

Report 01-113

DC4185 light locomotive and private car collision

Egmont Tanneries private level crossing

164.14 km Marton - New Plymouth Line

19 September 2001

Abstract

On Wednesday 19 September 2001, at about 0705, a collision occurred between a light locomotive and a private motorcar at Egmont Tanneries Ltd private level crossing between Stratford and Inglewood on the Marton to New Plymouth Line. The motor vehicle had made a right-hand turn from State Highway 3 which ran parallel to the railway line and entered the unprotected level crossing immediately in front of the approaching locomotive.

The locomotive engineer was the only crew on the locomotive and was not injured but the car driver, who was the sole occupant of the car, received fatal injuries.

The collision was caused by the failure of the car driver to see and give way to the approaching locomotive at the level crossing.

The safety issues identified included:

- the lack of appropriate warning signage at the level crossing
- the use of the level crossing for purposes outside the deed of grant
- the restricted views at the level crossing

Two safety recommendations were made to the operator.

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Abbreviations

km/h kilometres per hour

LE locomotive engineer

LTSA Land Transport Safety Authority

m metre(s)

the deed A Grant of Right of Way and Private Level crossing over Railway land

the highway State Highway 3

the manual Manual of Traffic Signs and Markings

the Tanneries Egmont Tanneries Ltd

Tranz Rail Tranz Rail Limited

Data Summary

Train type and number:	DC4185 light locomotive		
Date and time:	19 September 2001 at about 0705		
Location:	private level crossing		
	164.14 km Marton - New Plymouth Line		
Persons involved:	Train Car	1 (LE) 1 (driver)	
Injuries:	Train: Car:	nil 1 fatal	
Damage:	minor damage to locomotive; car extensivel damaged		
Operator:	Tranz Rail Limited (Tranz Rail)		
Investigator-in-charge	D L Bevin		

1 Factual Information

1.1 Narrative

- 1.1.1 On Wednesday, 19 September 2001, DC4185 was an unscheduled light locomotive movement from New Plymouth to Stratford and was crewed by a locomotive engineer (LE).
- 1.1.2 At about 0705 the locomotive was approaching the Egmont Tanneries Ltd (the Tanneries) private level crossing from north along a 5 km straight section of track with its headlight on. The LE sounded the locomotive horn when his train was about 100 m from the level crossing at which time it was clear.
- 1.1.3 The train emerged from behind a row of trees about 70 m from the level crossing at which time the LE saw a car turn off State Highway 3 (the highway) and cut the corner into the right of way to the level crossing (refer Figure 1). The LE again sounded the horn. He estimated the car was travelling at 20 to 25 km/h as it made the turn.



Figure 1
The view of the level crossing from where the car entered the right of way

For the photograph a locomotive was positioned at the end of the row of trees, 70 m from the level crossing. The compulsory Stop sign visible in the photograph was installed by Tranz Rail immediately after the collision.

- 1.1.4 The LE saw the car driver looking to her right as the car turned and realising that she probably had not seen the locomotive, he applied the locomotive brake.
- 1.1.5 The car did not stop but instead entered the level crossing and was hit by the locomotive and pushed about 25 m south from the point of impact before it was thrown to the side of the track. The car driver was fatally injured in the collision.

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¹ A light locomotive is a locomotive with no wagons attached.

- 1.1.6 The locomotive brakes did not have time to respond before the impact and it travelled another 300 m before coming to a stop. The LE recalled his train speed was about 60 km/h prior to the collision. The maximum authorised line speed for the area was 70 km/h.
- 1.1.7 An examination of the car following the collision by a crash damage expert showed that the speedometer needle was jammed at about 28 km/h.

1.2 Site information

1.2.1 The general layout of the crossing is shown in Figure 2.

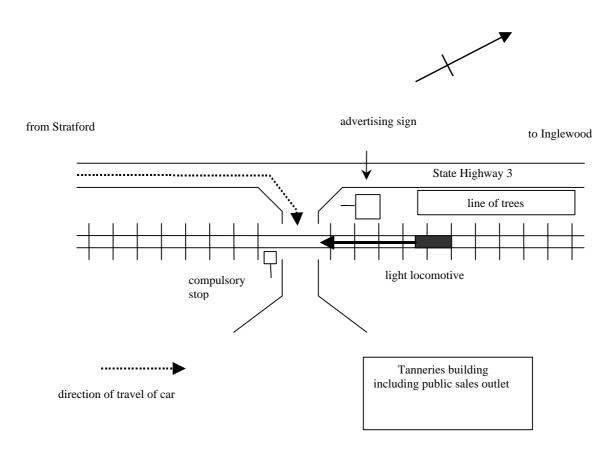


Figure 2
Site plan of Egmont Tanneries level crossing (not to scale)

- 1.2.2 The Tanneries had occupied the site for at least 100 years. Attached to one of the buildings in the complex was a public showroom and sales outlet, which had been open for at least 20 years. The business had changed hands to a new owner about 3 years ago.
- 1.2.3 The level crossing was situated at the 164.14 km between Stratford and Inglewood and provided the only vehicular access to the Tanneries. It was used by:
 - Tanneries staff (private motor vehicles)
 - customers (private motor vehicles)
 - service providers (trucks and utilities)
 - tourist buses.

- 1.2.4 The approach to the level crossing from the highway allowed a stacking distance of about 14 m and consisted of mainly broken seal. The approach from the Tanneries was unsealed. There was no compulsory Stop or Give Way sign in place at the level crossing for traffic approaching from the highway, nor was there any signage advising motorists that they would encounter a level crossing immediately after turning off the highway.
- 1.2.5 There was a compulsory Stop sign and lockable gates on the Tanneries side of the level crossing for traffic leaving the Tanneries. These gates remained open during the hours of business.
- 1.2.6 A row of tall trees ran parallel to the railway line for about 500 m in each direction from the level crossing which obstructed the motorist's view of trains approaching the level crossing (refer Figure 3).



Figure 3
The right of way from 150 m away looking north in the direction of travel of the car

- 1.2.7 An advertising sign for the public sales shop had been erected 6 m north of the level crossing, 6.85 m from the nearest rail and 8.2 m from the edge of the highway (refer Figure 1).
- 1.2.8 A driver entering the right of way had line of sight between the left-hand side of the sign and the end of the row of trees about 70 m north. The approach road dipped where it left the main road, and this allowed the driver of a standard height car to see approaching rail traffic under the sign.



Figure 4
The LE's view from 70 m away from the level crossing

- 1.2.9 At a restart² distance of 3 m from the nearest track (refer 1.5.7) on the highway side of the level crossing a driver had a clear view of trains approaching from the north.
- 1.2.10 Tranz Rail advised that there was a restriction on the placing of advertising signage in the vicinity of level crossings if its presence obstructed views of approaching trains from the restart distance. Shortly after the accident the sign was removed.
- 1.2.11 This particular section of the Marton to New Plymouth Line normally had 3 scheduled train movements passing through the level crossing each day during daylight hours, and other unscheduled movements from time to time to meet Tranz Rail requirements.
- 1.2.12 The weather at the time was sunny and clear and the sun would have been bearing about 102 degrees at about 23 degrees above the horizon.

1.3 Locomotive event recorder

- 1.3.1 Data from the event recorder from DC4185 was downloaded and supplied for analysis.
- 1.3.2 Tranz Rail's Mechanical Code required that Speed Indicators be accurate within (±) 5 km/h between 25 km/h and 100 km/h and DC4185 complied with this Code requirement.
- 1.3.3 The locomotive event recorder showed that DC4185 was travelling at 70 km/h at the time of impact.
- 1.3.4 The locomotive was coasting as it approached the level crossing and no changes to the locomotive control settings were shown until about 2 seconds before impact, at which point an application of the independent locomotive brake was recorded.

² The point where vehicles must stop if a train is approaching the crossing

1.4 Personnel

- 1.4.1 The LE was a certified Grade 1 LE and had 27 years experience driving trains.
- 1.4.2 The driver of the car involved in the collision had been employed at the Tanneries for many years. She lived in Stratford and had travelled from her home there to start work at the Tanneries at 0700. It was later established that she was running late for work on the morning of the accident.

Analysis 1

- 1. The light locomotive was an unscheduled movement to meet Tranz Rail's operational requirements but such movements were not uncommon. The infrequency of trains passing the Tanneries during daylight or working hours probably meant that the car driver had seen very few during her long employment there and it is possible that she may never have had to stop at the level crossing for trains before.
- 2. It was highly likely that the car driver did not see the locomotive until just before the collision and possibly did not see it at all. She was seen by the LE to cut the corner on her approach to the level crossing, which may have been for any of the following reasons:
 - she was running late for work
 - there may have been opposing traffic approaching in the southbound lane of the highway and she wanted to get across ahead of it so she wasn't further delayed
 - she was not expecting any trains
 - this was a regular driving habit developed during the years of using the level crossing.
- 3. The car driver's failure to see the approaching locomotive may have been that she was satisfied it was safe to turn from the northbound lane of the highway and had steered her car towards the nearest corner of the approach to the level crossing. As the car turned, her line of sight would have moved from straight ahead down the highway to focus on various points in the turn she intended to make, the first probably in line with the words "sheepskin shop" seen on the building in the background of Figure 1. The LE's report supported this.
- 4. The position of the sun was such that it would not have affected the driver's ability to see the locomotive as she entered the right of way to the level crossing but would have been directly in her eyes at that point and may have distracted her.
- 5. The locomotive would have been visible as it approached from her left hand side but it was outside her field of vision, which had swept to the right as the car completed the turn and straightened to enter the level crossing.
- 6. Looking to the left before making a right-hand turn is a common driver action but looking to the left during a right-hand turn is not, so it was reasonable to expect that she had not looked to her left, the direction from which the locomotive was approaching, during her turning manoeuvre.
- 7. The LE's estimate of the speed of the car as it approached the level crossing was similar to the speed captured on the car speedometer following the collision. Working on an average speed of 25 km/h the car would have taken about 3.6 seconds to travel the 25 m from the point where it started to turn from the highway to the level crossing. At a speed of 70 km/h, DC4185 would have travelled 70 m in the same time and was therefore just emerging from behind the trees at the same time. The LE, and the car driver therefore had less than 4 seconds to see and respond to each other's presence.

- 8. The angle at which the car approached the level crossing suggests that the driver was hurrying, not expecting any trains and not preparing to stop. Alternatively, that may have been the way she usually approached the level crossing and this day was no different. For whatever reason, once the car had entered the approach to the level crossing it was less than 14 m or 2 seconds away from the railway line. At the same time the locomotive was 35 m away, halfway between the end of the row of trees and the level crossing. The speed the car entered the turn would have required the driver to focus mainly on negotiating the turn while keeping control of the car. Any chance of seeing the locomotive at that time would have been in her peripheral vision only. Although the locomotive with its headlight was probably visible in her peripheral vision, the much closer and relatively larger advertising sign may have been more prominent.
- 9. Even if the car driver had seen the approaching locomotive at this point, its close proximity, together with a normal human response time, meant that she would not have had time to take any effective evasive action, and a collision was inevitable.
- 10. Had the car continued north on the highway for about another 10 m before starting the turn it is possible that as a result of any or all of the following factors the collision may not have occurred:
 - the car would have been travelling more slowly in preparation for making a 90 degree turn to the approach to the level crossing
 - the visibility of the railway behind the sign up to the row of trees was better from that position on the highway
 - because the vehicle would have been travelling more slowly it would have been in a better position to stop if required.
- 11. Although the advertising sign obstructed the view of trains approaching from the north from about 150 m away, as vehicles got closer the significance of the sign diminished to the extent that from about 70 m away trains clear of the row of trees were visible.
- 12. The LE's view of the level crossing and its approaches was not obviously obstructed by the sign (refer Figure 4).
- 13. Although the removal of the advertising sign took away a highly visible invitation for the public to cross the railway it would not have stopped all such traffic. The shop had been in existence for many years and its presence was widely known. There was also a large sign on the wall of one of the Tanneries buildings and visible from the highway which advertised the shop. It is considered that removing one of the 2 advertising signs did not change the fact that the public was still being invited to cross the railway line. A safety recommendation covering this issue was made to Tranz Rail and is included in Section 5 of this report.

1.5 Private level crossings

Definition

1.5.1 The Tanneries level crossing was a Granted private level crossing, the definition of which was:

These are private crossings that have generally been provided subsequent to a railway's opening and for which Deeds of Grant set out the conditions on which each is provided and maintained. In some circumstances a Statutory Private Level Crossing can alter in status to a Granted level crossing and be subject to a Deed of Grant (see 1(a) for an example). Section 35 of the New Zealand Railways Corporation Act 1981 refers and Section 12 of the Railway Safety and Corridor Management Act 1992.

Protection at private level crossings

1.5.2 Tranz Rail later accepted the Land Transport Safety Authority (LTSA) definition of a public level crossing applied to the Tanneries level crossing. This definition was contained in Section 2 of the LTSA publication "Road signs and markings for railway level crossings".

"Public Railway Crossing - A crossing of a railway at grade (on the level) that the public has access to (regardless of whether it is on a public or private road or railway). A private crossing that the public is entitled to use (for delivery vehicles and customers/clients etc.) is also considered a public railway level crossing."

- 1.5.3 Tranz Rail's recommended standards of protection for private level crossings where the public had access were the same as for public crossings and were listed in Appendix 5, Private Level Crossings, Recommended Policy on Protection, of Company Procedure Q517. In summary those standards were:
 - signs and markings should be provided to standards detailed in the LTSA/Transit NZ "Manual of Traffic Signs and Markings" ⁴ (the Manual) Parts 1 and 2
 - views to be kept clear in accordance with whether Give-way or Stop signs installed
 - automatic alarms to be installed where justified by traffic levels
- 1.5.4 Tranz Rails Infrastructure Group Track Code T003, P115 also stated in part:

"STOP" OR "RAILWAY" SIGNS must be erected on each side of every public level crossing. Private level crossings may be signed where the RM T&S determines a need. The general rule for guidance is that where the public at large have ready access across the railway.

1.5.5 In the case of this level crossing the approach views were considered by Tranz Rail to be obstructed on all four quadrants because it was only 15 m from the parallel highway on one side and did not have 30 m of straight approach from the Tanneries right-of-way side. Under these conditions the Tranz Rail required standard of protection was three RG-32 Stop plus "crossbuck" sign combinations (refer Figure 5) but without the PW-59 LOOK FOR TRAINS sign, duplicated on the highway side and directed towards approaching traffic. The restart views at 5 m from track centre also needed to be kept clear for a distance of 156 m in each direction based on a maximum line speed of 70 km/h. The restart views 5 m from track centre exceeded the minimum requirement of 156 m in each direction in this case.

Signage and road markings

1.5.6 Clause RG-32 of the Manual stated:

An RG-32 RAILWAY LEVEL CROSSING STOP sign combination consists of a PW-14 (crossbuck) sign and an RG-5 STOP sign mounted on the same support.

RG-32 sign combinations shall be erected on the left-hand side of the road on approaches to railway level crossings controlled by RG-5 STOP signs.

1.5.7 The manual provided for RG-32 sign combinations to be erected at least 3 m clear of the nearest rail indicating the point where vehicles must stop if a train was approaching the level crossing.

³ A guideline publication which related to the provision of road signs and markings on the approaches to and at railway level crossings

⁴ A manual jointly prepared and distributed by Transit New Zealand and the LTSA which set out the policy and requirements for traffic signs and included guidance for the location and positioning of signs.

1.5.8 The manual stated that RG-5 (compulsory Stop) signs should be erected as part of the RG-32 railway level crossing stop sign combination where the driver of a vehicle had insufficient visibility of an approaching train. A PW-59 LOOK FOR TRAINS sign was an optional sign which could also be attached to the RG-32 sign combination.

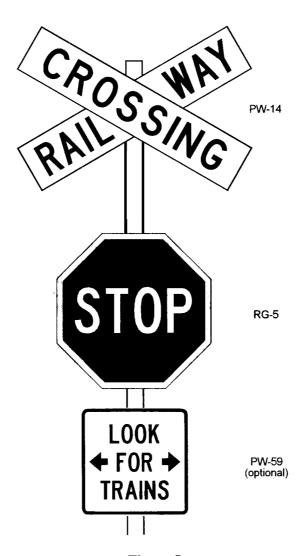


Figure 5
An RG-32 Railway Level Crossing Stop sign combination with a PW-59 sign attached

- 1.5.9 The manual recommended limit lines to be marked 3 m from the nearest rail on all sealed approaches to railway level crossings, to indicate the safe positions for vehicles to stop, if necessary, to avoid conflict with trains and that where practical the word "STOP" should be marked on the road surface of all sealed approaches to railway level crossings controlled by RG-5 STOP signs approximately 10 m from the limit line. There were no limit lines or pavement messages on the western (broken seal) side of the level crossing.
- 1.5.10 Clause PW-13.1 of the manual allowed for the provision of "Railway Crossing On Side Road" signs alongside the highway in either direction, about 160 m from the approach to the level crossing. These signs were to be erected where a railway level crossing was located on the side road immediately adjacent to the main road intersection (refer Figure 6). There were no such signs for this crossing.

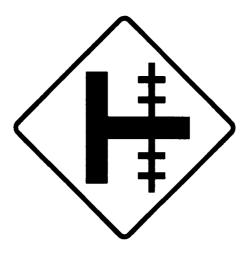


Figure 6
A PW-13.1 Railway Crossing On Side Road sign

1.6 Regulations governing level crossings

1.6.1 The Railway Safety and Corridor Management Act 1992 said that it was the duty of every person when approaching or crossing a level crossing to keep a vigilant lookout for any approaching rail service vehicle using the railway line and that no person should drive or attempt to drive any vehicle on or across a level crossing when there was any risk of that vehicle being involved in a collision with any rail service vehicle using the railway line.

1.7 Railway Grant No 57621

- 1.7.1 An agreement called "A Grant of Right of Way and Private Level-crossing Over Railway Land at: MNPL 164.147" (the deed) existed between Tranz Rail and the owner of the land on which the Tanneries was sited. The deed had been signed between the then landowners and New Zealand Rail Ltd (now Tranz Rail) on 18 July 1991 and entitled the owners to use the private level crossing subject to the conditions outlined.
- 1.7.2 The current owner took over the Tanneries in January 1998. He advised he was unaware of the existence of the deed pertaining to the level crossing and right of way but had been paying the annual fee.
- 1.7.3 Clause 1(b) of the deed stated that the grantee was to provide, erect and maintain gates fitted with locks or provided with chains and padlocks at each end of the right of way and that the gates were to be erected and maintained to the satisfaction of Tranz Rail. They were to be kept locked at all times when not actually in use. There were gates with chains and a padlock on the Tanneries side of the level crossing, but these were kept unlocked and open during the hours of business to provide access to the complex.
- 1.7.4 Clause 1(d) of the deed stated that the grantee was not to allow the right of way or the level crossing to become a public thoroughfare without the written consent of Tranz Rail. There was no record of such consent being given at any time. The deed also stated that trains may pass without warning at any time and that the use of the right of way was entirely at the user's risk.
- 1.7.5 Although Tranz Rail regularly undertook inspections of level crossings, which included the measurement of view lines 5 m from the track centre line, it stated the purpose of such inspections was not to assess if the conditions of the respective deeds for private level crossings were being complied with.

1.7.6 A copy of the deed predating 1991 could not be supplied by Tranz Rail but the company advised the deed was a standard document and was usually rolled over when renewed. The deeds were taken out between the company and landowners and were usually only renewed when land changed hands. Historic name changes to Tranz Rail had not resulted in changes to the deeds; they were simply transferred to the new company. Similarly no change to the deed had resulted from the change of ownership within the family owning the Tanneries.

Analysis 2

- 1. Although Tranz Rail considered that the level crossing met the definition of a public level crossing its use as such was in contravention of the deed between the company and the grantee, as written consent for its use as a public thoroughfare had not been given. This situation had been in place at least since the current deed was signed in 1991 and probably prior to that.
- 2. Although Tranz Rail said that deeds were generally only renewed when landowners changed, no new deed had been signed with or by the current landowner who said he was not even aware of the existence of a deed between Tranz Rail and the previous landowner.
- 3. Although the current owner of the Tanneries was not aware of the existence, let alone the terms of the deed, the level crossing was an identifiable and obvious risk to not only its staff but also its customers. The current owners of the Tanneries could and should have consulted with Tranz Rail and local authorities to minimise that risk.
- 4. The gates on the Tanneries side of the level crossing were positioned to restrict access to the Tanneries right of way rather than access to the level crossing when closed and were used more as a security measure rather than a protection for the level crossing.
- 5. Given the time that the public sales outlet had been in operation, the existence of advertising signs and Tranz Rail's regular track inspections passing the Tanneries, it is highly likely Tranz Rail was aware the level crossing was being used by the public and that appropriate signage had not been provided.
- 6. Under the Railway Safety and Corridor Management Act 1992 the driver of the car was responsible for giving way to trains at the level crossing, but under the deed conditions and Tranz Rail's Code there was a joint responsibility between the Tanneries owner and Tranz Rail to provide appropriate signage and protection to assist the driver. Because of the drivers familiarity with the level crossing, it is possible that even had the level crossing been appropriately signposted the accident may still have happened, but the lack of appropriate protection for the level crossing created a significant risk to the public users of it.
- 7. The presence of the advertising sign and the sales outlet on the opposite side of the track meant that the level crossing was extensively used by members of the public yet Tranz Rail had not implemented the standards of protection listed in its Company Procedure Q517 nor its Infrastructure Group Track Code T003, P115. Under these clauses the use to which the private level crossing was being put should have ensured that the level of signage would have been as that for a similar public level crossing.

- 8. The responsibility for signage at private level crossings rested with the Regional Manager, Track and Structures. Tranz Rail could offer no explanation why the Tanneries level crossing had not been reviewed by the Regional Manager for additional signage prior to 19 September 2001 but advised that some level crossings which were known to have public traffic had been fitted with additional signage during the national upgrading of signage at uncontrolled (passive) public level crossings.
- 9. The condition of the seal on the western side of the level crossing meant that the painting of limit lines or pavement messages was not practical and therefore in terms of the manual were not required. It is doubtful that the existence of some form of road marking would have prevented the collision under these circumstances.
- 10. The minimum standard signage required at this crossing was an RG-32 RAILWAY LEVEL CROSSING STOP sign combination with a PW-59 LOOK FOR TRAINS sign attached in conjunction with PW-13.1 RAILWAY CROSSING ON SIDE ROAD signs positioned alongside the highway. The PW-59 LOOK FOR TRAINS sign is considered a particularly appropriate reminder to road traffic at level crossings in areas where there is light rail traffic.

2. Findings

- 2.1 The main factors contributing to the collision between light locomotive DC4185 and the private car was the speed of the car and the path it took as it entered the right of way to the level crossing which resulted in the car driver either not seeing the locomotive, or seeing it too late to prevent the collision.
- 2.2 The advertising sign posted adjacent to the level crossing would not have prevented the car driver from seeing the locomotive had the car approached the level crossing preparing to give way or stop, but may have reduced the drivers ability to detect the locomotive in her peripheral vision.
- 2.3 The Tanneries level crossing did not have the required signage to warn road users of its presence, which created a significant risk to staff and customers of the Tanneries.
- 2.4 Tranz Rail had not authorised the level crossing to be used for public access but was probably aware that it had been used for public access for some time.
- 2.5 Had the level crossing been appropriately sign posted, it may or may not have prevented this collision, but it would have drawn staff and the public's attention to an identifiable risk.

3. Safety Actions

Following the collision Tranz Rail arranged for the advertising sign to be removed and installed a compulsory Stop sign on the highway side of the level crossing.

4. Safety Recommendations

- 4.1 On 24 January 2002 it was recommended to the managing director of Tranz Rail that he:
 - 4.1.1 either immediately prohibit the public use of the level crossing in accordance with Clause 1(d) of the Deed of Grant or, if public use is to continue, give written consent to the lessee under conditions which ensure safe public access (077/01)
 - 4.1.2 identify all other private level crossings that the public are invited to use to ensure that:
 - the appropriate authority has been given for such use
 - the deed of grant contains appropriate conditions that ensure public safety
 - the appropriate signage for a public level crossing status is in place. (078/01)
- 4.2 On 1 February 2002 the Managing Director of Tranz Rail replied:

077/01 – Tranz Rail accepts this recommendation.

Tranz Rail has worked in partnership with the owners of Egmont Tanneries and the District Council to upgrade an existing alternative access route for use by the public and the tannery. The level crossing will be closed upon completion of the new access road. This is expected to occur during February 2002.

078/01 - Tranz Rail is in the process of reviewing this recommendation.

Tranz Rail needs to undertake further work to determine to what extent it is possible to implement this recommendation. Tranz Rail has a database of "known" private level crossings (approximately 700 in number). However, when a property is sold or changes hands, Tranz Rail has no way of knowing that this has occurred, as it is not informed. In such a situation, the Deed of Grant permitting use of the private level crossing would become invalid since it is a private agreement between Tranz Rail and the owner of the property and does not pass to the new owner with the title to the land. A new owner should, under law, then apply to Tranz Rail for its own Deed of Grant. Tranz Rail is planning to review the terms of the Deed of Grant to include an obligation to notify Tranz Rail of a change in ownership, but Tranz Rail has no way of enforcing this. In addition, there are a number of statutory private level crossings which are granted to farmers and the like by statute and which Tranz Rail also has no record of.

Tranz Rail intends to write to known private level crossing owners who have a Deed of Grant to remind them of their obligations under the Deed of Grant and to ask them to notify us of any public use of their crossings. Public use is prohibited under the Deed of Grant without Tranz Rail's consent. Tranz Rail then intends to deal with each known case of public use, by requiring the holder to erect appropriate signage, where this is the appropriate course of action. Unfortunately, it is the private holder and not Tranz Rail who is in the best position to monitor public use of the crossings and to this extent is reliant upon the compliance of the holders to the terms of their grant.

In addition, Tranz Rail also intends to amend its Deed of Grant to all new holders, to refer to the appropriate signage which should be put up in compliance with LTSA standards for the protection of level crossings with public use.

Further work is also required to determine the role of track inspections and now they can identify the status of private level crossings.

This is an ongoing project for Tranz Rail and the company is committed to following it through to all extents reasonably possible.

Approved for publication 05 February 2002

Hon. W P Jeffries **Chief Commissioner**