



**Report 99-108**  
**north yard shunt and No. 1 shunt**  
**collision**  
**Middleton yard, near Christchurch**  
**18 May 1999**

**Abstract**

At approximately 1215 hours on Tuesday, 18 May 1999, a collision occurred between the north yard shunt and No. 1 shunt in Middleton yard. No injuries occurred but the locomotives sustained some damage and 3000 litres of diesel leaked from a ruptured fuel tank.

The safety deficiencies identified included:

- the suitability of the procedures and compliance monitoring in place to ensure the safe operation of remote control locomotives
- the failure of staff to follow defined procedures regarding the berthing of a main line shunting service into the defined work area of a yard shunting service.



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## List of Abbreviations

ASP	alternative shunt practices
km/h	kilometres per hour
LE	locomotive engineer
m	metre
OC	operations controller
RCO	remote control operator
t	tonnes
Tranz Rail	Tranz Rail Limited
TXO	train examiner operations

# Rail Incident Report 99-108

## Data Summary

<b>Train type and number:</b>	north yard shunt No. 1 shunt
<b>Date and time:</b>	18 May 1999, approximately 1215 hours
<b>Location:</b>	Middleton yard, near Christchurch
<b>Type of occurrence:</b>	collision
<b>Persons on board:</b>	crew:           north yard shunt:    2 No. 1 shunt:           1
<b>Injuries:</b>	nil
<b>Damage:</b>	minor
<b>Operator:</b>	Tranz Rail Limited (Tranz Rail)
<b>Investigator-in-Charge:</b>	R E Howe

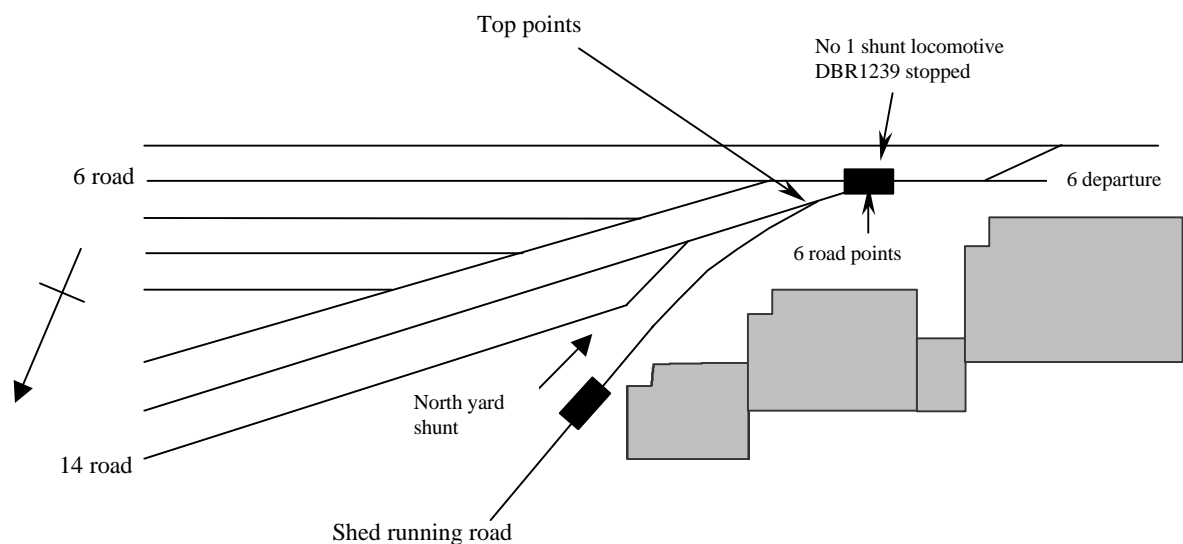




# 1. Factual Information

## 1.1 Narrative

- 1.1.1 At approximately 1215 hours on Tuesday, 18 May 1999, the Middleton yard north yard shunt, comprising DSG3127 and 3 wagons with a train weight of 90 t, was returning up the shed running road towards the top points in preparation for placing the wagons to 14 road in the freight terminal. The shunt was under the control of a remote control operator (RCO) who was positioned on the brake lever on the front right-hand side of the leading wagon immediately behind the locomotive in the direction of travel. A shunter was positioned in the rear shunters refuge on the left-hand side of the locomotive in the direction of travel. A shunter making up the third member of the crew was walking from the freight terminal shelter to set the points for 14 road in preparation for placing the wagons.
- 1.1.2 At approximately 1210 hours, No. 1 shunt comprising locomotive DBR1239 was approaching Middleton from the north. The signalman at Addington Signal Box, who controls all movements into and out of Middleton yard, requested authority through the permission box from the operations controller (OC) in Middleton to berth No. 1 shunt. The traffic operator in the permission box office contacted the OC who authorised the berthing of No. 1 shunt in 6 road, north yard. This authority was relayed to Addington Signal Box. No. 1 shunt required piloting in the yard and was crewed by a locomotive engineer (LE1) and a train examiner operations (TXO) acting as pilot.
- 1.1.3 No. 1 shunt was returning to Middleton for an end-of-shift crew change. LE1 was aware from radio contact with the OC that the changeover locomotive engineer (LE2) was waiting in the terminal manager's office building to take over No. 1 shunt, so he stopped in the immediate vicinity of the office, and over 6 road points. Figure 1 shows the site plan of the area.



**Figure 1**  
**Locality plan (not to scale)**

- 1.1.4 LE2 left the office and changed over with the incoming LE1 on the locomotive once it had come to a stop.
- 1.1.5 At about the same time (1215 hours), the north yard shunt was approaching the top points, which was the turnout to 14 road in the freight terminal. The RCO was unaware that DBR1239 was standing across 6 road points over which his shunt had to run to gain access to 14 road.

- 1.1.6 LE2 saw the north yard shunt bearing down towards him when it was about 20 m away and, anticipating a collision, attempted to move DBR1239 north back into 6 road, from where it had just come. However, he was unable to clear the points and the north yard shunt collided with DBR1239.
- 1.1.7 The RCO on the north yard shunt did not see the locomotive standing across 6 road points until he was approximately 50 m away, at which point the locomotives were 36 m apart. He estimated his speed at the time was between 10-15 km/h. The shunter riding on the locomotive of the north yard shunt described the speed as “normal”.
- 1.1.8 As soon as the RCO became aware of the presence of DBR1239 he applied the emergency brake and jumped from the wagon. The shunter was unaware of the impending collision until he heard the RCO call out “there is an engine in the way”. He estimated the distance between the locomotives as 40 m when he stepped off DSG3127 “without too much difficulty” and watched the collision.
- 1.1.9 Nobody was injured in the collision.
- 1.1.10 The fuel tank on DBR1239 was split as a result of the impact, causing approximately 3000 litres of diesel fuel to spill. This drained away quickly into the clay sub-base, which was subsequently dug out and refilled to the Regional Council’s satisfaction.
- 1.1.11 Braking tests later carried out under similar conditions indicated a stopping distance of about 25 m was required to bring a shunt to a stop from the maximum allowable speed of 25 km/h.

## 1.2 Site details

- 1.2.1 No. 6 road was a straight through road, which continued beyond 6 road points to become 6 departure.
- 1.2.2 The shed running road connected the freight terminal shelter roads to the yard. The exit from the freight terminal was around a right-hand curve where visibility was restricted by adjacent buildings. Figure 2 shows the view from the position where DBR1239 first became visible to the RCO on the inside of the curve.



**Figure 2**

**The view from where No. 1 shunt locomotive was first visible to the RCO of the north yard shunt**

- 1.2.3 Staff interviewed were aware of the potential hazard of the area in which the collision occurred, which was referred to as “the worst bottleneck in the yard”.
- 1.2.4 The terminal manager’s office building was situated adjacent to the top points and 6 road points and contained all staff amenities including book-on and book-off facilities. Crew changes in this vicinity were common, although staff interviewed said the locomotives were usually parked slightly south of the 6 road points in 6 departure road.

### **1.3 North yard shunt movements**

- 1.3.1 The north yard shunt had taken a rake of 4 wagons from Middleton terminal down the shed running road to the freight terminal shelter. On arrival the RCO was requested by the team leader at the freight terminal to place 3 of the wagons to 14 road which involved returning along the shed running road to 6 road to gain access.
- 1.3.2 The RCO had anticipated stopping for a lunch break after placing the 4 wagons to the freight terminal shelter and had advised the operations controller (OC) of his plans to do so. He had not expected to be returning to the yard immediately.
- 1.3.3 As the shed running road curved to the right in the direction of travel the position taken up by the RCO on the inside of the curve ensured that he had line of sight as the shunt rounded the curve towards the top points. The maximum permitted speed for the movement was 25 km/h, although there was a requirement for speed to be controlled such that the movement could be stopped in the clear distance ahead.

### **1.4 No. 1 shunt movements**

- 1.4.1 The OC stated that he assumed the north yard shunt had departed to the freight terminal and, based on the information from the RCO regarding a lunch break, would not be coming back into the yard while No. 1 shunt was berthed.
- 1.4.2 As LE2 was booked-on and ready to commence duty, the OC had requested LE1 to stop DBR1239 outside the office to allow the OC to utilise LE2 for some urgent work before his TXO was booked on.
- 1.4.3 The OC did not contact the north yard shunt RCO before arranging to berth DBR1239 over 6 road points, which were within the authorised work area for the north yard shunt.
- 1.4.4 Once DBR1239 had stopped outside the terminal manager’s office building and the crew change had been made, LE2 stayed in the locomotive cab awaiting instructions from the OC who was going to be his pilot for the work they were going to undertake.
- 1.4.5 LE2 stated he chose to move north rather than south when he saw the shunt approaching because he was able to move north with line of sight but could not see south (long hood leading) to see if the way was clear to move in that direction without endangering ground staff.

### **1.5 Personnel**

- 1.5.1 The RCO had 25 years operating experience. He was certified as a Rail Operator (Grade 1) and held a current Operating Certificate for Remote Control Operations.
- 1.5.2 The OC had 20 years operating experience, of which 5 were in his current role. The role did not require specific certification.

## **1.6 Procedures for avoiding conflicting movements**

- 1.6.1 The ASP<sup>1</sup> Instruction and Operating Plan, Christchurch Area, Section 4 Main Line Trains, dated 13 October 1998 stated:

The berthing of main line trains and shunting services must be arranged in consultation between Rail Operators and Operations Controllers.

Although the yard shunting services have working rights within their respective work areas, when necessary the Operations Controller may require the Rail Operator of the shunt to stay clear of the intended movement.

Having reached this understanding staff will be responsible for positioning themselves in such a manner as to ensure conflicting movements are protected.

## **1.7 Radio procedures**

- 1.7.1 All local communication with shunting services operating within Middleton yard was through designated channels on short-range ASP radio, whereas contact with main line trains and shunting services, when operating on the mainline or berthing within Middleton yard, was by the use of the short-range channel (channel 1) of the multi-channel train radio.
- 1.7.2 To effectively co-ordinate movements within the yard the OC required access to both radio systems. When in the office this was achieved by a desk mounted base set for each system. When away from the office he stated he always carried a mobile train control radio, and sometimes an ASP radio as most arrangements with the yard shunts were made before leaving the office. The OC was carrying a portable multi-channel train radio at the time of the collision but not a portable ASP radio.

## **2. Analysis**

- 2.1 A possible collision scenario was set up by the failure of the OC to contact the north yard shunt RCO, in accordance with the Christchurch Area Operating Plan, and advise him of his intention to bring another train into the authorised work area of the north yard shunt.
- 2.2 The OC believed the RCO would be placing the wagons to the freight terminal and then having his lunch. The OC took this to mean that once the north yard shunt had placed the wagons the RCO would stop short on the shed running road for a lunch break, as was the normal practice. At this stage neither party was aware of the forthcoming request from the team leader at the freight terminal for the repositioning of wagons to 14 road.
- 2.3 The OC was unaware of the arrangements for the north end yard shunt to reposition wagons from the freight terminal, requiring it to return along the shed road and use the top end points. As the north end shunt was operating in its area there was no requirement for the RCO to advise the OC of this.
- 2.4 No. 6 points was the next turnout beyond the top points and by standing where it was DBR1239 effectively occupied the headroom required by the north yard shunt once it cleared the top points turnout.
- 2.5 To contact the RCO on the north yard shunt the OC required ASP radio contact. While the OC's office had a fixed ASP radio for such use, once outside the office it was necessary for him to use a portable radio for this purpose. Although it was common practice for the OC to take a portable ASP radio when leaving his office it was not mandatory. On this occasion he elected not to, his decision being based on his perceived understanding of where the north yard shunt was and what

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<sup>1</sup> Alternative shunt practices; the use of radios for controlling shunt movements.

its next movements were. The OC's haste to effect an urgent task may have affected his judgement in assuming the way would be clear for locomotive DBR1239.

- 2.6 The north yard shunt RCO was unaware that the OC had authorised the berthing of No. 1 shunt in 6 road.
- 2.7 The operating procedures for remote control operation should have been a defence against a collision occurring, but were ineffective on the day.
- 2.8 The position taken up by the RCO on the front of the first wagon behind the locomotive met Tranz Rail's requirements. However, a combination of this position, the shunt speed and the view available meant the RCO was unable to stop the shunt before a collision occurred.
- 2.9 Although the shunting gang was a 3-person gang, the absence of the third member who was walking across to 14 road points at the time did not contribute to the collision as the numbers present were adequate to have safely carried out the intended move.
- 2.10 Braking tests carried out under similar conditions showed that the north yard shunt could have stopped within approximately 25 m at 25 km/h. Allowing for reaction time the shunt travelled around 28 m, from the time the brake was applied to impact at approximately 5 km/h to 10 km/h, indicating the speed was likely to have been in excess of 25 km/h at braking.
- 2.11 Although the consequences of the incident may have been reduced if LE2 had moved No. 1 shunt to the south, such a movement could not be carried out safely because of the possibility of ground staff in the area.

### **3. Findings**

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

- 3.1 All staff involved were correctly certified for the duties being undertaken.
- 3.2 The north yard shunt was operating within an approved area at the time of the collision.
- 3.3 The potential for the collision was set up when the OC authorised No. 1 shunt to enter the work area of the north yard shunt without first following standard procedures in consulting with the RCO of the north yard shunt.
- 3.4 The RCO of the north yard shunt was unaware of the presence of No. 1 shunt.
- 3.5 In not following procedures laid down to avoid conflicting movements the OC bypassed the first defence against the collision.
- 3.6 The OC not having an ASP radio with him when he went to pilot No. 1 shunt did not, under the circumstances, contribute to the collision.
- 3.7 The position taken up by the RCO meant that the line of sight on the shed running road approaching the curve into the Middleton yard was marginal for the maximum permissible speed of 25 km/h.
- 3.8 The speed of the north yard shunt was probably greater than 25 km/h as it approached the top points.

- 3.9 Although the RCO's position was within Tranz Rail requirements, it did not achieve maximum warning of any possible obstruction as the shunt exited the shed running road.

## 4. Safety Actions

- 4.1 On 26 July 1999, a Local Instructions and Operating Plan, Christchurch Area was issued to supersede the ASP Instructions and Operating Plan, Christchurch Area dated 13 October 1998 that was effective at the time of the collision. Although the relevant clause 4 relating to berthing and dispatching of mainline trains and quoted in 1.6.1 of this report remained the same, a new clause was included:

**7. There are restricted view lines when travelling from the Freight Centre back to the Marshalling yard due to buildings in the area.** Because of these restricted view lines all precautions must be taken to ensure that the shunt consist can stop within the view line ahead.  
The Service Co-Ordinators [previously OCs] before permitting any movements within this area MUST come to a clear understanding with the Rail Operator as to what movements are going to take place, and during this time under no circumstances are wagons or locomotives to stop foul of any roads.

The inclusion of this new clause should focus extra attention on procedures for movements within this particular area of Middleton yard.

- 4.2 As a result of previous investigations carried out by the Commission into 2 similar shunting incidents in Railway Occurrence Report 99-107, Southdown, and Railway Occurrence Report 99-111, Kinleith, 2 safety recommendations have already been made to Tranz Rail. Those safety recommendations, together with Tranz Rail's responses are detailed below:

4.2.1 **Safety recommendation 043/99 (which was similar to safety recommendation 066/99)**

Reinforce the training and increase the compliance monitoring of remote control operators to ensure they are positioned and operate in such a manner that a combination of:

- range of vision
- normal operating distractions and
- shunting speed

maintain an acceptable factor of safety with respect to possible collision.

Tranz Rail responded:

Tranz Rail has changed the Safety Observation Process specifying a minimum of three formal observations within a two year period at no more than eight month intervals.

Training in the new procedures has been completed for Managers and implemented at Supervisory level.

All instructions in the Rail Operating Code relating to the movement of shunts in terminals are being reviewed as detailed in our response to Safety Recommendation 44/99 below.

4.2.2 **Safety recommendation 044/99 (which was similar to safety recommendation 067/99)**

Amend existing code instructions and training procedures for the operation of remote control locomotives to ensure they include:

- a definition of what constitutes “adequate” when describing “range of vision” with particular regard to speed and the need to stop in a distance related to the clear distance seen ahead
- unambiguous guidelines as to the best position for operators on the leading vehicle, taking account of curved track and limitations imposed by positioning themselves on the trailing end (044/99 and 067/99).

Tranz Rail responded:

Tranz Rail is reviewing Section 5 of the Rail Operating Code with the intention of rewording and reorganising all procedures relating to the movement of shunts (remote control or otherwise) in Terminals as we can see that the relevant information is contained in a number of sub sections and would be better understood if all associated instructions were grouped together.

4.3 Tranz Rail advised that Section 5 of the Rail Operating Code was being rewritten to clarify existing instructions relating to shunting movements, and that in particular care was being taken to consolidate the instructions so that all information relating to moving vehicles/locomotives was together. This was required because over a period of time some of this information had become fragmented.

4.4 Based on the positive response by Tranz Rail to the safety recommendations previously made, and likely action arising from the review of the lessons learned in this incident, no additional safety recommendations have been made.

Approved for publication, 12 April 2000

Hon. W P Jeffries  
**Chief Commissioner**