



Report 99-116

Train 3149 and an empty runaway diesel multiple unit

near collision

Papakura

29 June 1999

Abstract

On Tuesday, 29 June 1999 at approximately 1400 hours, an empty diesel multiple unit which had been parked on the suburban platform road at Papakura ran away towards the down main line at the north end of the station into the path of Train 3149, which was approaching from the north to the suburban platform road. The locomotive engineer of Train 3149 was able to stop his train before any collision occurred. No injuries resulted and there was no damage sustained.

The safety deficiency identified was the lack of security when diesel multiple units were left unattended.

One recommendation was made to the operator.

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Contents

List of Abbreviations.....	ii
Data Summary	iii
1. Factual Information	1
1.1 Narrative	1
1.2 Site details.....	2
1.3 Brake requirements for stabling DMUs	3
1.4 Signage	6
1.5 Cab security	6
1.6 Random survey of DMU units.....	7
1.7 Reporting of defects.....	7
1.8 Personnel.....	7
2. Analysis	7
2.1 Stabling.....	7
2.2 Cab security	9
2.3 Handbrakes	9
2.4 Signage	9
3. Findings	10
4. Safety Actions	10
5. Safety Recommendation.....	10

Figures

Figure 1	Diagram of the north end of Papakura showing the movements of the DMUs involved	2
Figure 2	A typical handbrake with restraining clip at the bottom, but with no locking facility, as used on ADKs	4
Figure 3	The handbrake in an ADB car showing clip in place and square key lock	5
Figure 4	A lockable outside bolt on a driving cab external door	8
Figure 5	A handbrake with restraining clip at the top, but with no locking facility.....	8

List of Abbreviations

DMU	diesel multiple unit
LE	locomotive engineer
Tranz Rail	Tranz Rail Limited

Data Summary

Train type and number:	diesel multiple unit (DMU) 3149 and a DMU not in service
Date and time:	29 June 1999, approximately 1400 hours
Location:	Papakura
Type of occurrence:	near collision
Persons on board:	crew: 2 passengers: 30
Injuries:	nil
Damage:	nil
Operator:	Tranz Rail Limited (Tranz Rail)
Investigator- in-Charge:	R E Howe

1. Factual Information

1.1 Narrative

- 1.1.1 At approximately 1000 hours on Tuesday, 29 June 1999, Train 3231, a DMU comprising ADK685 (power car) and ADB785 (trailer car), arrived in Papakura and berthed at the suburban platform on the west side of the yard. After discharging passengers the service was scheduled to go out of service and be stabled at Papakura until it was required later in the day. After the passengers had disembarked the locomotive engineer (LE) confirmed the shut-down with the train guard, and then called the signalman at Papakura for instructions regarding the parking of the unit.
- 1.1.2 The signalman instructed him to “pull up short and stable”, which required the LE to move his DMU approximately 20 m south to vacate the suburban platform. After repositioning the DMU the LE stated that he went through the shut-down procedure and applied a handbrake at the south-end cab from which he had been driving, and slipped the restraining clip over the wheel. He stated he then went to the north-end cab where he applied that handbrake also, put the restraining clip in place and locked it with a square key.
- 1.1.3 At approximately 1350 hours on the same day, Train 3149, consisting of a 2-car DMU set, approached Papakura near the end of its journey from Auckland. The train travelled under an overhead road bridge at the north end of Papakura as it left the down main line to proceed to the suburban platform. As it did so the LE became aware of a DMU moving slowly towards him along the route set for his train.
- 1.1.4 The LE of Train 3149 stated that his train was travelling slowly as it negotiated turnouts on the way towards the suburban platform when he saw the opposing DMU stop across 29 points, inside no 31 signal. No 31 signal had a proceed at low speed indication for Train 3149, the correct indication for the route of the train, which indicated to the LE that the points for his intended move were correctly set but not that the route ahead was unoccupied. He stopped his train short of the stationary DMU.
- 1.1.5 The LE of Train 3149 noticed that the driving cab of the DMU ahead was unoccupied and called the Papakura signalman by radio and explained the situation. He asked if there was another LE available in the station who could come down and move the runaway DMU back to the platform, but was advised there was no one available. He then asked the train guard to pilot their service on to the empty DMU and couple both sets together.
- 1.1.6 Following the LE’s call, the signalman checked his signal panel and saw by the block indications displayed that the section ahead of Train 3149 was occupied. He immediately went outside to confirm this before going to where the runaway DMU and Train 3149 were standing.
- 1.1.7 The signalman stated that after assisting with the coupling up of the two DMUs he went to the leading cab at the south end of the empty set and climbed in through an unlocked door. He also stated that on entering the cab he noticed the handbrake was not applied and the restraining clip was not in position.
- 1.1.8 After coupling the two DMUs together, the signalman piloted the service to the suburban platform and repositioned the empty DMU to the stabling area.

- 1.1.9 Once the runaway unit had been repositioned, the signalman applied the handbrake to the south-end car and engaged the restraining clip, but could not lock it as he did not have a square key.
- 1.1.10 The LE of Train 3149 stated that after positioning the runaway DMU back to the stabling area, he entered the north-end cab of the runaway DMU and noticed the handbrake was not applied. He applied the handbrake and engaged the restraining clip but could not remember if the restraining clip was positioned at the top or the bottom of the handbrake wheel. He could not remember if it had a square key lock or not, but stated he had not applied one.
- 1.2 Site details**
- 1.2.1 The suburban platform at Papakura was situated on the west side of the yard, separated from the main station building by 3 railway tracks (see Figure 1).
- 1.2.2 Trains departing and arriving at the suburban platform to and from the north were routed via 3 sets of points with corresponding signals for departing services and 4 sets of points with corresponding signals for arriving services.
- 1.2.3 Signalling duties for Papakura were carried out from a panel within the main station building located between the down and up main lines.
- 1.2.4 The siding on which the DMU was stabled sloped uniformly towards the north-end main line connections. Over the 320 m from where the DMU was originally standing to the main line connection, the siding dropped 685 mm, an average grade of approximately 1:470.

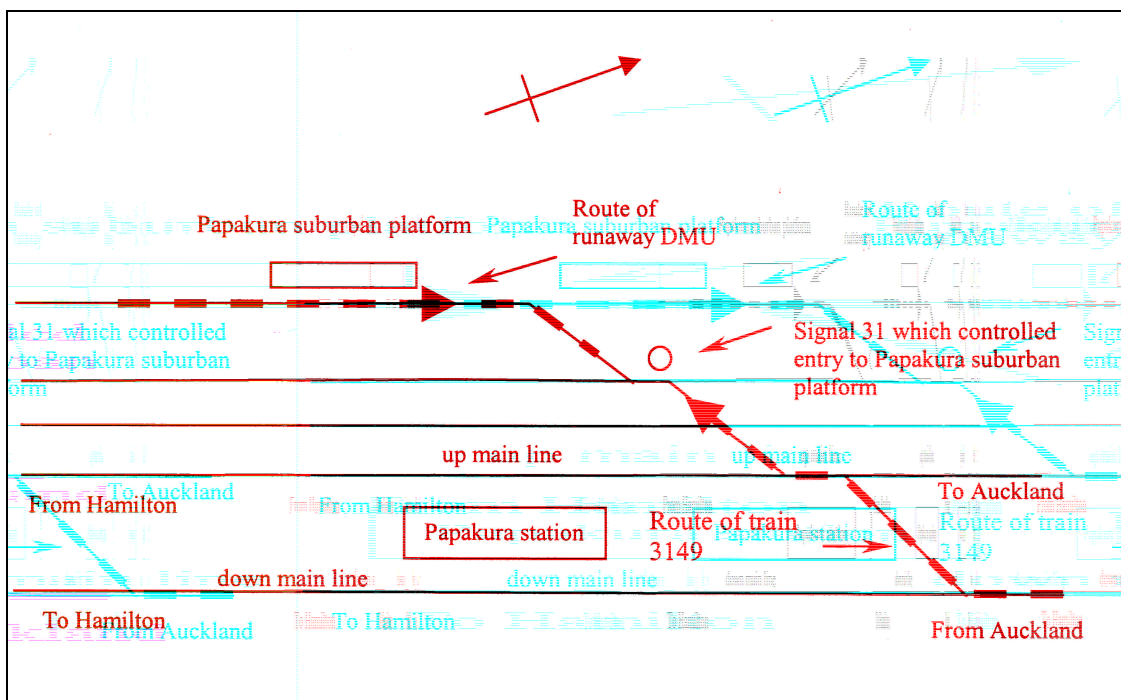


Figure 1
Diagram of the north end of Papakura showing the movements of the DMUs involved
 (not to scale)

- 1.2.5 An unofficial pathway went from the suburban platform alongside the stabling road to the south end of the yard, providing pedestrian access to public streets in the vicinity. The path was used by school children to walk south before leaving it to cross the yard to reach schools located in that area, rather than use the footbridge provided at the suburban platform. Tranz Rail staff advised that unauthorised tampering with equipment on DMUs had occurred in the past, including interference with air brake taps, and that DMUs stabled at Westfield tended to suffer a significantly reduced level of such interference because of the more difficult public access to that yard.

1.3 Brake requirements for stabling DMUs

- 1.3.1 Tranz Rail Operating Rule 128 stated in part:

A motive power unit¹ may only be left unattended after all precautions as required in the related rules and instructions have been taken by the Locomotive Engineer.

- 1.3.2 Tranz Rail Code Supplement 4.16: Operating Instructions for ADK and ADB Diesel Multiple Units (DMU), Instruction 3.2, stated in part:

On the front cab wall is a wheel type handbrake that, when applied, can be locked in place by a square key.

- 1.3.3 Tranz Rail Operating Code Section 4: Operating Instructions for Locomotive Running Staff, Instruction 10, stated in part:

10.1 Handbrakes (Parking Brakes) are provided for the primary purpose of preventing a vehicle rolling away when unattended.

It is important to apply the handbrake before leaving a locomotive, railcar or multiple unit unattended, irrespective whether the vehicle is still active (or live).

- 1.3.4 Tranz Rail Code Supplement 4.16: Operating Instructions for ADK and ADB Diesel Multiple Units (DMU), Instruction 10.10, stated that:

When all engines are stopped, turn reverser key to “off” and place in locked box in ADK cab. Apply handbrakes in all cars. Turn off battery isolating switch on all cars. If this is not done the batteries will soon become flat.

- 1.3.5 A handbrake wheel was provided on the front wall of the driving cab at each end of the DMU set. The handbrake at each end was designed to be held in position with restraining clips once the handbrakes were applied to avoid the brake wheel releasing. The ADK handbrake worked on 2 of the 8 car wheels and, although fitted with a restraining clip, was not fitted with a lock (see Figure 2). The ADB handbrake worked on all of the 8 wheels on that car. The importance of this brake was recognised by a restraining clip intended to be locked in position with a square key lock (see Figure 3).

Tranz Rail advised that some ADK cars handbrakes were also fitted with locks although none was seen during this investigation.

¹ Motive power unit is defined as a locomotive, railcar or multiple unit.



Figure 2
A typical handbrake with restraining clip at the bottom, but with no locking facility, as used on ADKs



Figure 3
The handbrake in an ADB car showing clip in place and square key lock

- 1.3.6 Tranz Rail advised it was not mandatory to lock handbrake wheels when applied, as there was a requirement to lock cab doors when DMUs were left unattended. Although Tranz Rail expected the restraining clip to be used, there was no reference to this in code requirements or other procedures.

1.4 Signage

- 1.4.1 Signage reminding LEs to apply the handbrake when the DMU was stabled were required to be fixed adjacent to the handbrake wheels. Both driving cabs of the DMU involved in this incident had the required signage displayed.

- 1.4.2 In ADK cars the sign stated:

ADB HANDBRAKE MUST ALSO BE APPLIED WHEN DMU IS STABLED

Not all ADK cars had signs fitted (see 1.6.2).

- 1.4.3 In ADB cars the sign stated:

THIS HANDBRAKE MUST BE APPLIED WHEN DMU IS STABLED

Not all ADB cars had signs fitted (see 1.6.3).

1.5 Cab security

- 1.5.1 Tranz Rail Code Supplement 4.16: Operating Instructions for ADK and ADB Diesel Multiple Units (DMU), Instruction 8.8, stated in part:

All cabs when not in use must have sliding doors and access doors closed and locked. No bikes, pushchairs or unauthorised persons are permitted in cabs not in use.

- 1.5.2 There were two types of locks used on the doors separating the driving cab from the passenger saloon: a square key lock or a yale lock.

- 1.5.3 External doors to the driving cab were secured by either a lockable outside bolt which dropped into a hole in the step (see Figure 4) or drop bolts on the inside of the door which fitted into holes in the interior floor.

- 1.5.4 Comments from LEs indicated that the locking of external doors and internal doors when stabling DMUs was not a common practice. Most LEs claimed to have given up trying to follow this instruction because of the condition of a number of the key locks on the internal doors and the number of broken or unworkable locks on the outside bolts of external doors and damaged or non-fitting drop bolts on the inside.

- 1.5.5 Three out of 4 of the external cab doors on Train 3231 could not be secured because of the condition of the locks or drop bolts.

1.6 Random survey of DMU units

1.6.1 A random sample of 3 DMU sets parked at Papakura and Westfield highlighted the following:

- of the 6 handbrakes only 3 had been applied and none was locked
- the 2 handbrake wheels that had restraining clips with square key locks available could not be locked (Figure 5 shows one of these)
- of the 6 external lockable doors only one was locked and one could not be locked
- of the 6 internal tower bolts only one was bolted and 2 could not be bolted.

1.6.2 Not all ADKs carried the appropriate signage.

1.6.3 Not all ADBs carried the appropriate signage and not all top restraining clips were present. Of those that were, some square key locks were inoperative. Figure 5 shows an example of non-compliance.

1.7 Reporting of defects

1.7.1 Company procedures required that DMU defects be recorded in the Loco 54D repair book for the respective unit for action by repair staff. However, LEs interviewed stated they had not reported defective locks in this manner for some time as earlier reports had gone unactioned and they therefore considered that ongoing reporting was of little use.

1.8 Personnel

1.8.1 The LE of Train 3231 (the service that was stabled after berthing) had been employed with Tranz Rail for 35 years. He had been an LE for 20 years with 4 years' experience operating DMU services around the Auckland metropolitan area, including Papakura.

2. Analysis

2.1 Stabling

2.1.1 Stabling of DMU sets at Papakura while out of service was a regular occurrence and was allowed for under Tranz Rail's Operating Rules. The company's procedures specified the actions to be taken prior to leaving a DMU unattended, including locking all doors. However, the condition of the cab door security fittings meant these could not be complied with. It was apparent the high number of unlockable doors was accepted by local staff.

2.1.2 Although the LE of Train 3231 stated that he had correctly applied, restrained and locked the handbrakes, neither handbrake was applied when the signalman and the LE from Train 3149 entered the respective cabs following the runaway.

2.1.3 There were 2 possible scenarios which could have permitted the DMU runaway:
either:

- the handbrake(s) of the DMU had been fully or partly applied but had later been released by persons unknown gaining access to the unsecured cab(s) or
- the handbrake(s) of the DMU had not been applied contrary to reports.



Figure 4
A lockable outside bolt on a driving cab external door



Figure 5
A handbrake with restraining clip at the top, but with no locking facility

- 2.1.4 Members of the public who used the unofficial path passed beside the track where the DMUs were stabled, and were out of sight from Tranz Rail staff, making access to the stabled units easy and undetectable.
- 2.1.5 Based on the cab security deficiencies, available public access and previous interference with stabled units, it is probable that a person or persons unknown entered the unlocked DMU and released the handbrakes.
- 2.1.6 Either then, or at some later stage due to a catalyst such as the vibration from a passing train, the frictional resistance between wheels and rail was overcome and the unit rolled down the grade, eventually stopping due to a flattening of the grade and the resistance provided through the turnouts.

2.2 Cab security

- 2.2.1 Although Tranz Rail procedures required all cabs to be locked when DMUs were left unattended, the random survey of stabled DMUs showed that it was not uncommon for DMUs to be stabled unsecured. This can be related to the reported history of failures to get repairs done to faulty locks and bolts as reported in the Loco 54D book, and the resulting end to such reporting.

2.3 Handbrakes

- 2.3.1 A square key lock for securing the restraining clip on the handbrake wheel was provided in ADB cars but not in most ADKs, a recognition of the importance of the higher braking capacity of the ADB car. It was accepted that the ADB handbrake was sufficient to secure a DMU, and this was supported by differences in signage in the different cars. The signage ensured the ADB handbrake was always applied whichever end the LE was occupying when he stabled his unit.
- 2.3.2 Many of the square key locks provided on handbrakes in ADB class cars were inoperable and in at least one case the lock was missing. Tranz Rail did not make it a mandatory requirement to lock handbrake wheels (refer 1.3.2) and, when viewed in conjunction with locked cabs, this is understandable.

2.4 Signage

- 2.4.1 Signage, where provided, reminded LEs to apply the handbrake but did not reinforce the requirement to use the restraining clip. The signage relating to the applying of handbrakes in ADK cars (see 1.4.2) inferred that when stabling from the ADK cab it was necessary to apply both handbrakes. However, if stabling from the ADB cab it was only necessary to apply the handbrake at that end. It is desirable that Tranz Rail clarify these requirements, and post them accordingly, and a recommendation has been made in this regard.

3. Findings

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

- 3.1 Train 3231 was not secured to Tranz Rail Code requirements when stabled.
- 3.2 Train 3231 could not be secured due to the condition of the cab door security locks.
- 3.3 The probable cause of the runaway was a person or persons unknown releasing the handbrakes when the unit was parked on a grade.
- 3.4 The importance of security of the DMUs when stabled had been diminished by the lack of response to lock and bolt defects initially reported.
- 3.5 There appeared to be an acceptance by repair and operating staff for DMUs to be stabled without being secured.
- 3.6 The Papakura environment and layout meant that stabled DMUs were susceptible to interference from the public, and that such interference could affect the safety of main line operations.
- 3.7 The requirements for applying, restraining and locking ADB and ADK handbrakes could be variously interpreted.

4. Safety Actions

- 4.1 Tranz Rail has repaired all external locks and installed new internal locks to all ADK and ADB driving cabs. Periodic inspection is undertaken by the operations manager to ensure driving cabs are secured in accordance with Section 4, clause 8.1.2 of the Rail Operating Code.

5. Safety Recommendation

- 5.1 On 30 May 2000 it was recommended to the Managing Director of Tranz Rail Limited that he:
 - 5.1.1 clarify the requirements for the application and securing of handbrakes on ADB and ADK cars, and ensure they are appropriately signposted. (028/00)
- 5.2 On 3 July 2000 the Managing Director of Tranz Rail Limited responded as follows:
 - 5.2.1 Requirements for the application and securing of handbrakes on ADB and ADK cars will be clarified. As noted in the report at 1.3.6 it is not mandatory to lock handbrake wheels as there is a requirement to lock cab doors when units are left unattended, and no change from this position is thought necessary. Existing signage is worded to ensure that the ADB handbrake is applied (as noted in the report at 2.3.1). We intend adopting a single sign to instruct that the handbrakes in both cars are to be applied when the DMU is stabled.

Approved for publication 13 June 2000

Hon. W P Jeffries
Chief Commissioner