



Report 96-103

Train 622

Waipawa

27 March 1996

Abstract

A utility travelling west on Victoria Street, Waipawa on Wednesday 27 March 1996 moved onto the level crossing ahead of an approaching train. The level crossing alarms, consisting of flashing lights and bells, were operating. A collision resulted in which injuries sustained by the driver and front seat passenger subsequently proved fatal. The causal factor was the utility driver's apparent failure to see and respond to the warning devices. Safety issues identified were the effectiveness of the warning system in particular sunlight conditions and the available view at the crossing.

Transport Accident Investigation Commission

Rail Accident Report 96-103

Train type and number:	Express Freight, 622
Locomotives:	DX 5051/DX 5264
Date and time:	27 March 1996, 0743 hours
Location:	Waipawa, 115.54 km, Palmerston North - Gisborne Line
Type of occurrence:	Collision with motor vehicle
Persons on board:	Crew: 1
Injuries:	Crew: Nil Others ¹ : 2 fatal
Nature of damage:	Motor vehicle destroyed, moderate damage to pedestrian crib
Investigator in Charge:	R E Howe

¹ Driver and front seat passenger in motor vehicle

1. Factual Information

- 1.1 On Wednesday 27 March 1996 Train 622 was a scheduled northbound express freight service operated by Tranz Rail Limited (TRL) running from Palmerston North to Napier.
- 1.2 Train 622 consisted of DX 5051 (leading), DX 5264 and 17 wagons, of approximately 479 tonnes mass, and 302 m in length. It was crewed by a Locomotive Engineer (LE).
- 1.3 At 0743 hours the train was approaching Victoria Street level crossing, Waipawa, at 115.54 km Palmerston North - Gisborne line at a speed of 58 km/h. The allowable line speed was 90 km/h with a restricted 50 km/h curve 200 m north of the crossing.
- 1.4 The level crossing was protected with flashing lights and bells (FLBs).
- 1.5 The LE was slowing down for the curve ahead and blew the train's whistle as he approached the crossing. The weather was fine and sunny and he could see the lights were working, and school children on the left-hand side waiting for the train to pass.
- 1.6 As the lead locomotive approached the crossing the LE's view on the right hand side was restricted to approximately seven metres from centreline by a building, and his first sight of an approaching westbound white Mazda utility was when he was approximately 15 m from the crossing.
- 1.7 The LE immediately blew the whistle again and applied emergency brakes on impact. The lead locomotive came to rest approximately 310 m from the point of impact.
- 1.8 The LE used his emergency button to contact Train Control and advised them of the accident, and then made his way back to the crossing to see if he could assist.
- 1.9 The accident had been witnessed by a number of people in the vicinity and emergency services had been notified. When the LE reached the site the driver of the utility and the front seat passenger were being attended to by members of the public, prior to the arrival of the emergency services.
- 1.10 The utility was hit on the left passenger door by the right front of DX 5051 and thrown in the air. It came to rest upright against the pedestrian crib on the north-east side of the crossing, facing to the north and approximately 18 m from the point of impact. The front seat passenger, who was not wearing a seat belt, was thrown through the windscreen and landed on the footpath adjacent to the vehicle. The driver remained in the vehicle.
- 1.11 The police arrived on site at approximately 0752 hours and the ambulance at 0755 hours. The two occupants of the utility were seriously injured and taken to hospital, one by rescue helicopter and the other by ambulance. In both cases the injuries subsequently proved fatal.
- 1.12 The occupants of the utility were two brothers (70 years old and 75 years old) who lived in Waipawa, the driver in Victoria Street. The driver had been a resident for seven years and was a regular user of the crossing. He was reported as particularly fit for his age and as having no unusual hearing or eyesight deficiencies.
- 1.13 A witness some 20 m east of the level crossing on the south side of Victoria Street saw the utility approaching at approximately 30 km/h. He knew the occupants and when it was about 30 m from the crossing he saw them wave at him and he waved back. He recalled hearing the bells operating at the time but said the utility did not slow down prior to being hit by the train.



Figure 1
Northbound LE's view of the utilities approach (right hand side)



Figure 2
Westbound utility drivers view of the trains approach (left hand side)

- 1.14 The view lines² on the south-east quadrant of the level crossing were limited by a panelbeater's workshop which encroached within four metres of centre line of the track (Figures 1 and 2). Some trees on the right-hand side of the track south of the crossing were cut back on the day after the accident resulting in an approximate 100 m view line at the stop line 3.5 m from centre line, and an approximate 60 m view line at five metres from centre line. The view lines would have been less prior to the trees being cut back.
- 1.15 All four quadrants of the crossing were equipped with pedestrian cribs to control and direct pedestrian traffic. These were installed approximately four years ago in recognition of the frequent pedestrian use of the crossing and a fatal accident which had occurred.
- 1.16 The utility was approaching the crossing from east to west and the low rising sun was directly behind the vehicle. The witness, who was a regular crossing user, stated he had known such conditions to result in the sun reflecting off the flashing lights making them difficult to see.
- 1.17 The Land Transport Safety Authority (LTSA) is currently producing a "Road Signs and Markings for Railway Level Crossings" manual which includes consideration of sight distances at level crossings which have passive control i.e. signs and devices which are not activated by the approach of a train. Such considerations are used to determine the appropriate signage for particular situations, and whether adequate sight distance is available if a 'stop' control is installed. No requirements are laid down for sight distances at level crossings which have active controls i.e. devices activated prior to and during the passage of a train, such as the FLBs at Victoria Street.
- 1.18 TRL Code Supplement CSG/417 "Level Crossings - Policy", in effect 27 March 1996, contained requirements for minimum view lines at level crossings. Minimum view lines from a road vehicle driver's position five metres from centre line of the rail track were defined for all public and private crossings, including those with FLBs and barriers, dependent on the speed of the fastest train on the approach. For the train speed of 60 km/h, which applied at Victoria Street, the minimum view line requirement was 130 m.
- 1.19 During the course of the investigation it became apparent that a separate but related problem existed concerning a high number of nose-tail collisions on the adjacent State Highway in this vicinity, caused by the difficulty in separating traffic turning right onto Victoria Street. It is understood four options for improvement are under evaluation by the Central Hawkes Bay District Council in conjunction with the LTSA and Transit New Zealand, and an option favoured by the Council is to relocate the level crossing approximately 70 m to the north.

Previous History

- 1.20 There have been at least three other accidents or incidents at this level crossing since September 1993.
- On 9 September 1993 a westbound car collided with a northbound train resulting in serious injuries to the driver. The accident occurred at 0830 hours on a sunny day. When interviewed following the accident under investigation, the driver considered sun reflection was the reason he did not see the lights operating at the time, although he has been a regular level crossing user since 1993 without any similar problems.

² "view lines" is a term used by TRL and defined as "[length of] line of sight from the driver of a vehicle to a loco headlight". "Sight distance" is the Traffic Engineering term used to describe the same parameter.

- On 6 May 1995 at 2040 hours, a westbound car collided with a northbound train causing minor injuries to the driver.
- On 25 July 1995 at 1625 hours, a westbound car passed 30 m in front of a northbound train.

In all cases the FLBs were operating correctly.

- 1.21 TRL have advised that this crossing has a low product count (a function of density of road and rail traffic) and is not on the TRL national Level Crossing Upgrading Accident Priority List for upgrading to half-arm barriers. In addition they advised the close proximity of the level crossing to the main highway (10 m) would preclude barrier installation without additional works.
- 1.22 The crossing was identified by TRL on a short list of crossings which although producing a low product count had a high accident rate. This list was used by TRL as an indicator of desirable resource allocation to achieve improvements where possible.

2. Analysis

- 2.1 The level crossing was equipped with standard flashing lights and bells with train activation sited appropriate to rail traffic speed, to give adequate warning to road traffic. The road approach was posted with the appropriate signs.
- 2.2 Witness reports and the absence of any evidence of braking indicated the driver did not notice or respond to the flashing lights and bells which were operating. His reported excellent physical condition indicated this failure to notice and respond was not related to his age or any impaired faculties.
- 2.3 The driver involved in the accident which occurred on 9 September 1993 considered the sun at low level behind him was the reason he failed to see and respond to warnings. Conditions and timing were such that the reflection of the sun from the flashing lights on 27 March 1996 could have masked this visual warning of the approaching train to the driver.
- 2.4 All four accidents or incidents since 1993 have involved the south-east quadrant of the crossing. A common denominator is the restrictive effect of the building on sight distances. There are no regulatory requirements for sight distances at level crossings protected with FLBs. However an indication of what are considered as minimum view line requirements are included in Code Supplement CSG/417 "Level Crossings - Policy". This document defines minimum values for restart (five metres from centre line of rail track) view lines at crossings with active protection, but there are situations, as at this crossing, where TRL have no control over the factors influencing such view lines. In recognition of this, and of the appropriateness of the restart concept to such crossings, the TRL Code is under critical review and the requirement for minimum view lines at crossings with active protection is likely to be deleted.
- 2.5 The lack of regulatory sight distance requirements reflects, in theory, that minimum views are not required at crossings with active controls. The rail traffic has right of way and road traffic must respond to the warnings given. However there are times when active controls may not be seen or responded to, as may have applied on two occasions at Victoria Street crossing.

- 2.6 It is considered that severely restricted views, such as those at Victoria Street in the south-east quadrant, can increase the risk of collision considerably in such circumstances. In the case of the Victoria Street crossing, although the road and rail product count is low the number of accidents is particularly high (currently averaging one per year).
- 2.7 It is considered that the proposal to relocate the crossing to the north, in conjunction with minor improvements to the detail of the FLBs, has the best potential to overcome the high number of rail accidents associated with the present level crossing layout.
- 2.8 If the level crossing is not relocated at an early date, improvement to the present flashing lights and bells arrangement could have a positive effect on the safety of the existing level crossing which would have equivalent benefits if the FLBs were relocated to suit any proposed new site.

3. Findings

- 3.1 The train was being operated correctly.
- 3.2 The FLBs were operating as intended.
- 3.3 The marking of the roadway and attendant signs were in accordance with current practice and adequate for the purpose.
- 3.4 The driver of the utility was approaching the crossing normally and at an appropriate speed.
- 3.5 The driver of the utility did not respond to visible and audible warnings of the train's approach.
- 3.6 The driver was reported to be in particularly good health for his age, with no eyesight or hearing deficiency which would account for his failure to respond to the warning devices.
- 3.7 The driver's ability to see the flashing lights as he approached the crossing may have been affected by the low rising sun behind him reflecting off the flashing lights.
- 3.8 The driver's ability to see the flashing lights close to the crossing was affected by the distraction which occurred when he saw and acknowledged a pedestrian acquaintance.
- 3.9 The limited view in the south-east quadrant of the crossing gave no time for the driver of the utility to see and respond to the approaching train or for the LE to see the approaching utility and give any additional whistle warning or reduce speed.

4. Safety Recommendations

- 4.1 It was recommended to the Transit New Zealand that:
- 4.1.1 When liaising with Central Hawkes Bay District Council regarding alternative proposals to overcome the problem associated with access from SH2 to Victoria Street that priority consideration be given to options that include improved view lines in the south-east quadrant of the Victoria Street level crossing, either at its present site or by relocating the crossing to the north. (040/96)

4.2 The Regional State Highway Manager, Transit New Zealand, Napier responded, inter alia:

we will be investigating proposals to alleviate the problems associated with this intersection, but do not want to see your recommendation exclude the option of barrier arms.

4.3 It was recommended to the General Manager, Central Hawkes Bay District Council, that:

4.3.1 When liaising with Transit New Zealand regarding alternative proposals to overcome the problems associated with access from SH2 to Victoria Street that priority consideration be given to options that include improved view lines in the south-east quadrant of the Victoria Street level crossing, either at its present site or by relocating the crossing to the north. (041/96)

4.3.2 The Council liaise with Tranz Rail Limited as required to implement any proposed alterations to the present flashing lights and bells which would improve the level of protection to west-bound motorists on Victoria Street. (042/96)

4.4 On 10 September 1996 the General Manager Central Hawkes Bay District Council responded, inter alia:

Having analysed the various options I have recommended that we relocate the intersection to a position approximately 60 metres north of its current location and control the intersection with traffic lights linked to the railway warning system..

If the District Council accepts my recommendation, project timing is dependant on final acceptance of the recommendation by Transit NZ, Tranz Rail Limited and Council funding.

In addition to the comments already made I would strongly recommend that an amendment to Tranz Rail Limited policy on the installation of barrier arms be recommended to Tranz Rail Limited.

I would recommend that in addition to its current policies on barrier arm installation and location Tranz Rail staff have the flexibility to approve or recommend on a location by location basis.

This includes the ability to negotiate with local authorities on the installation of such safety devices and with or without reference to the national Level Crossing Upgrading Accident Priority List.

And on 27 September 1996 the Council further advised:

On Thursday 26 September 1996 Council considered a report on the Victoria Street Railway Crossing and resolved:

That moving the intersection of Victoria Street with SH2 northward and the installation of traffic lights to control the new intersection be further investigated, and that the Transport Accident Investigation Commission's recommendations as follows be adopted.

“When liaising with Transit New Zealand regarding alternative proposals to overcome the problems associated with access from SH2 to Victoria Street that priority consideration be given to options that include improved view lines in the south-east quadrant of the Victoria Street level crossing, either at its present site or by relocating the crossing to the north.

Liaise with Tranz Rail Limited as required to implement any proposed alterations to the present flashing lights and bells which would improve the level of protection to west-bound motorists on Victoria Street.”

Council staff will now carry out further planning on this proposal, and discuss the involvement of Transit NZ and Tranz Rail with them. I expect at this time that the project will be submitted to Transfund as a new construction project in November 1996, with physical construction taking place in 1997/98. This will of course depend on the outcomes of our further work.

4.5 It was recommended to the Managing Director of Tranz Rail Limited that:

4.5.1 Tranz Rail Limited review the number, size, orientation and backing details of the flashing lights protecting Victoria Street level crossing to see if an improved indication can be given to westbound motorists on Victoria Street during early morning sun conditions and liaise with the Central Hawkes Bay District Council, as necessary, to achieve early implementation of any possible improvements arising from the review. (043/96)

4.6 Tranz Rail Limited responded as follows:

Tranz Rail Ltd is in discussion with the local council with regard to improved road indication for west bound motorists.

5. Observation

The responses of the Central Hawkes Bay District Council and Transit New Zealand indicated interest in the installation of half-arm barriers as a possible solution to the level crossing/SH2 problems. In addition concern was expressed that the application of the policy implicit in the current TRL Accident Priority Listing as the criteria for upgrading to half-arm barriers may prevent the most cost effective solution to a particular crossing problem proceeding. While the Commission acknowledges the benefits of such upgrading in general, and the possible benefits in the Victoria Street situation, this upgrading in isolation does not address the particular problem of views at this crossing. However it is hoped that any integrated solution to the problems associated with the level crossing and the SH2 intersection will not preclude consideration of half-arm barriers as part of that solution and the Commission's safety recommendations are not intended to exclude this possibility.

In this regard, and based on the responses received, it may be timely for all parties concerned to review the criteria for upgrading level crossings to half-arm barriers. Such a review should consider including within the criteria the flexibility for upgrading to proceed where cost benefit analysis shows such a solution to be the most effective if, as the responses indicate, such flexibility does not exist at present. Funding is always a factor in a systematic improvement programme such as upgrading to half-arm barriers and in cases where agreed priority criteria are not met the concept of exceptions proceeding on the basis that costs would fall where benefits accrue has merit.

The LTSA has advised that during the recent review of level crossing safety co-ordinated by the Authority agreement in principle was reached that the primary criterion for the installation of “active controls” should be benefit cost analysis as for other roading projects. The LTSA is continuing to take the initiative in co-ordinating the formalisation of this agreement.

23 October 1996

M F Dunphy
Chief Commissioner

