



**Report 97-102**

**Train 270**

**collision with roadroller**

**Mangapehi**

**12 March 1997**

### **Abstract**

On Wednesday, 12 March 1997, at about 1615 hours a roadroller entered State Highway 30 from a side road to cross Bennydale Road level crossing at Mangapehi, and moved onto the level crossing ahead of an approaching train. The level crossing alarms were operating. The driver of the roadroller was killed in the resulting collision. The cause was the driver's apparent failure to see or hear the warning devices. A safety issue identified was the suitability of control procedures for the movement of roadrollers and similar machines over level crossings.

# Transport Accident Investigation Commission

## Rail Accident Report 97-102

<b>Train type and number:</b>	Freight, 270
<b>Locomotives:</b>	EF 30163/EF 30071
<b>Date and time:</b>	12 March 1997, 1615 hours
<b>Location:</b>	Mangapehi, 449.74 km, North Island Main Trunk
<b>Type of occurrence:</b>	Collision with roadroller
<b>Persons on board:</b>	Crew: 1
<b>Injuries:</b>	Crew: nil Others <sup>1</sup> : 1 fatal
<b>Nature of damage:</b>	Major damage to roadroller, moderate damage to EF 30163
<b>Investigator-in-Charge:</b>	R E Howe

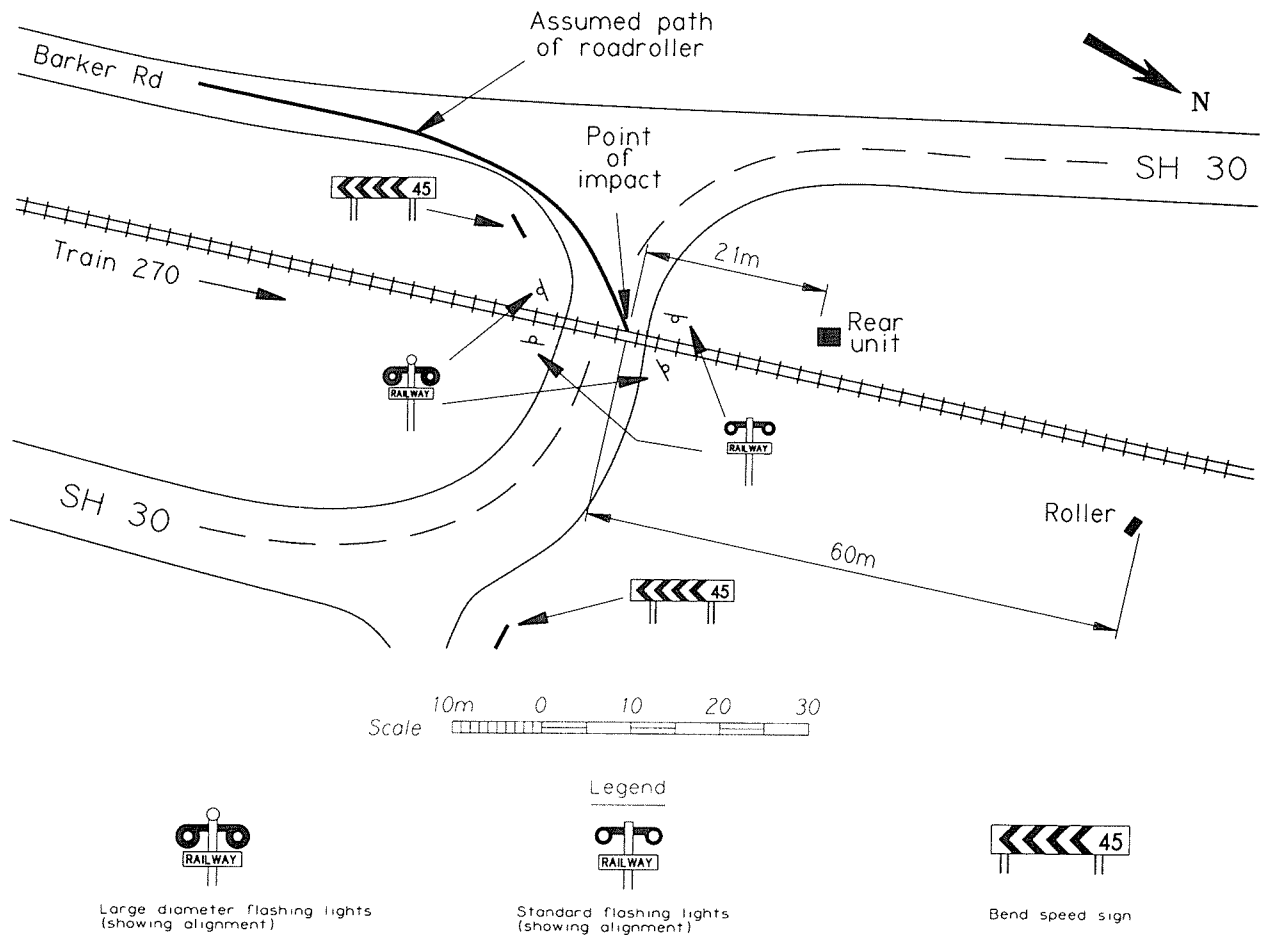
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<sup>1</sup> Driver of the roadroller

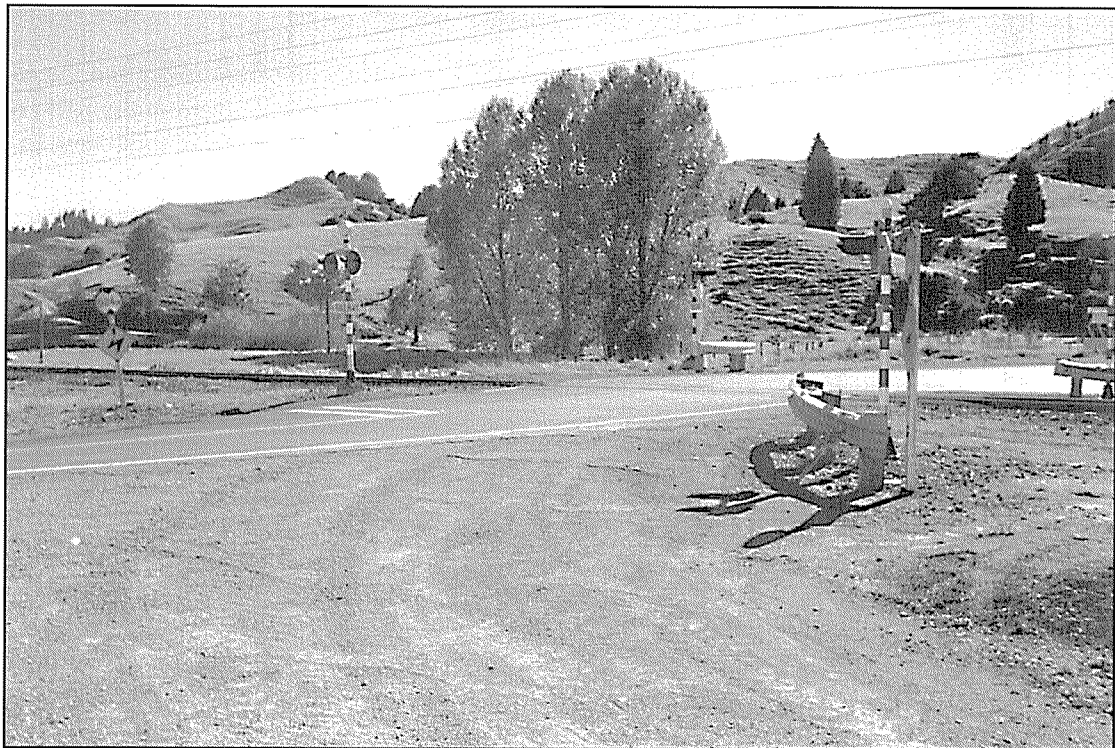
# 1. Factual Information

## 1.1 Narrative

- 1.1.1 On Wednesday, 12 March 1997, Train 270 was a scheduled northbound freight service operated by Tranz Rail Ltd (Tranz Rail) running from Palmerston North to Hamilton.
- 1.1.2 Train 270 consisted of EF 30163 (leading), EF 30071 and 23 wagons, of approximately 600 t, and 280 m in length. It was crewed by a locomotive engineer (LE).
- 1.1.3 At 1615 hours the train was approaching Bennydale Road level crossing, Mangapehi, at 449.74 km North Island Main Trunk at a speed of 57 km/h. The allowable line speed for a freight train was 55 km/h.
- 1.1.4 The level crossing was protected with flashing lights and bells (FLBs). The two flashing light standards with a long road approach were equipped with 300 mm diameter lenses and the two with a short road approach with 200 mm diameter lenses in accordance with current Tranz Rail practice. Figure 1 shows the general layout of the level crossing.
- 1.1.5 When the train was about 300 m from the crossing the LE saw a northbound car parallel to him on State Highway (SH) 30 approaching the crossing. He sounded the air horn for approximately two seconds and noticed the brake lights on the car had been applied.
- 1.1.6 When he again looked towards the level crossing he was about 200 m away and saw a roadroller on his left side approaching the crossing. He sounded the air horn for a further two seconds.
- 1.1.7 The LE reported the roadroller “. . . looked to be approaching [the crossing] at a 45° angle in the same direction as the train was moving” and was travelling about walking pace. He sounded the air horn a third time but the roadroller continued to move slowly across the line and impact occurred.
- 1.1.8 The left side of the locomotive struck the roadroller between the front roller and the cab unit, splitting it in two. The cab rear unit came to rest on the left side 21 m from the point of impact (POI) with the driver out of the cab and pinned near the front. The roller unit came to rest on the right side 60 m from POI.
- 1.1.9 Witnesses to the accident were quickly on hand and found that no pulse was present in the pinned driver. This was confirmed by an Ambulance Officer who arrived a few minutes later.
- 1.1.10 Damage to the locomotive included a broken left-hand cab window at three metres above rail level and fracturing of the front brake pipe cocks. The latter resulted in a full brake application at impact which brought the train to rest 250 m beyond the POI.
- 1.1.11 The northbound car on SH 30 contained two occupants who witnessed the accident. They confirmed the flashing lights and bells were operating, sounding of the air horn, and the approach angle and speed of the roadroller. The driver of the car had slowed and stopped at the white line on the east side of the crossing. He had time to reverse five metres after realising the potential for collision which was developing.



**Figure 1**  
**Site details**



**Figure 2**  
**Roadroller driver's view from Barker Road**

- 1.1.12 The accident was also witnessed by a southbound motorist who was slowing for the crossing and approximately 25 m away at the time of impact. He saw the roadroller turn right out of Barker Road, and coming out at “quite an angle”. The motorist heard the bells and the intermittent sound of the air horn and saw the flashing lights and the headlights of the approaching train. He stated he thought the roadroller driver had seen the train at the last moment and attempted to turn in the direction the train was travelling.
- 1.1.13 The roadroller had been rolling the metal on Barker Road. The driver had commenced work at 0700 hours and had been working in conjunction with a road grader. On completion of work at Barker road he was travelling to Tapuwae Road, some 8 km south, to follow up grading on that road. His normal finishing time was between 1700 hours and 1730 hours depending on work progress.

## **1.2 Personnel**

- 1.2.1 The LE held a current operating certificate for the duties concerned.
- 1.2.2 The roadroller driver was 61 years old and had spent 14 years with Waitomo Civil Construction Ltd, the last seven years working with the vehicle involved in the accident. He was an experienced driver with a reputation for operating his equipment within recognised limits. Although he had recently lost his wife and was described by co-workers as having been “a different man” since his loss, he was reported as being in good spirits on the day of the accident with no indication of any particular health or stress problems.
- 1.2.3 He was wearing earmuffs at the time of the accident which was his standard practice when driving the roadroller.
- 1.2.4 The driver held a current Class I licence to drive the roadroller concerned and was certified by his employer as fully trained in the skills required.

## **1.3 Roadroller**

- 1.3.1 The roadroller was a Pacific Raggo SP120 (1979) seven tonne single drum vibrating roller, registered number JC3255, owned and operated by Waitomo Civil Construction Ltd. The cab seating gave a driver line of sight at approximately three metres above road level.
- 1.3.2 Such a vehicle was classed as “heavy special purpose mobile machinery” and was registered and licensed accordingly. Machines in this category did not require a warrant of fitness.
- 1.3.3 A brake replacement and overhaul had been carried out in early March and the roadroller, although elderly, appeared to be well maintained.

## **1.4 Site details**

- 1.4.1 Marks on the road indicated the roadroller was facing north-east at approximately 45° to the railway line at the POI. This line of approach, and the exit line from the east side of Barker Road which this inferred, was supported by recent tyre marks exiting Barker Road. Figure 2 shows the general view of the level crossing from Barker Road.
- 1.4.2 Site tests from three metres above road level on the assumed line of approach showed the visual impact of the level crossing lights on the north-west quadrant standard was decreased by their offset alignment and the hood over the lens, although the lights were still visible.
- 1.4.3 The weather was fine and the visibility good. The angle of the sun did not interfere with the roadroller driver’s view of the crossing.

## **1.5 Control of roadrollers over level crossings**

- 1.5.1 The New Zealand Railways Corporation (General) Regulations 1982, part viii, clause 27 (and the Government Railways (General) Regulations 1957 which preceded them) prohibited vehicles such as the roadroller concerned from travelling over level crossings without written approval from a district railways engineer and subject to such conditions that officer saw fit to impose. However industry sources advised that most, if not all, movements of roadrollers over level crossings have been made without such approvals.
- 1.5.2 The New Zealand Railways Corporation (General) Regulations Application Order 1990, 1990/314, made the 1982 regulations applicable to all railway operators that are Crown transferee companies, and in particular applicable to New Zealand Rail Limited, the Crown transferee company owning and operating the New Zealand rail system from 1990 until 1993.
- 1.5.3 In 1993 New Zealand Rail Limited was sold to private interests and later renamed Tranz Rail Limited. Tranz Rail advised the Commission that clause 27 of the New Zealand Railways Corporation (General) Regulations 1982 did not apply to Tranz Rail since it has been privatised. They considered this appeared to be by omission rather than design, with the appropriate authorities possibly having overlooked the existence of safety regulations within these general regulations, and advised the issue of correcting the error had been taken up with the Ministry of Transport.

## **2. Analysis**

- 2.1 Witness reports confirmed all audible and visual warning systems were working prior to the accident, but that the driver of the roadroller seemed unaware of the approach of the train until near, or at, impact.
- 2.2 The noise of the roadroller would have made it difficult for the driver to hear the crossing alarm bells or the air horn from the locomotive, and the earmuffs he wore may have exacerbated this.
- 2.3 Witness reports and road markings indicated a likely line of approach as shown on Figure 1. While the flashing lights were still visible from the driver's position their partial obscuration decreased their effectiveness.
- 2.4 Although such vehicles as roadrollers were prohibited from using level crossings without specific approval until 1993 it is unlikely that a system was in effect to ensure compliance.
- 2.5 The reasons for a need to control vehicles such as roadrollers when using level crossings are not defined although it is likely that this was related to the possibility of damage to the railway affecting rail safety. Tranz Rail advised the current reason relates to the possible shorting out of track circuits by metal wheels. The weight and configuration of such vehicles are no more hazardous to rail traffic than some of the other vehicles currently permitted unrestricted use of level crossings. However in this case the driver's height above road level, the noise of the roadroller, and his use of earmuffs may have decreased his ability to recognise and respond to normal protection devices.
- 2.6 The Transport Act 1962, clause 64, requires compulsory stopping of certain vehicles at railway crossings. Although this could be extended to include vehicles such as roadrollers care would be needed to ensure that the available time, power to weight ratio, acceleration characteristics, and the physical features of the crossing allowed stop and restart to be conducted safely.

- 2.7 The accident occurred nine hours after the commencement of the driver's shift. This, and his possible preoccupation due to his recent bereavement, may have caused a lower level of attention than usual and contributed to his apparent inability to detect warnings of the approaching train.

### **3. Findings**

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

- 3.1 The train was operated correctly.
- 3.2 The FLBs operated as intended.
- 3.3 The roadroller was being operated in accordance with the restrictions covering such vehicles.
- 3.4 Although the level crossing lights were positioned for traffic on SH 30 the view from a vehicle exiting Barker Road by the required approach line on the left side of the road was satisfactory.
- 3.5 The driver's actions indicated he did not hear or see the warning system or the approaching train.
- 3.6 The assumed approach line of the roadroller to the crossing, and the driver's height above road level, restricted the driver's view of the level crossing lights.
- 3.7 The noise of the roadroller and the effect of the earmuffs worn by the driver would have diminished the audible warning given by the crossing alarm bells and the locomotive's air horn.
- 3.8 The driver's alertness may have been affected by his recent bereavement and the length of time worked on his shift.
- 3.9 "Heavy special purpose mobile machines" such as roadrollers regularly travel unrestricted over level crossings throughout New Zealand, obviating the intent of the 1982 Regulations.

### **4. Safety Recommendation**

- 4.1 It was recommended to the Director, Land Transport Safety Authority, that he:
- 4.1.1 Review the desirability of allowing the vehicles defined in part viii, clause 27 of the New Zealand Railways Corporation (General) Regulations 1982 to continue to have unrestricted access over level crossings and to impose any conditions considered necessary to improve the safety of such operations. (058/97)
- 4.2 The Director, Land Transport Safety Authority, responded that it was not intended to adopt the safety recommendation as worded. The response included:
- 4.2.1 LTSA considers the more appropriate course of action to take arising from this accident is educative rather than legislative. Accordingly LTSA will make operators of heavy special purpose mobile machinery aware of the circumstances of the accident and of appropriate precautions which should be taken in regard to railway level crossings.

