1230 hours, the HRV “off-tracked” as the ganger was aware a relief locomotive was on its way from Featherston.
- 1.1.10 At this stage, the ganger was able to make radio contact with the LE of the relief locomotive which had departed Featherston at 1217 hours and instruct him to come up to the off-tracking stand. The relief locomotive arrived at the north side of the off-tracking stand at 1236 hours. The fire officer from Featherston and Train Control (through the LE of the relief locomotive who had radio contact) discussed whether the relieving locomotive would be taking the disabled train through to Upper Hutt or back to Featherston.
- 1.1.11 The fire officer stated he was concerned with the condition of an elderly lady on the HRV who was suffering from angina and had difficulty breathing. He was anxious to get oxygen to her early and knew this could best be achieved by getting her to emergency services at Featherston. He was also aware of the anxious state of some of the elderly passengers left on the train and considered that the best course of action was for the train to be brought back to Featherston where he knew there was adequate and readily available relief. As this action was in conflict with the advised emergency plan understood by Train Control (to have the train propelled to Upper Hutt), the fire officer exerted his influence, backed by his own personal knowledge of the situation, to change the planned course of action. He was not aware of the emergency procedures or the details of the emergency services waiting at the southern portal.
- 1.1.12 Having been advised by Train Control that he was to take Train 1605 back to Featherston, the LE of the relief locomotive entered the tunnel allowing the HRV to depart with its passengers at 1246 hours. (The HRV could not “on-track” until the relief locomotive had moved south of the off-tracking stand.) On arrival at Featherston the distressed passenger from the HRV was taken by waiting ambulance to the Featherston Medical Centre.
- 1.1.13 The relief locomotive coupled onto Train 1605 and by 1258 hours had reached the northern portal on its way back to Featherston. On arrival at Featherston, 27 of the passengers were bussed to Wellington and 20 to Masterton. One man was taken by car to the Wellington Hospital to keep an appointment and two passengers were transported to the Featherston Medical Centre for treatment, one with chest pains and one with asthma. The balance of the passengers departed from the station without assistance.

## **1.2 Personnel**

- 1.2.1 The LE had 15 years railway experience and gained his first class driver’s ticket in 1989. He held a current operating certificate.
- 1.2.2 The guard had 25 years railway experience, and had been a Tranz Metro guard for the last 15 years. He held a current operating certificate.

## **1.3 Rimutaka Tunnel**

- 1.3.1 The southern portal of the tunnel is at 39.276 km on the Wairarapa Line and 7.122 km from Upper Hutt Railway Station. The tunnel is 8.8 km long and is graded with a high point near the middle and with down gradients of 1 in 400 to the south and 1 in 180 to the north.

- 1.3.2 The tunnel is provided with a vertical ventilation shaft to the ground surface near the centre of the tunnel. Under normal operating conditions and taking standard precautions, the ventilation is adequate. However if a train is stopped in the tunnel for more than five minutes it is required to stop its engine to minimise fumes.
- 1.3.3 There is public road access to Maymorn, approximately 500 m south of the southern tunnel portal and private road access to within 20 m of that portal.
- 1.3.4 The nearest public road access on the northern side of the tunnel is Speedy's Crossing (Western Lake Road) approximately 7 km from the portal. Access for equipment and personnel beyond this crossing is by HRV. Private farm access permitted vehicles to approach to within 500 m of the northern portal and this was used by Police and New Zealand Fire Services (NZFS) staff on the day. Vehicular access to the northern tunnel portal beyond that point was prevented by swampy land.
- 1.3.5 Following a locomotive fire in the tunnel on 4 February 1995<sup>4</sup> discussions between New Zealand Rail Limited (NZRL) (now Tranz Rail) and the NZFS included the following proposals for action by NZRL:
- a) Road vehicle access to the northern portal to be upgraded, to allow more ready access by emergency service vehicles.
  - b) NZRL to provide NZFS with a detailed access plan to the southern portal at Maymorn.
  - c) In the event of a tunnel emergency, NZRL to assist NZFS by providing HRVs to transport personnel and equipment to the scene. NZRL would routinely call out their track staff at either Upper Hutt or Masterton (or both) to a tunnel emergency, the staff at both locations being equipped with HRVs.
- 1.3.6 Proposals b) and c) were implemented but a) was not.

#### **1.4 Control of trains**

- 1.4.1 The rail traffic on the Wairarapa Line is controlled by Centralised Traffic Control (CTC) which can detect and display in which of the various track circuited sections within the block that make up the line the train is located. The Rimutaka Tunnel forms part of the block section between Maymorn (at the Upper Hutt end of the tunnel) and Featherston. The CTC system could not detect or display the position of a train within the tunnel.
- 1.4.2 The CTC circuit included a warning system which detected if a train had been in the tunnel for more than 15 minutes (twice the normal running time of a freight train through the tunnel). The warning system was connected to the signal panel at Upper Hutt and if the alarm sounded emergency procedures were activated. Appendix 1 details these emergency procedures.
- 1.4.3 At 1055 hours the alarm indicated to the signalperson at Upper Hutt that Train 1605 had not exited the tunnel within 15 minutes of entering and at 1058 hours he advised Train Control Wellington accordingly.

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<sup>4</sup> TAIC Railway Occurrence Report 95-104.

## 1.5 Train Control action

- 1.5.1 Following the advice of the non-exit of Train 1605 from the tunnel, the following significant events were initiated by the Network Control Manager's (NCM) office to provide emergency services at the southern portal:

Time	Event
1117 hrs	Arranged dispatch of HRV to Maymorn from Woburn.
1117 hrs	Wellington Fire Service control room advised.
1123 hrs	Wellington Police control room advised.
1130 hrs	Wellington Free Ambulance (WFA) advised. (Based on an estimated passenger count of 20 advised by Tranz Rail, two ambulances were sent to Maymorn.)
1143 hrs	Tranz Rail Area Manager Wellington advised and proceeded to Maymorn to assume Site Manager role.
1145 hrs	Four 4-wheel vehicles dispatched to the southern portal. (Placed on standby at Maymorn.)
1155 hrs	Police requested to arrange for Victim Support at Maymorn. (Updated passenger figure of 60 supplied to Police by Train Control.)

- 1.5.2 The following significant events were initiated by NCM to provide emergency services at the northern portal:

Time	Event
1104 hrs	Track Ganger Masterton contacted to take the HRV to the northern portal. (Ganger requested by Train Control to uplift the Featherston Fire Crew at the Featherston Railway Station on route to the portal.)
1112 hrs	NZFS Featherston advised of situation. (While waiting at the Featherston Station the fire crew became aware that Tranz Rail staff on site understood the passenger numbers were approximately 50.)
1133 hrs	Wairarapa Ambulance Service (WAS) advised by WFA of emergency situation. Seven vehicles committed, including three sent to Speedy's Crossing, to cater for the 20 passengers advised (at 1146 hours WAS were monitoring WFA and heard that passenger numbers had now been advised by Tranz Rail as "30 to 40", and the WAS response assumed 40 maximum from then on).
1235 hrs	Operations Manager, Tranz Link Masterton advised and proceeded to Featherston to assume Site Manager role.

## **1.6 Southern response**

- 1.6.1 At 1143 hours Central Fire Control advised Train Control that the train had broken down some 2.5 km into the tunnel. This information had been obtained through the Featherston Fire Chief from the passenger who had walked out of the tunnel and met the fire crew on the HRV. This was the first indication that the southern response team had of the particular circumstances.
- 1.6.2 The Police Command Post vehicle arrived at Maymorn at approximately 1145 hours and was established as the overall emergency Command Post. Tranz Rail's Area Manager, advised of the emergency at 1143 hours, arrived at Maymorn at approximately 1220 hours to provide Tranz Rail support to the Command Post.
- 1.6.3 At 1145 hours the Post Commander confirmed the general understanding that since the southern end of the tunnel offered better road access and was nearer a hospital, the disabled train should be moved to that end. Ambulances would take passengers requiring urgent medical treatment to Lower Hutt Hospital and the remaining passengers go by rail to Upper Hutt. On Tranz Rail's initial advice enough ambulances for 20 passengers went to Maymorn.
- 1.6.4 At 1155 hours Train Control advised the Command Post that 60 passengers, the average number for a Friday, were likely to be on the train.

## **1.7 Northern response**

- 1.7.1 By 1146 hours WAS were responding on the basis of their understanding that a train with up to 40 passengers could be coming out at the north end. At 1150 hours the Command Post advised the northern police headquarters of the decision to take the train to the south end although Featherston services were not to be stood down. The HRV was out of contact at this stage.
- 1.7.2 WAS advised they received an official "stand-down" from Masterton Police at 1228 hours but elected to remain committed.
- 1.7.3 On receipt of the information on the train location NCM made arrangements to dispatch a relief locomotive from Featherston to assist the disabled train. The relief locomotive arrived at the off-tracking stand at the northern portal at approximately 1236 hours.
- 1.7.4 At approximately 1230 hours WAS had redeployed three ambulances to Rimutaka Summit in response to a request for possible additional vehicles at the south end from WFA.
- 1.7.5 At 1303 hours WAS was able to confirm conflicting indications that the train may be coming out to Featherston by talking to the NZFS officer on board the HRV when it arrived at Featherston. All WAS vehicles were immediately redeployed to Featherston.
- 1.7.6 The train arrived at Featherston Station at approximately 1315 hours. The Masterton Police had stood down at 1224 hours and there were no Police on site at Featherston when the train arrived. WAS were in attendance and all passengers were triaged by 1336 hours, with those requiring attention referred to the Featherston Medical Centre.
- 1.7.7 At approximately 1320 hours Wairarapa Victim Support received their first advice of the incident. Although they were able to respond promptly most of the passengers had departed before victim support were on site.

## **1.8 North/South communications**

- 1.8.1 At approximately 1245 hours the NCM office advised the Command Centre that the recovery plan had been altered by the on site request from the NZFS officer at the northern portal to recover the train to Featherston. At a later stage (1320 hours) the Featherston Police recognised that no provision had been made for victim support and this was duly arranged.

## **1.9 Formal emergency services system**

- 1.9.1 Following the locomotive fire in the tunnel in 1995, Tranz Rail developed the emergency procedures detailed in Appendix 1 in conjunction with Police (and others).
- 1.9.2 On 17 October 1997 the only copies of the procedures held by the various emergency services involved were at Upper Hutt Police Station and on the Police Command Unit vehicle. Other emergency services involved were not aware that particular procedures had been laid down for an emergency in the Rimutaka Tunnel although Tranz Rail advised that the NZFS had been involved with the development of the procedures.

## **1.10 Communications**

- 1.10.1 Unlike other long tunnels (e.g. Otira and Kaimai), the Rimutaka Tunnel was not cabled for Radio Communication; train to Train Control to enable single person operation. The only available communication within the tunnel was by 22 telephones fixed to the side of the tunnel wall at an average spacing of about 400 m for the full length of the tunnel and linked directly to Wellington Train Control by cable.
- 1.10.2 The telephones enabled staff in the tunnel to contact Train Control direct but it was not possible for Train Control to selectively ring any telephone in the tunnel.
- 1.10.3 Each telephone had a light fixture above it, some of which were found to be inoperative during an inspection following the incident due to damage sustained from items such as loose tarpaulins and ropes on passing wagons.
- 1.10.4 Because of a loose wiring joint in the tunnel telephones wiring circuit at the Train Control equipment room the telephones were all out of operation. Train Control were unaware of the failure in the system until 1143 hours when the HRV ganger (via the NZFS) had talked with them following the discussion with the passenger who had walked out of the tunnel.
- 1.10.5 Section S.44b of Tranz Rail's Operations Group Code (Signals and Communications) stipulated that track and line telephones connected to cable circuits must be tested annually by section staff to ensure proper working order. The cable circuit telephones in the tunnel had last been tested on 28 August 1997.
- 1.10.6 Section S.45 of the Code stated: "Telephone Metrage Numbers must be maintained in easily readable condition on or adjacent to trackside telephones". Instruction 8.8.4 of Tranz Rail's Working Timetable listed the individual metrages of the 22 telephones within the tunnel but the metrages were not displayed at the telephone sites.
- 1.10.7 Because of the terrain at the northern portal the effectiveness of cellphones could not be guaranteed. Reception near the portal was intermittent and transmission unreliable.
- 1.10.8 Passengers interviewed expressed surprise and dissatisfaction with the long delay. However they indicated that the information given to them by the LE and the guard was adequate under the circumstances, that they answered concerns promptly and there was no undue panic or agitation.



## **1.11 Train disablement**

- 1.11.1 Train disablements can occur due to a variety of mechanical, electrical, human or other factors. Disablement is not uncommon and Tranz Rail's Rules and Regulations cover such eventualities.
- 1.11.2 The disablement of Train 1605 was caused by a combination of open circuiting of the traction motor field, most likely due to a loose connection, and a resulting flashover due to a possible dirt build-up on the contactors. Disablement due to this cause is not common.

## **2. Analysis**

### **2.1 General**

- 2.1.1 The problems associated with emergency responses to railway tunnel accidents or incidents have been recognised for some years. Rail tunnels, by their very nature, can be inaccessible due to the topography they traverse and this makes rescue operations difficult. Occasionally an access track is available to a portal but generally access is along the track or across country.
- 2.1.2 There is little clearance within tunnels for normal train movements and in the event of an accident the already tight clearance can be reduced to nothing with the spread of wreckage.
- 2.1.3 In the event of a mishap in a tunnel there are also the problems of lack of light, poor ventilation and difficult communication to be overcome. The Rimutaka Tunnel is a long tunnel by world standards and the above problems are intensified so that special precautions are required to help alleviate the situation in the event of any mishap.

### **2.2 Access**

- 2.2.1 Road vehicle access to the northern portal had not been improved since the 4 February 1995 incident and again hindered direct access to that portal for emergency services.
- 2.2.2 The assistance given by Tranz Rail's HRV in supplying transport for NZSF personnel and equipment to the site proved to be particularly effective for this incident.
- 2.2.3 Road access to the southern portal allowed direct access for emergency services, which positioned there.

### **2.3 Communication**

- 2.3.1 The fault in the wiring of the telephone system was the main cause of the excessive delay in evacuating passengers associated with a typical train disabled incident. In the event, there were no major consequences but had there been a more serious incident, the delays which could result from a communication loss could have had more serious consequences.
- 2.3.2 The Train Control staff at the time of the incident were unaware of any fault in the telephone circuitry to the tunnel and had no way of checking the integrity of the line directly.
- 2.3.3 Because of hilly terrain and the lack of reliable mobile telephone coverage at the northern tunnel portal, it was not possible for the staff in this area to make reliable contact with Train Control or emergency services staff with hand-held cellphones.

## **2.4 Passenger count**

- 2.4.1 Train 1605 was a normal scheduled service and it was not customary to establish the number of passengers on board. However in the event of an incident likely to involve emergency services, the need for an accurate head count becomes essential.
- 2.4.2 The initial figure of 20 was given by Tranz Rail to emergency services based on historical average passenger counts before it was realised that a Friday count would be higher and it was subsequently upgraded to “30 to 40” (1.5.2) and then to 60 at 1155 hours (1.5.1). The upgraded figures were not communicated to those eventually required to respond to them. A reconciliation of passengers transported by bus was made after the event but there was no accurate accounting for all the passengers on the train. It is estimated 60 passengers were on board Train 1605, although the actual passenger count is unknown.
- 2.4.3 Although the train disablement precipitated symptoms from pre-existing medical conditions in three passengers there were no injuries. However, the lack of an accurate head count could have serious consequences in the event of a more significant occurrence.

## **2.5 Operating rules**

- 2.5.1 In the CTC area there were operational limitations imposed on the disabled locomotive which prevented it from setting back (i.e. coasting down the 1 in 140 gradient) towards the northern portal. Under Tranz Rail Rules and Regulations such movements were not permitted under normal conditions without prior authorisation from Train Control and as the telephone link was dead this could not be obtained. While the crew were aware of the possibility of setting back in an emergency situation under Rule 5 of the Rules and Regulations, they did not consider the situation justified this action. Setting back had the potential to place the train and HRV at risk under the rules applicable on the day.

## **2.6 Co-ordinated emergency response**

- 2.6.1 Although some improvements had been made following the February 1995 fire emergency, the response was uncoordinated and lacked an integrated plan and effective communications system.
- 2.6.2 Personnel on each side of the tunnel responded separately, based on different information, and no effective conduit existed to reconcile information and action which took into account the communication difficulties at the northern portal.
- 2.6.3 The emergency procedures prepared by Tranz Rail in liaison with some emergency services in 1995 satisfied an internal Tranz Rail need but were :
- a) not sufficient to cover an integrated response and
  - b) not disseminated to all of the parties involved in an integrated response.
- 2.6.4 It was fortunate that despite the difficulties the WAS remained on alert and expecting 40 passengers, and were able to deal effectively with the balance of the 60 passengers that they received at 1315 hours with approximately 12 minutes notice.
- 2.6.5 One result of the uncoordinated response was that adequate and timely victim support was not available at Featherston on the day.

## **2.7 Train disablement**

- 2.7.1 The particular circumstances which disabled Train 1605 are not common. However train disablement is an eventuality that Tranz Rail expect and for which they prepare.
- 2.7.2 The incident highlighted that systems and procedures were not in place to ensure effective and timely response to any train disablement which occurred within the 8.8 km length of the Rimutaka Tunnel.

## **3. Findings**

Findings and any safety recommendations are listed in order of development and not in order of priority.

- 3.1 The train was being operated normally prior to the incident.
- 3.2 The electrical control gear fault on the locomotive was one of a number of operational irregularities which could arise at any time or location and result in train disablement.
- 3.3 The LE's actions following disablement of the train were appropriate.
- 3.4 The crew's action in attempting to contact Train Control whilst safeguarding the train and its passengers was appropriate.
- 3.5 The lack of communication facilities, both within the tunnel and at the northern portal, hindered the recovery operation and the deployment of emergency services.
- 3.6 The crew's lack of freedom to set back without power to the north end safely under Tranz Rail operating rules unnecessarily prolonged the passengers' discomfort.
- 3.7 The inaccurate assessment of the number of passengers on Train 1605 could have resulted in an inadequate emergency response.
- 3.8 The lack of ready access for road vehicles to the northern portal could restrict effective emergency response to any future incidents or accidents.
- 3.9 The lack of a comprehensive and integrated emergency response plan, and the lack of dissemination of the plan in effect on the day, inhibited the appropriate emergency response.
- 3.10 The continued lack of a comprehensive and integrated emergency response plan will adversely affect the ability of emergency services to deal effectively with any future incidents or accidents.

## **4. Safety Actions**

### **4.1 Communications**

- 4.1.1 Immediately following the incident, Tranz Rail took the following actions:
  - a) Modified the track telephone system servicing the tunnel to allow electronic checking at hourly intervals for integrity and to incorporate a pop up failure message on the radio computer screen in Train Control.

- b) Installed a base radio just outside the northern portal accessible to all emergency services and with sufficient performance to ensure contact with Train Control at all times.
- c) Installed a speaker telephone, with a mute button, in the Upper Hutt signal panel to allow a link with the tunnel telephone line, and defined procedures for use in the Working Timetable.
- d) Identified and clearly marked all telephones in the tunnel by number and metrage.
- e) Arranged for shields to protect tunnel track telephones and lights from damage by tarpaulins and ropes. These were to be installed by April 1998.
- f) Changed the schedule for the technician's inspection of the tunnel telephones from once a year to three monthly.
- g) Introduced a requirement that Inspecting Gangers check a representative number of telephones at four weekly intervals.
- h) Initiated an investigation into the practicability of installing a track circuit to allow the position of a disabled train to be identified with respect to the summit of the tunnel. A proposal is currently awaiting formal approval.

## **4.2 Emergency procedures**

### 4.2.1 Tranz Rail advised the following actions are in hand:

- a) Modification of rules and procedures to allow a disabled train in the tunnel to set back without the authority of Train Control.
- b) A review of the emergency procedures for the Rimutaka Tunnel incorporated in the Working Timetable.
- c) Completion of a new controlled document "Rimutaka Tunnel - Emergency Services Operational Plan", in conjunction with emergency services. It will integrate all aspects of response to an emergency, be held as a controlled document by all relevant emergency services and be included as an attachment to the Working Timetable procedures.
- d) Revision of the call-out list and procedures to ensure that future call-outs are made in order of priority, with subgroups delegated for call-out where necessary.
- e) A review of the availability of HRVs and contactability of HRV drivers with particular regard to improving communications and ensuring vehicle and driver availability. This is particularly important on the north side which has only one HRV available.
- f) A review of the problems associated with road access to the northern portal to see if the swamp conditions at Pigeon Flat which currently limit road access to the portal can be overcome.
- g) Clarification of the role of Speedy's Crossing on the north side of the tunnel in the new integrated plan.

## **4.3 Passenger count**

### 4.3.1 Tranz Rail advised that average passenger counts are now held in Network Control, updated three monthly and supplemented as required for group travel.

#### **4.4 Other long tunnel applications**

- 4.4.1 Although the Rimutaka Tunnel is the only long tunnel in New Zealand relying solely on track telephones, many of the lessons learnt from this incident have general application to other long tunnels. Tranz Rail advised they propose to assess the application of the improved Rimutaka Tunnel response procedures to tunnels such as Otira and Kaimai and to incorporate them as appropriate in similar detailed procedures.

### **5. Safety Recommendations**

- 5.1 It was recommended to the Managing Director of Tranz Rail that he:

- 5.1.1 Provide road vehicle access, or alternative transport arrangements, to the northern portal of the Rimutaka Tunnel which gives emergency services the ability to respond at the northern portal in a manner similar to that achievable at the southern portal at Maymorn. (011/98)

- 5.2 The Managing Director, Tranz Rail, responded as follows:

- 5.2.1 Tranz Rail is reviewing our emergency response procedures for any occurrence in the Rimutaka Tunnel and we are assisting Emergency Services with the development of a combined emergency plan for significant occurrences.

Access is one part of the review process covered with the plan.

Road vehicle access or, alternative transport arrangements will be considered in the overall plan within the framework of transport at reasonable cost.

15 April 1998

Hon W P Jeffries  
**Chief Commissioner**



# Appendix 1

<b>NEW ZEALAND RAIL LTD</b>		<b>WORKING TIMETABLE</b>	
<b>Section:</b> L5	<b>PALMERSTON NORTH AND ALL LINES SOUTH AND WAIRAPAPA LINE</b>	<b>Page:</b> 8.4	
<b>Subject:</b> 8	<b>WELLINGTON-WOODVILLE AREA STATION/YARD INSTRUCTIONS</b>	<b>Date Effective:</b> As advised by Train Advice	
		<b>Issue (Amendment) No.:</b> 16	

## 8.8 RIMUTAKA TUNNEL

### 8.8.1 LOCOMOTIVES

Manned locomotives must NOT run long hood leading in the tunnel

### 8.8.2 VENTILATION

Exhaust gases are present at various locomotive power outputs. There are no health hazards to train crews under NORMAL OPERATING CONDITIONS.

### 8.8.3 TRAIN CREWS

Before any locomotive enters the Rimutaka tunnel, the cab windows and doors must be closed. Unless it is necessary to open them if the train stops, the cab windows and doors should be kept closed until the locomotive leaves the tunnel.

After a train or railcar has been standing in the tunnel for five minutes the engine must be stopped and must not be restarted until ready to proceed.

### 8.8.4 TUNNEL TRACK PHONES

Train Control phones are in the tunnel as follows:-

39 667	40 053	40 450	40 848	41 171	41 636
42 066	42 506	42 926	43 326	43 726	44 119
44 453	44 908	45 307	45 702	46 095	46 488
46 949	47 278	47 672	48 120		

**NEW ZEALAND RAIL LTD      WORKING TIMETABLE**

**Section:** L5 PALMERSTON NORTH AND ALL LINES  
SOUTH AND WAIRAPAPA LINE

**Page:** 8.5

**Subject:** 8. WELLINGTON-WOODVILLE AREA  
STATION/YARD INSTRUCTIONS

**Date Effective:** As advised by  
Train Advice

**Issue (Amendment) No.:** 16

**8.8.5 SIGNAL FAULT**

If a signalling block fault should occur the following arrangements will apply:

**Down Trains** - The Locomotive Engineer is to radio call Train Control just after departing from Featherston and when just beyond the tunnel.

**Up Trains** - The Locomotive Engineer is to radio call Train Control approaching Maymorn station and again when approximately one kilometre beyond the tunnel.

In these circumstances the Signaller, Upper Hutt, must maintain constant observation of the signal panel and inform Train Control if the train exceeds the normal running time plus an allowance for lost running on the Mis.59 authority.

If radio contact cannot be made with Train Control the Locomotive Engineer should stop the train at the nearest telephone and arrange for a member of the train crew to call Train Control or Signaller, Upper Hutt.

**8.8.6 LOCOMOTIVE HAULED PASSENGER TRAINS : WELLINGTON-MASTERTON**

The train locomotive is to be equipped with a functional radio. The radio will be tested for voice, base and emergency calls prior to departure from Masterton or Wellington.

If contact cannot be established with Train Control over the primary "E" band radio link then the Locomotive Engineer must inform Train Control before departure. A second person will not be provided in these circumstances. If the locomotive radio is defective and will prevent communication between the Locomotive Engineer and Guard a portable radio must be supplied to the Locomotive Engineer.

The Guard is to be equipped with a channel one radio. This radio must remain switched on between Upper Hutt and Masterton.

The channel one radio procedures at stopping stations apply.

The locomotive vigilance device is to be switched for one person operation.

When passenger trains stop for any reason other than an authorised passenger stop the Guard must contact the Locomotive Engineer immediately to establish the reason for the stop.

Should a train be delayed in the tunnel and radio communication cannot be established with the Guard, the Locomotive Engineer when necessary will sound the locomotive whistle; this will signify that assistance is not required and that the Guard should remain on the train.

Whenever possible the Guard is to remain within 3 carriages of the locomotive so channel one communication between the Guard and Locomotive Engineer can be maintained. The Locomotive Engineer must arrange for contact to be made with Train Control if the delay will cause the timer system buzzer to operate.

Should evacuation be required, then sufficient handbrakes are to be secured to hold the train against grade, wind etc. Passenger and crew are to proceed away from the train and away from danger.

**8.8.7 RIMUTAKA TUNNEL TIMER SYSTEM INSTALLED AT UPPER HUTT**

A tunnel timer system has been installed in the CTC control panel at Upper Hutt station.

If a train has been in the Rimutaka Tunnel for more than 15 minutes an alarm buzzer on the "Tunnel Timer System" panel will operate.

The alarm can be cancelled by operating the 'Cancel' button pushbutton on the tunnel timer panel.

If the alarm buzzer is activated, the Signaller, Upper Hutt, must contact Train Control immediately who in turn must follow the instructions detailed in 8.8.8.



**NEW ZEALAND RAIL LTD      WORKING TIMETABLE**

**Section:** L5 PALMERSTON NORTH AND ALL LINES  
SOUTH AND WAIRAPAPA LINE

**Page:** 8.6

**Subject:** 8. WELLINGTON-WOODVILLE AREA  
STATION/YARD INSTRUCTIONS

**Date Effective:** As advised by  
Train Advice

**Issue (Amendment) No.:** 16

Once a month the Signaller should check the operation of the alarm buzzer. To check the operation of the buzzer, the "System Check" pushbutton should be operated. The "System Operating" and the track indications BKT and CAT on the CTC track diagram will be illuminated. Fifteen minutes after the operation of the "System Check" pushbutton the alarm buzzer will operate. The alarm should be cancelled by operating the "Cancel" pushbutton. The "System Operating" indication and the track indications will be extinguished. The results of each check carried out are to be recorded in the train register. If the alarm buzzer does not operate after 15 minutes Signal Maintenance staff must be advised.

**8.8.8 EMERGENCY SITUATION IN TUNNEL**

If the timer alarm buzzer sounds and a member of the train crew has not called to advise of a delay then the Signaller must advise Train Control. In this situation it must be assumed that an emergency situation exists. Train Control must take the following action:-

**NORTH BOUND TRAINS**

- \* Upper Hutt Fire Service to be contacted, and if possible the approximate distance the train is in from the portal is to be given.
- \* Track Ganger, Upper Hutt, is to be contacted and advised to take the NKR Hi-Rail truck to the Maymorn yard to meet the fire brigade.
- \* Featherston Fire Service is to be contacted, and if possible the approximate distance the train is in from the portal is to be given.
- \* Track Ganger, Masterton is to be contacted and advised to take the NKR Hi-Rail truck to Featherston to meet the fire brigade.

The Hi-rail truck on the Hutt side, after being authorised by Train Control, is to reverse with extreme caution into the tunnel to assess the situation.

NOTE: The Hi-Rail truck from the Wairarapa side is not to 'on track' until authorised by Train Control to proceed into the tunnel.

**SOUTH BOUND TRAINS**

- \* Featherston Fire Service to be contacted, and if possible the approximate distance the train is in from the portal is to be given.
- \* Track Ganger, Masterton is to be contacted and advised to take the NKR Hi-Rail truck to Featherston to meet the fire brigade.
- \* Upper Hutt Fire Service to be contacted, and if possible the approximate distance the train is in from the portal is to be given.
- \* Track Ganger, Upper Hutt is to be contacted and advised to take the NKR Hi-Rail truck to the Maymorn yard to meet the fire brigade.

The Hi-rail truck on the Wairarapa side, after being authorised by Train Control, is to reverse with extreme caution into the tunnel to assess the situation.

NOTE: The Hi-rail truck from the Hutt side is not to 'on track' until authorised by Train Control to proceed into the tunnel.

Caution must be taken by staff and emergency services when entering the tunnel as the train may be drifting out or may have lost braking power. Once the Emergency Services are on site no other movements are to be authorised unless permitted by the member in charge of the site.

