# Report 98-110

# Train 902

# derailment

# Islington

# 28 June 1998

## Abstract

On Sunday 28 June 1998, at approximately 1650 hours, Train 902, the northbound *Southerner* express passenger, derailed at Islington at slow speed. The rear of the train was routed to the down main when motorised points moved under the train. There were no injuries.

Causal factors were non-compliances with intended procedures for points operation. Safety issues identified were the suitability of those procedures and the effectiveness of compliance monitoring. A number of safety actions were taken by the operator and 5 safety recommendations were made to address the safety issues.

# Contents



# Figures

## List of abbreviations

| | |
|---|---|
| LE | locomotive engineer |
| RO | rail operator |
| TA | train advice |
| TCO | train control officer |
| Tranz Rail | Tranz Rail Limited |

# Transport Accident Investigation Commission

## Rail Incident Report 98-110

| | |
|---|---|
| **Train type and number:** | Express passenger 902 |
| **Date and time:** | 28 June 1998, 1650 hours |
| **Location:** | Islington |
| **Type of occurrence:** | Derailment |
| **Persons on board:** | Crew: 3<br>Passengers: 20 |
| **Injuries:** | Crew: nil<br>Others: nil |
| **Nature of damage:** | Minor damage to van and track, points motor destroyed |
| **Operator:** | Tranz Rail Limited (Tranz Rail) |
| **Investigator-in-Charge:** | R E Howe |

# 1. Factual Information

## 1.1 Narrative

1.1.1 Train 902, the scheduled northbound Tranz Rail *Southerner* passenger express, was operating from Invercargill to Christchurch on Sunday 28 June 1998. The consist was DX5235, freight wagon HKP142, van AG118, carriage AO19, buffet car AB3534 and carriage AO54.

1.1.2 The train was crewed by a locomotive engineer (LE) and 2 train crew, and carried 20 passengers as it neared Christchurch at the end of its run.

1.1.3 At approximately 1648 hours the train stopped at Signal 4R, the up home signal at the south end of Islington, which was displaying a red indication.

1.1.4 The red indication was displayed because of previous planned work which had required a power disconnection. The work had been completed some 25 minutes earlier. Although power had then been restored to the signalling, power had not been restored to the points motors which operated the points of No. 3 crossover joining the single line track south of Islington to the double line track into Christchurch. Figure 1 shows the layout and signalling details.

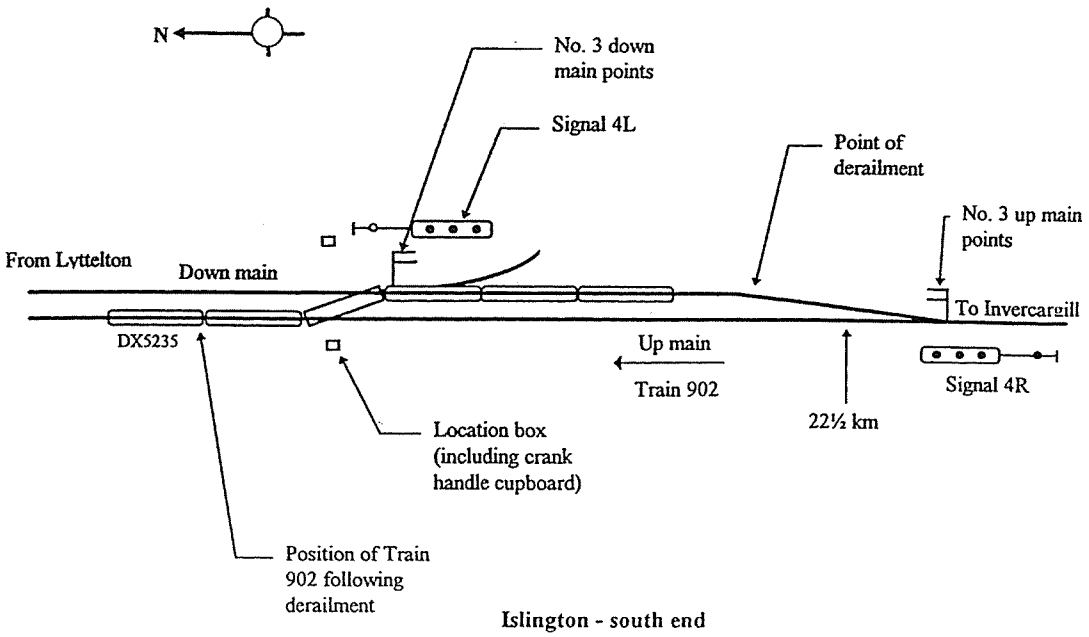


**Figure 1**
**Track layout and signalling details**

1.1.5 The train control officer (TCO) controlling the centralised traffic control section involved knew from his panel display that there was no power to No. 3 crossover, and that as a result of this he could not give Train 902 a proceed indication on Signal 4R. He was aware the points should have been "correctly set" from the previous movement over them. He advised the LE of this and asked him to check that the points were "correctly set", and that if they were the LE had permission to pass Signal 4R.

1.1.6 The LE checked the points were "correctly set" for his movement and immediately moved his train forward on this authority and passed over No. 3 points to the up main at slow speed. Figure 2 shows No. 3 points viewed from the south looking north.

1.1.7 As his train continued to move forward the LE felt some resistance. He had just increased power in response to this resistance when he heard the brakes start to apply. He looked around, saw the van travelling sideways across both mains, and immediately stopped the train.

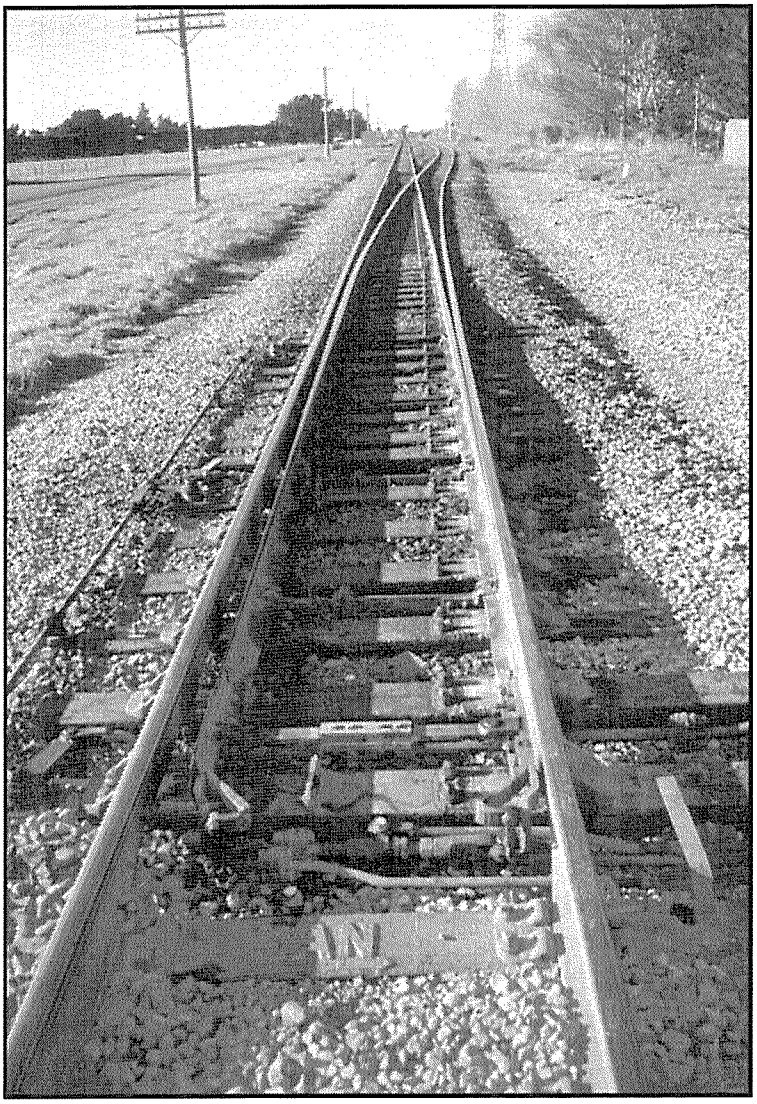

**Figure 2**
**No. 3 points viewed from the south looking north**

**Figure 3**
**Looking south. Location box on the right containing the crank handle**

1.1.8 Train 921, a southbound express freight, was approaching Islington on the down main ready to proceed south once Train 902 had cleared the single line section. The LE of Train 921 stated that as his train approached Halswell Junction Road level crossing at 21.27 km he overheard the LE of Train 902 advise the TCO of the derailment on the train radio. He continued moving forward to clear the level crossing and stopped his train some 100 m clear of the derailed Train 902.

1.1.9 A Tranz Rail rail operator (RO) was at the south end of Islington at the time of the derailment. He was there at the request of the Middleton operations controller, and understood that he had been asked to restore power to the points motors.

1.1.10 The RO stated that following his arrival at Islington he:

- noticed Train 902 arriving from the south
- stopped his vehicle on the main road alongside the location box containing the crank handle for hand operating of No. 3 points (see Figure 3)
- unlocked the crank handle cupboard and uplifted the crank handle from its appointed place for when motor points were isolated[1] (see Figure 4)
- walked to the adjacent down main points motor with the crank handle in his hand
- observed the points were set in the normal position (this meant they were set for the derailing road, protecting an up movement)
- moved the isolating ring to the "motor operating" position (see Figures 6 and 7 and Appendix 1 for details of the Nippon points motors installed at No. 3 crossover)
- closed and locked the weatherproof cover
- returned to his car and drove approximately 170 m to the up main points motor
- walked to the adjacent up main points motor with the crank handle in his hand
- observed the points were set for the up main
- moved the isolating ring to the motor operating position
- closed and locked the weatherproof cover (the RO stated that at that stage Train 902 was stopped at Signal 4R)
- returned to his car and reversed back to the location box
- returned the crank handle to its appointed position for power operation of the motor points (see Figure 5)
- locked the crank handle cupboard
- returned to his car and, as he drove off, saw Train 902 derail.

The above events occurred over approximately 5 minutes.

[1] Isolated is a Tranz Rail term meaning that the power is cut off to the motor.

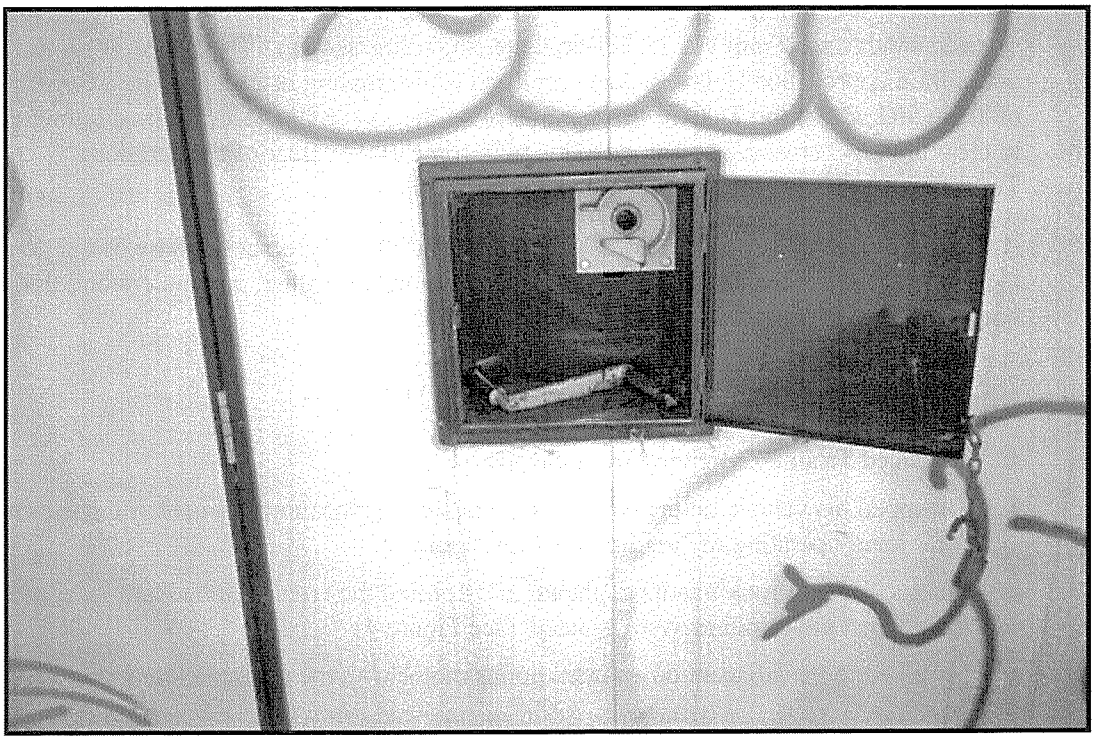

**Figure 4**
**The crank handle in its "appointed place" when No. 3 points were isolated**

**Figure 5**
**The crank handle in its "appointed place" when power was supplied to No. 3 points**

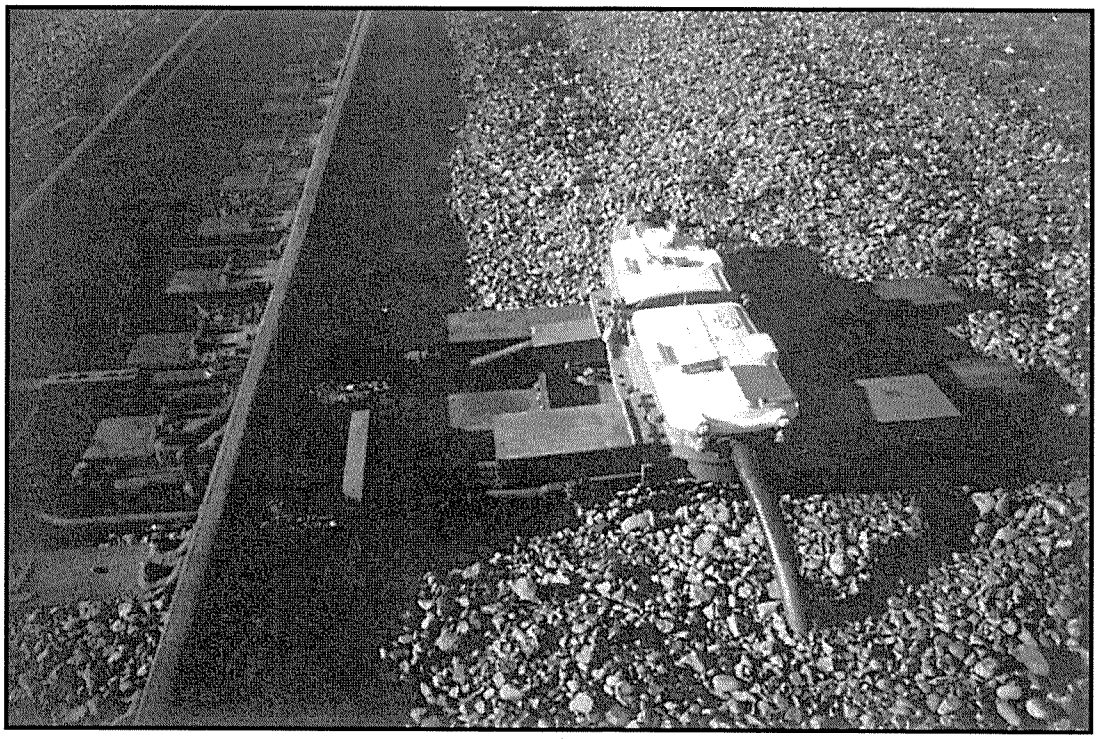

**Figure 6**
**Nippon points motor at No. 3 main line points**
**(Points cover locked in the closed position, isolating ring therefore in the motor operating position)**

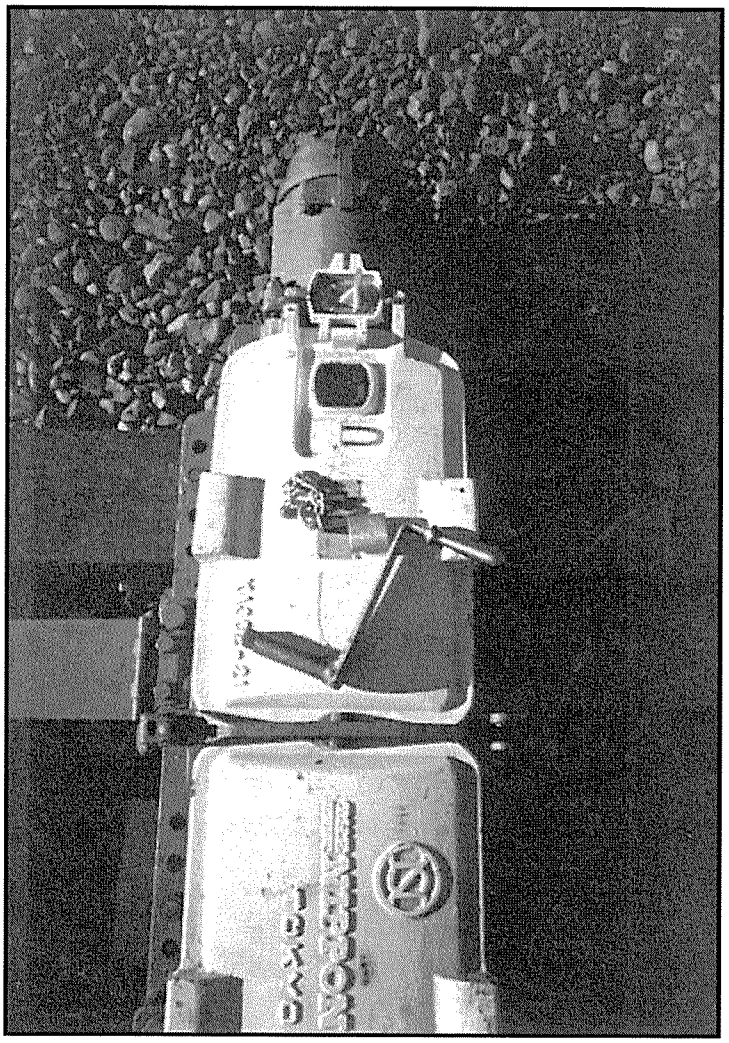

**Figure 7**
**View with points cover open, isolating ring to the right, i.e. points isolated, cover cannot be closed and locked**

1.1.11 The RO was not wearing a high-visibility vest, as required by Tranz Rail procedures, and was using his private vehicle. He did not have a radio with him so could not communicate with train crews or Train Control.

1.1.12 The LE of Train 902 stated that he saw somebody in the vicinity of the up main points as he was obtaining authority to pass Signal 4R, but did not recognise the person as a Tranz Rail employee. The relevant extracts from the Train Control tape recorded at 1648 hours were:

| | |
|---|---|
| TC | 902 from Control are you receiving over? |
| 902 | Stopped at 4R at red Islington over |
| TC | Roger there ()[2] um right those points should be correctly set for you to proceed ah the light locos that run in from the coast had the road set ah can you check that the points are correctly set, if they are you've got permission to pass 4R signal over |
| 902 | Yeah roger they are correctly set it's just that somebody out here had had a bit of a look at the points, they are correctly set, on the move thanks |
| TC | There's a man there now is there? |
| 902 | He's just gone, over |
| TC | Oh OK I don't know who that was then unless it was the man from Middleton. Just make sure you do check those points then before going over them. I haven't got any indication on them but they should be isolated in normal position () |
| 902 | No they're fine |
| TC | Thanks Control out. |

1.1.13 At about the same time as Train 902 started to move forward the LE overheard a conversation between Train Control and Train 921 on his radio, which was recorded on the tape at 1649 hours as:

| | |
|---|---|
| TC | 921 when you get to Islington you'll have to reset the points over |
| 921 | Righto () do you want them left isolated or you want the crank handle put back in? |
| TC | Crank handle back in over. |

It then registered with him that the person he had observed at No. 3 points appeared to have the crank handle in his hand. He stated his thoughts then were that ". . . he would be putting the crank handle in the box and leaving it there for the driver on 921 who was still about a kilometre away . . . So the crank handle would be there for this member to reverse the points so he could leave Islington".

1.1.14 Train 902 derailed at about 1650 hours.

## 1.2 Site information

1.2.1 Fresh wheel marks were found over the head of the down main right rail at 22.470 km, 61 m north of No. 3 up main points. There were wheel marks on the ballast and sleepers between the up and down mains from 22.470 km to 22.365 km, the position at which the rear bogie of AG118 stopped.

1.2.2 The points motor between the up main and the down main at 22.375 km, which operated the down main points, was destroyed during the derailment.

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[2] names deleted

1.2.3 After the derailment the locomotive, wagon and leading bogie of AG118 were on the up main. The trailing bogie of AG118 was derailed to the left of the down main in the direction of travel. Alliance couplings between the rear of AG 118 and carriage A019 had parted. The 2 carriages and the buffet car were on the down main (see Figure 1).

1.2.4 Inspection following the derailment found:

- turnouts set for a down main movement
- motor points for the up main turnout locked, with the isolating ring in the motorised position (see Figure 6)
- the crank handle in the power position inside the crank handle cupboard (see Figure 5).

## 1.3 Locomotive event recorder

1.3.1 The locomotive event recorder was extracted and the printed short log, which gave details of speed, air pressure and throttle position every second for 6 minutes prior to the completion of recording, was supplied for analysis.

## 1.4 Planned work

### 1.4.1 Management and control

1.4.1.1 The maintenance work planned for Sunday 28 June 1998 was covered by Train Advice (TA) 3476 (Appendix 2) and was to be carried out between 0930 hours and 1415 hours. The main work involved electricians renewing power cables. The cable renewal work required signal staff to re-test and certify signalling at Middleton North on completion. Signal staff also renewed a signal at Addington Passenger under the cover of the TA. On completion of all work the "Signals section staff member in charge" had to certify that all signalling, interlocking and automatic warning devices mentioned in the TA had been restored to normal operation. The period 0915 hours to 1415 hours covered two TCO shifts; TCO(1) to 1400 hours and TCO(2) thereafter.

1.4.1.2 The power cable work took longer than expected and signalling was not returned to normal until 1627 hours.

1.4.1.3 The signals field engineer stated that he was on site at approximately 1330 hours checking progress, and advised TCO(1) that the work would overrun, that the TA needed extension, and that power would be restored before the *Southerner* and Train 921 were due. He stated that TCO(1) advised him of the light locomotive due through at approximately 1500 hours and requested assistance for hand winding. The signals field engineer advised TCO(1) that other arrangements would have to be made as work was running late and there were no spare staff available to hand wind. The signals field engineer briefed the electrical field engineer and signal maintainer on site of his discussion with TCO(1) before leaving.

1.4.1.4 The TA was not extended to cover this defined overrun.

1.4.1.5 The TA included a requirement for certification by the "Signals section staff member in charge" on completion of the work, although the member in charge was not identified.

1.4.1.6 At 1530 hours a signal maintainer called Train Control with the question "You're having problems?" TCO(2) outlined a problem with alarms which had continued to operate at a level crossing at Templeton, and asked the signal maintainer to travel to Templeton to check the protection. The conversation ended with the following exchange:

| | |
|---|---|
| TC | How are things going [the planned works] by the way? |
| SM | Slow |
| TC | Slow, OK. Any idea what time? |
| SM | No I'm not part of that project really |
| TC | Oh aren't you |
| SM | No the electricians are sort of handling all the power side of it, I don't quite know where they've got to at the moment |
| TC | Oh right are you working on something else there today? |
| SM | Yeah we sort of snuck in while the alterations were happening at Addington |
| TC | Oh OK fair enough |
| SM | OK I'll be in touch |
| TC | Thanks () |
| SM | I'll have a look at that crossing |
| TC | Yep OK |
| SM | Thanks bye. |

1.4.1.7 At 1600 hours the signal maintainer reported to Train Control that the Templeton problem was solved. TCO(2) asked him how he could contact the staff doing the cable work to get an update. The signal maintainer said he was on his way to the site and would update as soon as he arrived.

1.4.1.8 The signal maintainer rang TCO(2) at 1606 hours to advise power should be back on in 30 minutes. Power was restored at 1627 hours.

1.4.1.9 Tranz Rail advised that the signal maintainer who rang with the information was considered to be the "member in charge" referred to in the TA. This was the same signal maintainer who was briefed by the signals field engineer at 1330 hours.

### 1.4.2 Power disconnection

1.4.2.1 Power was disconnected at 0915 hours after Train 801 had passed through Islington southbound at about 0900 hours.

1.4.2.2 No. 3 points were set in reverse[3] for the passage of Train 801 from the down main to the single line section.

1.4.2.3 Tranz Rail Operating Rules (General), Rule 96 "Locking or Securing of Points" included:

> ... Except where instructions provide otherwise, interlocked points must be kept in the normal position when not in use. ...

[3] For No. 3 points at Islington the Signalling and Interlocking diagram defined normal as set for a northbound train to the up main and reverse as set for a southbound train going to the single line.

Although there were no instructions providing otherwise at Islington TCO(1), who was on duty at the time, left the points in reverse when the power was disconnected. He stated it was common practice to leave points set for the next movement and he was aware southbound Train 847 would be the next train through Islington.

1.4.2.4 The control system logic for motorised points included the points returning to the position they were in when power was disconnected as soon as power was restored to the points motors. Because TCO(1) had left No. 3 points at Islington in reverse on that day, this meant the points would return to the reverse position when power was restored.

### 1.4.3 Isolating and hand operation

1.4.3.1 Tranz Rail advised that isolating and hand operation of motor points during planned work was covered by Tranz Rail's Operating Code, Section 2 Emergency Procedures, part 9. The relevant requirements are attached as Appendix 3.

### 1.4.4 Restoring signalling

1.4.4.1 Restoring signalling to "normal operation" as defined in TA 3476 was the responsibility of the signalling staff member in charge. "Normal operation" included restoring power to all signals and location boxes but did not include restoring power to points motors.

### 1.4.5 Restoring motorised points to power operation

1.4.5.1 Once the signalling staff member in charge had certified that signalling had been restored to "normal operation" the signalman (TCO in the case of No. 3 points at Islington) was responsible for controlling the restoration of power to the points motors. It was the TCO's decision as to whether No. 3 points were hand operated or restored to power operation for the first movement following the restoration of "normal operation" to Islington.

### 1.4.6 Changes to No. 3 points

1.4.6.1 When power was disconnected No. 3 points were set in reverse.

1.4.6.2 The RO travelled out to Islington before Train 847 and isolated No. 3 points by removing the crank handle and placing the isolating rings in the hand operating position. He stated he did not hand operate the points as they were already set correctly, in reverse, for the southbound Train 847.

1.4.6.3 The northbound light locomotive was the next train through Islington at approximately 1520 hours. The LE of the light locomotive hand operated the points from reverse to normal to enter the up main and left them in the normal position and isolated.

1.4.6.4 The points remained in this condition until the RO restored power to the points motors just before the derailment.

## 1.5 The role of the RO

1.5.1 The RO received his instructions from the operations controller, who in turn was responding to a request from TCO(2).

1.5.2 TCO(2)'s request at 1629 hours was recorded on the tape as:

| | |
|---|---|
| TC | Hello Train Control |
| OC | Hi () (Addington Box) just rung me and said he's got the power back on now |
| TC | Yep so have I. I've just got it on just 30 seconds ago now |
| OC | Yep rightyo |
| TC | So that train can go |
| OC | Yeah they're both ready to go |
| TC | You haven't got the hand winder of points around have you or has he finished? |
| OC | Um (RO) was doing our end but I don't know who was doing out past Islington |
| TC | Yeah no it is just if you had (RO) there I was going to ask if he can get out to Islington and reset the points there, for the Southerner |
| OC | At Islington? |
| TC | Yeah |
| OC | Yeah well (RO's) more or less finished here so he might be able to do it on the way home |
| TC | Yep if he wouldn't mind it'd be good |
| OC | Rightyo |
| TC | OK thanks |
| OC | Ta. |

When interviewed he stated that the intent of "reset the points there" was "to restore power to the points motor".

1.5.3 The operations controller stated that his request to the RO was "to go out to Islington to save time with 921" which was his recollection of what TCO(2) had asked for. He stated he did not instruct the RO to hand operate points or to restore the crank handle to the power position, and assumed that when the RO arrived at Islington he would take whatever action TCO(2) required.

1.5.4 The RO stated that he understood that TCO(2) had suggested that somebody (in the RO's words) "restore the points to, the opposite of isolate, to de-isolate the points at Islington". He was asked by the operations controller if he could do this, and as it was the end of his shift, and Islington was on his way home, he agreed. He stated that he left instructions with the operations controller to tell the LE of Train 921 that "As I was leaving without a radio to take his time and I would have the points restored by the time he got there". The operations controller could not recall this request and did not pass on any such message.

1.5.5 The RO said that as he left the operations controller's office he asked a locomotive engineer, who was in the foyer, where 921 normally crossed 902, and he was informed that it was at Rolleston (some 11 km south of Islington). Rolleston was the normal crossing point as shown on the pre-printed Train Control diagram. However, on 28 June Train 902 was running approximately 10 minutes ahead of its plotted path, and Train 921 was running approximately 10 minutes behind its plotted path due to the late power restoration. TCO(2) was required to respond to such operational variations, and had correctly made arrangements for a crossing at Islington which would avoid unnecessary delay to Train 902.

## 1.6 The role of TCO(2)

1.6.1 TCO(2) stated that following his initial request for somebody to restore power to the points motors at Islington he had tried to ring Middleton back, but there was no answer. As he had not heard from the RO, and did not know whether "the RO had gone home, forgotten about it or whatever" he began making alternative arrangements for trains to pass through Islington. The first of these was the passage of Train 902.

1.6.2 At 1632 hours the following exchange was recorded between TCO(2) and Addington Box:

| | |
|---|---|
| TC | Train Control |
| Ad Box | 921 |
| TC | Yep |
| Ad Box | 953's ready to go straight behind him |
| TXO | 953 your brakes are right () |
| Ad Box | OK yeah we might make them both go but can you tell 953 that he'll be sitting behind 921 so he sits him clear of crossings, he'll be waiting for the Southerner at Islington 921 |
| TC | 921's going to cross the Southerner at Islington |
| Ad Box | Righto I'll do that |
| TC | What time did that light engine get in ()? |
| Ad Box | Oh yeah I made him in at 52. Must look bad on the books |
| TC | No doesn't matter |
| Ad Box | Make this one away at 35 |
| TC | 35 OK () |
| Ad Box | Good as gold |
| TC | Thank you |
| Ad Box | I take it the Southerner's on time is it |
| TC | At the moment it is but he's going to have to hand wind the points at um |
| Ad Box | Haven't you got the power back? |
| TC | Oh no the points were last left isolated |
| Ad Box | Oh yeah |
| TC | Yeah so we have to leave them isolated, probably have to reset them, sorry, at Islington |
| Ad Box | Yeah |
| TC | OK |
| Ad Box | You'll have 921 out there in time to do that won't you? |
| TC | Ah I hope so that's what I was going to use him for |
| Ad Box | I'll get him to call you on arrival at Islington |
| TC | Yep good as gold |
| Ad Box | Bye bye () |
| TC | Bye. |

1.6.3 TCO(2) stated that he required the LE of Train 902 to only visually confirm that the points were correctly set for the movement before authorising Train 902 to pass signal 4R at stop. He said he knew from the previous train that they were isolated and "there should not have been any way that they could have been touched".

1.6.4 The LE stated that it was normal for him to be given authority to pass signals at stop during failure of motor points without having to leave the cab and check whether the points were isolated, and without hand operating the points. He also stated that other LE's agreed that this was common practice.

1.6.5 TCO(2) stated that he considered that a lack of communication led to the incident, and that "[the RO] should have called me before he touched anything at Islington, be it before he drove out to Middleton to do it, or when he got there, by radio or phone or by whatever means ...".

## 1.7 Radio communication

1.7.1 Tranz Rail relied on a system of base and mobile radios to provide communication. In the case of the duties being carried out by the RO on the day, the 3 options which could have been used by the RO were:

- a vehicle mounted multi-channel radio providing direct contact with Train Control
- a portable multi-channel radio providing direct contact with Train Control (commonly referred to as a "train radio")
- a portable single-channel radio which did not provide a direct link to Train Control (commonly referred to as a "shunting radio").

1.7.2 The RO stated that he would normally have had a radio with him, but because he was on his way home he did not take one with him on that occasion. However, he stated that even if he had taken a radio he would not have been able to contact Train Control directly, but would have had to relay through the LE. In the event radio communication with Train Control was available if the RO had elected to wait and use the radio on Train 902 when he saw the train approaching.

1.7.3 The operations controller at Middleton confirmed that portable train radios were not available for operational staff at Middleton because they were all required for the coal train operations (with the exception of one train radio held for emergency use). He said that it was normal for staff to take a shunting radio with them when required to use taxis or their own car to carry out hand operation duties.

## 1.8 Staff permitted to hand operate points

1.8.1 Hand operation of points, including isolation and return to motor operation, was a skill required by a wide variety of Tranz Rail operating staff, including LEs.

1.8.2 Training and certification in this particular skill was part of a number of formal certifications. In the case of the LEs it was part of their operating certificate. In the case of the RO involved it was included in his hand-signalman certification.

## 1.9 Personnel information

### 1.9.1 Rail operator

1.9.1.1 The RO had 36 years railway service. His operating certificate included certification in hand-signalling duties and the certificate was current at the time of the incident.

1.9.1.2 The RO's last work shift before 28 June 1998 was Thursday 25 June 1998 from 1600 hours to midnight. He was on sick leave on 26 June 1998 and had a rostered day off on 27 June. On 28 June 1998 his shift commenced at 0745 hours.

1.9.1.3 A number of stressful non-work related events involving the RO had occurred before the incident. The most significant of these were a recent bereavement from which he had not fully recovered and the hospitalisation of his elderly mother, who lived with him, on the morning of the incident.

1.9.1.4 His mother's hospitalisation occurred at 0400 hours on the morning of Sunday 28 June, the day of the incident. The RO accompanied her in the ambulance and stayed for 2 to 3 hours before returning home to prepare for work.

1.9.1.5 While at the hospital on the morning of the 28th he had arranged for other family members to oversee his mother during the day. Despite the preceding events he said he did not feel unduly tired or pressured during his work shift on 28 June. However, he did state that he was in a hurry to get home and find out how his mother was progressing.

### 1.9.2 The LE of Train 902

1.9.2.1 The LE of Train 902 had 24 years service, of which 17 years were based in Christchurch, and held a current operating certificate.

1.9.2.2 The LE's shift and recreational patterns were normal.

### 1.9.3 Train control officers

1.9.3.1 TCO(1) had 17 years train control experience in Greymouth and Christchurch. He held current certification in train control duties.

1.9.3.2 TCO(2) had 17.5 years train control experience in Christchurch. He held current certification in train control duties.

1.9.3.3 The work and recreation patterns of both TCOs were normal.

## 2. Analysis

### 2.1 The derailment

2.1.1 The markings on the rail and the position of Train 902 following the derailment indicated that the movement of the points occurred after DX5235, HKP142 and the leading bogie of van AG118 had entered the up main. As a result the trailing bogie of AG118 and the following carriages entered the down main. This was consistent with the known setting of No. 3 points before the arrival of Train 902, the reported action of the RO after his arrival at Islington at approximately 1645 hours, and the condition of the points following the derailment.

2.1.2 The rear bogie of the van derailed at 22.470 km, 61 m past the points, as the diverging tracks caused the leading left wheel of the trailing bogie to climb the left rail in the direction of travel.

2.1.3 Analysis of the train event recorder output showed Train 902 had stopped at signal 4R for one minute, accelerated to a speed of 10 km per hour as the locomotive passed over No. 3 points, reached a maximum speed of 22 km per hour at the time of the derailment, and came to rest in 25 m following loss of brake pipe pressure shortly thereafter. Derailment occurred 35 seconds after moving off from signal 4R, and the train came to stop 24 seconds later.

2.1.4 The parting of the Alliance coupling was most likely a result of the impact of the derailed rear bogie of AG118 on the points motor at 22.375 km.

## 2.2 The movement of No. 3 points under Train 902

2.2.1 A number of active failures, and latent failures from both local factors and organisational factors, contributed to the movement of the points under the train.

2.2.2 The failure to return No. 3 points to normal setting following the passage of Train 801 at 0900 hours, and before power was disconnected, was an active failure which contributed to the incident. Had TCO(1) returned No. 3 points to normal as required by Rule 96 (see 1.4.2.3) the incident would not have occurred. TCO(1)'s action in leaving the points set in reverse for the next movement was intentional, and leaving points set appropriately for the next movement was not an uncommon practice.

2.2.3 This apparent routine violation of Rule 96 must be considered with respect to the general understanding of, and compliance with, the intended procedures set out in Section 2, part 9 of the Rail Operating Code.

2.2.4 The last paragraph of Code 9.3.4 (see Appendix 3) required isolated points already set in the correct position for the next movement to be wound to the opposite position and back before that movement. This was not done for Train 847 at 1200 hours (under the control of TCO(1)), or for Train 902 before the derailment (under the control of TCO(2)), and Clause 9.1 requirements were also not complied with. These violations, by different crews and TCOs, may not simply be isolated instances of non-compliance but may be symptomatic of a higher underlying level of non-compliance. They raise a question as to the effectiveness of Tranz Rail's documentation, training and compliance monitoring associated with the procedures to ensure the safe passage of Train 902.

2.2.5 The communication between the signal maintainer and Train Control, and the communication between TCO(1) and TCO(2) at change over, did not give key operating staff involved (TCO(2), operations controller, signalman Addington, and LEs) an updated, clear picture of the overrun and its possible effects, and in particular did not allow forward planning for specific means of returning power to motorised points.

2.2.6 The signal field engineer's information to Train Control at about 1330 hours was appropriate in the circumstances. However, the failure of Train Control to extend TA 3476, the changeover of TCOs and the lack of any further information on progress of the work until 1606 hours resulted in TCO(2), the operations controller, the signalman at Addington, and the LE of Train 902 being poorly informed. Although Tranz Rail stated that the signal maintainer was the "member in charge" this was not included in the TA. The signal maintainer's statement to TCO(2) , "No, I'm not part of that project really" (1.4.1.6) indicated that he was unaware of his overall responsibility with respect to the integrated work being carried out under TA 3476, particularly with regard to keeping Train Control advised of progress.

2.2.7 TCO(2) was advised at 1606 hours that power would be restored within half an hour, and this was achieved at 1627 hours. However, due to a lapse his request for someone to reset the points for the *Southerner* at Islington was not made until 1629 hours, following a discussion with the signal maintainer. At 1629 hours TCO(2)'s intention was to restore power to No. 3 points before the passage of Train 902, the *Southerner,* which was due at about 1650 hours. This 21 minute period was about the time required for the RO to get to Islington from Middleton.

2.2.8 The RO was under the impression that Train 921 would be the first train to move through No. 3 points at Islington, and this was confirmed by the operations controller's recollection of his discussion with TCO(2) at 1629 hours (see 1.5.3).

2.2.9 The RO left Middleton at approximately 1635 hours and was at Islington at about 1645 hours. The 16 minutes between the request and his presence on site was a quick response. TCO(2) expected to hear from the RO before the RO removed the handle from its appointed position (see Appendix 3, last paragraph of 9.2.1), but did not necessarily expect to hear from him at Islington (see 1.6.5).

2.2.10 At 1632 hours, (see 1.6.2) TCO(2) was planning to bring Train 902 into Islington and cross Train 921 using hand operation (a change of plan from that outlined to the operations controller some 3 minutes earlier). While hand or motor operation of the points was the prerogative of the TCO, the timing of his original request, and his change of intention, should have prompted a rethink of his plan. The LE reporting a person in the vicinity of No. 3 points some 2 minutes before the derailment was a further cue missed by TCO(2).

2.2.11 TCO(2) should not have given authority for Train 902 to pass Signal 4R without him first getting the LE to confirm the points were isolated (Code 9.1 Appendix 3) as TCO(2) had no indication of the correct setting and no authority given in the local instructions. The only way for the LE to confirm the correct setting for Nippon points was to walk to the points and check the position of the isolating ring (if the cover was open), or to check that the cover was closed, which would indicate that the points were not isolated (the position the cover was in as Train 902 approached No. 3 points). The LE of Train 902 could see the points were correctly set but did not know whether they were isolated or not because he could not see the cover from the cab as his train left signal 4R.

2.2.12 It was apparently common practice for TCOs to authorise movements over isolated points without requiring LEs to confirm isolation and hand operate. When the LE of Train 902 said "No they're fine" (see 1.1.12) he was confirming the points were correctly set. Based on common practice his understanding was that the signalman (in this case TCO) had the necessary authority to authorise him to pass the signal at stop without checking that the points were isolated, and without hand operating them to confirm locking.

2.2.13 TCO(2)'s action in authorising Train 902 to pass Signal 4R at stop was a misapplication of the rules, based on past practices.

2.2.14 TCO(2)'s lack of effective action at 1648 hours, when he had already made arrangements with the operations controller for restoration of power to the points some 18 minutes earlier, and then had heard the LE's report of a man at the site, was a significant lapse. There was sufficient time for him to have responded to the situation by stopping Train 902 before it reached No. 3 points.

2.2.15 The failure of the RO to take a radio was not a direct violation of Tranz Rail procedures, but it meant that he was not equipped to practically implement the requirement of Code 9.2.1 (see Appendix 3) that the crank handle must not be removed from its appointed place without the permission of the signalman or TCO. Although not stated it is implicit in this requirement that the permission be requested just before removing the handle and this was the basis of Tranz Rail's training. The RO acted upon the request from TCO(2) through the operations controller as "permission".

2.2.16 The RO's lapse in not wearing a Tranz Rail high-visibility vest meant that the LE of Train 902 could not identify the status of the person he saw at No. 3 points.

2.2.17 The RO went to Islington expecting to restore power to the motor points to let Train 921 out southbound. Before restoring power he saw Train 902 approaching 4R signal. This should have alerted him to a change of plan and prompted a rethink of his intended action.

2.2.18 The local factors contributing to TCO(2)'s mistakes were the reported repeated misinterpretation of Rule 96 and Section 2, Part 9 of the code. The organisational factors underlying this were the adequacy of the rules and code requirements, and their compliance monitoring, as discussed in section 2.3.

2.2.19 The actions of the RO were influenced by his desire to assist in restoring train services without delay (his shift had finished and he had been requested to carry out the extra duty and agreed), and his concern to get home quickly to respond to his mother's hospitalisation. No ill health or fatigue were considered to have been contributory factors to the incident.

## 2.3 Defences

2.3.1 Tranz Rail's rules and code covering the failure of motor points included three requirements of which any one, correctly interpreted and applied on the day, would have avoided the possibility of a derailment arising from the individual lapses of the RO. These were:

- the requirement to keep interlocked points in the normal position when not in use (Rule 96)
- the requirement to obtain specific permission to remove a crank handle from its appointed place (Code 9.2.1)
- the requirement to hand operate correctly set isolated points to the opposite position and back to the required position to ensure the switch blades and the locking devices were fully in the desired position (Code 9.3.4).

2.3.2 Rule 96 is clear in its intent. However, compliance was apparently related to the next train movement over the points, and compliance monitoring had not detected and corrected this common practice.

2.3.3 The last paragraph of Code 9.2.1 is not clear in its intent as there is no time element defined and no indication who permission is given to. On the day the RO took a request relayed through the operations controller as "permission". The TCO expected to hear from the RO before he removed the handle, but would have accepted a call from the RO before he left Middleton to give this permission.

2.3.4 Code 9.3.4 refers to hand operation of points. The second paragraph states "when it is necessary to isolate and hand operate motor points with the switch blades lying in the position in which it is required to run over them ...". The intent of this was that it applied to the initial isolation and hand operation of motor points, and to all subsequent movements through isolated points until the power was restored. It was apparent by the procedures used for the passage of Train 847 and Train 902 over No. 3 points (refer paragraph 2.2.4) that these requirements were either misunderstood or not applied, and reports indicated that these non-compliances were not isolated examples. Compliance monitoring had failed to identify and address these non-compliances.

2.3.5 Notwithstanding the reminders issued by Tranz Rail following the incident (see 4.1 and 4.2) the level of non-compliance with the requirements of Part 9 of the code requires further action to ensure an understanding of, and continued compliance with, these important safety requirements. Section 5 includes safety recommendations addressing this need.

2.3.6 The Commission has reported previously on accidents or incidents which have involved apparent non-compliance with required procedures as common practice as identifed in 1.6.4. These were:

- Railway occurrence report 95-111 (May 1995) related to kick shunting, giving rise to safety recommendation 033/95.
- Railway occurrence report 97-108 related to container security. In view of safety actions taken by Tranz Rail no safety recommendations were made.
- Railway occurrence report 98-106 related to wagon loading, giving rise to safety recommendation 059/98.
- Railway occurrence report 98-115 related to the use of handbrakes, giving rise to safety recommendation 103/98.

These represent 10% of the operational occurrences investigated by the Commission since May 1995.

2.3.7 In all cases Tranz Rail responded positively to the safety recommendations and took action in the specific areas defined. However, the 4 occurrences investigated by the Commission which have identified areas of repeated non-compliance as common practice are a significant proportion of the total number of occurrences investigated. In view of the importance of this aspect of safe operations Section 5 includes safety recommendation 031/99 as a pro-active measure to confirm Tranz Rail's view that it has a documentation, training and compliance monitoring regime in place which is effective in identifying and actioning patterns of repeated non-compliance.

### 2.4 Management of planned works

2.4.1 Failure to extend TA 3476, and the failure to nominate a specific person as member in charge, contributed to the low situational awareness of key operating staff, but did not contribute directly to the derailment.

2.4.2 The member deemed to be in charge was unclear of his role (see 1.4.1.6) and this also contributed to the low situational awareness of key operating staff.

## 3. Findings

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

3.1 All staff were correctly certified for the duties being undertaken.

3.2 Train 902 was not being operated in accordance with Tranz Rail's operating rules and instructions when it passed over No. 3 points at Islington and derailed.

3.3 If TCO(2) and the LE of Train 902 had complied with the intended requirements of Code 9.3.4 the incident would not have occurred.

3.4 The non-compliance with Code 9.3.4 was not an isolated occurrence.

3.5 The intent of Code 9.3.4 was not clear with respect to previously isolated motor points, and needs to be clarified so that, in particular, LEs of single-manned trains are in no doubt as to the requirement to stop, dismount, and hand operate isolated motor points already set for the movement of their train.

3.6 If TCO(1) had complied with the requirements of Rule 96 to keep interlocked points in the normal position when not in use the incident would not have occurred.

3.7 The non-compliance with Rule 96 was not an isolated occurrence.

3.8 The failure to take a radio meant that the intent of Code 9.2.1 with respect to control of the crank handle could not be achieved unless a train was present at Islington to allow use of its radio.

3.9 The intent of Code 9.2.1 with respect to the timing and nature of the permission of the signalman or TCO was not clear.

3.10 Tranz Rail procedures for hand operation of motor points did not require staff to be equipped with a train radio.

3.11 The RO was aware he had left without a radio but considered he had taken precautions to allow for this.

3.12 The only mobile radio available for the RO to take was a shunting radio which would not have allowed direct contact with Train Control, but would have allowed indirect communication through the LE of Train 902.

3.13 The use of indirect communication through a third party when obtaining permission to remove the crank handle from its appointed position is not desirable.

3.14 The RO's lapse in not wearing a high-visibility vest meant that the LE of Train 902 was unable to immediately recognise him as a Tranz Rail staff member, and initiate clearer communication with Train Control which may have avoided the incident.

3.15 The RO's failure to recognise the significance of the presence of Train 902 at Signal 4R stopped him taking action which would have avoided the incident.

3.16 The RO's lapses were caused by his haste to carry out extra duties to facilitate reinstatement of traffic, while motivated by a need to return home and respond to his mother's hospitalisation.

3.17 Poor communication between Tranz Rail staff involved with planned work and train operations on the day resulted in a low situational awareness among key operating staff.

## 4. Safety Actions

4.1 Tranz Rail distributed the following "Rule of the week" reminder to operating staff on 10 July 1998.

> RAIL OPERATING CODE, INSTRUCTION 9.0 IN SECTION 2 DEALS WITH THE FAILURE OF MOTOR POINTS, SIGNALS AND TWO POSITION COLOUR LIGHT POINTS INDICATORS LEADING OVER MOTOR POINTS.
>
> CLAUSE 9.1 REQUIRES THAT BEFORE A TRAIN IS AUTHORISED TO PASS A SIGNAL AT "STOP", ALL MOTOR POINTS ON THE ROUTE UP TO THE NEXT FIXED SIGNAL IN ADVANCE MUST BE "ISOLATED" AND "HAND OPERATED" UNLESS THE SIGNALMAN HAS AN INDICATION OF THE CORRECT SETTING OF THE POINTS AND THE NECESSARY AUTHORITY CONTAINED IN THE LOCAL INSTRUCTIONS.

THERE IS NOTHING IN THE INSTRUCTIONS WHICH SAYS THAT POINTS PREVIOUSLY ISOLATED AND HAND OPERATED CAN BE ACCEPTED AS BEING CORRECTLY SET FOR A SUBSEQUENT MOVEMENT.

4.2 Train Control Bulletin Number 1998/2 issued by Tranz Rail in August 1998 included the following item:

> ITEM 1 ISOLATING AND HANDWINDING OF MOTOR POINTS
>
> An incident happened recently whereby the power was returned to a set of motor points as a train passed over them, resulting in a derailment.
>
> In all instances where trains are to pass over motor points which have been isolated the Locomotive Engineer must physically inspect the points and confirm not only the setting but that the points are still correctly isolated and therefore safe for the passage of his train.
>
> There is no exemption in Rail Operating Code Section 2 Instruction 9 that allows for a Signalman to accept previously isolated and hand operated points for any subsequent movements, indeed the provisions of Instruction 9.2 relating to the failure, isolation and hand operating of defective motor points apply to each individual movement over such points.

4.3 Immediately following the incident signalling staff were reminded of the key aspects of the management of planned works requiring suspension, disarrangement, and/or disconnection of signalling. Briefings were held down to team level and included the need for a nominated person to be in charge of the work, and the requirements for TA extension.

## 5. Safety Recommendations

5.1 On 12 April 1999 it was recommended to the managing director of Tranz Rail that he:

5.1.1 revise Rail Operating Code Section 2, Part 9 to give clear guidelines to all staff involved in the hand operation of motorised points, (022/99); and

5.1.2 clarify procedures for restoring power to points motors following planned works requiring power outage (023/99); and

5.1.3 take steps to identify and correct the repetitive non-compliance with Tranz Rail rules and procedures for safe operation identified during the investigation of this incident, (024/99); and

5.1.4 make sufficient radios available for staff required to carry out isolation, hand operation and power restoration of motorised points to communicate effectively with Train Control, (025/99); and

5.1.5 confirm the effectiveness of Tranz Rail's compliance monitoring regime in identifying repeated non-compliances at an early stage, and initiating appropriate follow up action, (031/99).

5.2 On 15 September 1999 the Managing Director of Tranz Rail responded as follows:

5.2.1 **022/99**
The relevant instruction in Section 2 of the Rail Operating Code has been reviewed and is currently under going preparation prior to printing and promulgation to staff.

5.2.2 **023/99**
Comments made in our submission to the Preliminary Safety Recommendation are still relevant, in that restoring power to motor points either after they have failed in service, or the power has been removed for planned work where hand winding has been involved is no different. Apart from action taken in regard to recommendation 022/99, we do not see any further change as being necessary.

Recommendation 023/99 is therefore not accepted.

5.2.3 **024/99**
A safety observation process has been formalised and will meet the requirement of this recommendation. In addition action taken with regard to Safety Recommendation 022/99 has also addressed some of the issues identified.

5.2.4 **025/99**
Suitable communication systems are available for use if required and action on this recommendation is complete.

5.2.5 **031/99**
Implementation of a safety observation process is underway and will meet the requirement of this recommendation.

Approved for publication 26 May 1999

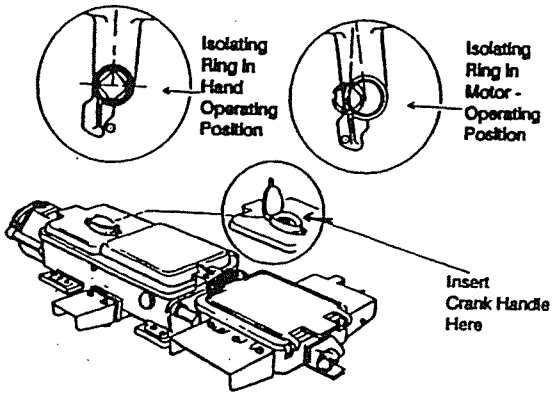
Hon. W P Jeffries
**Chief Commissioner**

# Appendix 1

| NEW ZEALAND RAIL LTD | RAIL OPERATING CODE |
|---|---|
| **Section:** 2 Emergency Procedures | **Page:** 9.10 |
| | **Date Effective:** 21 May 1995 |
| **Subject:** Failure of Motor Points | **Issue No.:** 2 |

**Type GRS, SGE and Nippon, top winding**

Power is isolated by moving aside a guard ring before it is possible to insert the crank handle.




When instructed by Train Control to leave the points in the isolated position leave the isolating ring in the hand operating position.

The GRS and SGE points can then have the weather proof covers relocked and the crank handle placed in the bottom of the box.

Do not replace it back into the detection sleeve.

The Nippon points cannot have the weather proof cover locked while the points are in the isolated position.

| NEW ZEALAND RAIL LTD | RAIL OPERATING CODE |
|---|---|
| **Section:** 2 Emergency Procedures | **Page:** 9.11 |
| | **Date Effective:** 21 May 1995 |
| **Subject:** Failure of Motor Points | **Issue No.:** 2 |

All that is required is to leave the points weather proof cover unlocked. Lock the padlock to the points so it is not lost and place the crank handle in the bottom of the box.

Do not replace it back into the detector sleeve.

# Appendix 2

TRANZ RAIL LTD

TRAIN ADVICE NO.3476 (2 pages)

Network Services
WELLINGTON 25 June 1998

SUNDAY 28 JUNE 1998
CHRISTCHURCH - ROLLESTON

Kindly refer to the following S&I Diagrams:-
No.2514 for Rolleston, No.2528 for Islington and No.2583 for Christchurch.

Between the hours of 0930, or after the arrival of No.801 at Rolleston and the arrival of No.729 at Middleton and 1415, Signals staff will carry out alterations to the 3.3kv power system and renew 108LA signal. The following arrangements will apply:-

Before commencement of work the Signals person in charge MUST obtain permission from Signalman Addington Signal Box, Train Control and Operations Controller, Middleton.

\- - -

SIGNALLING ARRANGEMENTS:

During the above hours the signals will be affected as follows:-

Christchurch Station:

114LABC Down Directing from Main North Line, will be blacked out.

Addington:

| | |
|---|---|
| 70R | Up Starting along Main North Line, fixed at stop |
| 70L | Down Directing along Main North Line, fixed at stop |
| 72R | Up Departure, fixed at stop |
| 72L | Down Outer Home from Main North Line, fixed at stop |
| 73R | Up Advance Starting along Main North Line, fixed at stop |
| 73L | Down Home from Main North Line, fixed at stop |
| 5A | Down Directing along Down Main, will be blacked out. |

ALL signals south thereof, ALL lines, will be blacked out to and including 2973 Down Intermediate signal between Islington and Rolleston.

Rolleston

| | |
|---|---|
| 8RA | Up Departure from East Main, fixed at stop. |
| 8RBC | Up Departure from West Main, fixed at stop. |

The above signals may ONLY be passed in accordance with the Regulations applicable to the passing of fixed signals in the "Stop" position.

33, Shunt from Old Wheel Lathe Backshunt, signal, 35, Shunt from South Yard, signal, 57AB, Up Directing from Down Main, signal and 62AB, Up Directing from Up Main, signal will operate normally.

\- - -

INTERLOCKING:

During the above hours No.3 motor points at Islington, No's 205, 206, 207, 208, 209, 283 and 284 motor points at Middleton and No's 49, 50, 107, 109, 111 and 113 motor points at Christchurch, will need to be manually operated to the required position for ALL movements. Staff will be in attendance to carry out the manual operation of the above mentioned motor points.

The switchlocks at Islington and Hornby will not be available for use and will be electronically secured so that trains may pass safely over them.

\- - -

TRAIN MOVEMENTS BETWEEN ISLINGTON AND ROLLESTON:

During the above hours ALL trains travelling between Islington and Rolleston will be worked in accordance with CTC Regulation 5 (b) and (e), (Mis 59's).

Continued on page 2.....BKG....

SUNDAY 28 JUNE 1998 - cont'd
CHRISTCHURCH - ROLLESTON - cont'd

TRAIN MOVEMENTS BETWEEN CHRISTCHURCH AND BELFAST:

During the above hours Up trains travelling between Christchurch and Belfast will pass 72R, Up Departure, signal at Christchurch in accordance with CTC Regulation 5 (b) and (e), (Mis 59's). Up trains entering the Christchurch - Belfast block section on a Mis 59 authority, MUST NOT exceed 10 kph over ALL level crossings in the Christchurch - Belfast block section.

- - -

LEVEL CROSSINGS:

During the above hours due to non-operation or possible irregular operation of automatic warning devices the speed of ALL trains must NOT exceed 10km/h over the following level crossings:-

Fendalton Road at 2.49km at Christchurch Station
Matai Street, Pedestrian, at 1.92km at Christchurch Station
Kilmamock Street, at 1.70km, at Christchurch Station
Riccarton Road, at 1.49km, at Christchurch Station
Whiteleigh Avenue at 13.47km at Addington
Matipo Street at 14.07km at Addington
Annex Road at 15.57km at Middleton
Carmen Road at 19.75km between Hornby and Islington
Parker Street at 20.69km between Hornby and Islington
Halswell Junction Road at 21.27km between Hornby and Islington
Barters Road at 23.24km between Islington and Rolleston
Kirk Road at 24.36km between Islington and Rolleston
Dawsons Road at 25.85km between Islington and Rolleston
Curraghs Road at 27.17 between Islington and Rolleston
Weedons Ross Road at 30.33km between Islington and Rolleston

- - -

CERTIFICATE:

On completion of work the Signals Section staff member in charge MUST certify to Signalman Addington Signal Box, Train Control and Operations Controller, Middleton that all signalling, interlocking and automatic warning devices mentioned herein have been restored to normal operation.

NETWORK CONTROL OFFICER

# Appendix 3

## 9.0 FAILURE OF MOTOR POINTS, SIGNALS AND TWO POSITION COLOUR LIGHT POINTS INDICATORS LEADING OVER MOTOR POINTS

### 9.1 Failure of Signals/Points Indicator Leading over Motor Points

When a signal leading over motor-operated points fails or cannot be cleared, the cause may be failure of the motor points and, if so, before a train is authorised to pass the signal at "stop", all motor points on the route up to the next fixed signal in advance must be "isolated" and "hand operated", unless the Signalman has an indication of the correct setting of the points and the necessary authority contained in the local instructions.

When a Two Position Colour Lights Points Indicator fails the associated motor points must be isolated and hand operated to the desired position in accordance with Track Warrant Regulation 9.

### 9.2 Failure of Motor Points

When motor-operated points fail they may be required to be "isolated" and then "hand operated" to the position desired.

Motor points must not be operated by staff unless they have had special tuition and are certified as competent by authorised instructing staff.

While train movements are being made over hand-operated motor points they must remain "Isolated".

"Isolated" means that the power is cut off to the motor.

In the event of a failure, both "isolating" and "hand operating" of points may be necessary, as the failure may have left the points correctly positioned but not locked or secured.

When it is necessary for motor points to be isolated and hand operated by a train crew, (unless in sole charge) on instructions from a Signalman or Train Control the motor points must be restored to their original position after the train has passed over them and the isolating switch restored to the "motor operating" position.
When a motor points failure affects one or both motors of a crossover the motors of both ends must be isolated and hand operated. Both motors must remain isolated until the movement is completed.

However, where one set of points in the route is part of a crossover, isolation of it may affect a parallel route and care must be taken not to interfere with a movement proceeding along that road.

#### 9.2.1 Isolating of Motor Points

Before hand operating motor points, the points motor must be isolated from its power supply.

There are several different types of electric motor points in use and consequently several different methods of isolation from the power supply are used.

In 'Classification of Motor Points' the types of motor points are grouped according to the isolation arrangement provided.

The type of electric motor points in use at any particular station is contained in the Local Instructions to the Signalman or Train Control Officer concerned.

The crank handle must not be removed from its appointed place without the permission of the Signalman or Train Control Officer.

### 9.2.2 Operation of Isolating Devices

When hand operation has been decided upon and a crank handle removed from its appointed place, **NO** isolating device may be restored to the power operating position until the movement is clear of all points for which the crank handle applies.

Particular care should be taken to follow this instruction where it is necessary to remove a crank handle from one motor to hand operate another, as in the case where two or more points motors are controlled from the same points lever. Therefore, if the points were hand operated for a train to shunt, the isolating device must not be restored to the power operating position until the shunting is completed and the train despatched, or, if the points were hand operated to the reverse for a train to enter a loop the points should be restored to normal, the position in which they failed, and the isolating switch restored to the power operating position when the train has entered the loop.

**NO** isolating device may be restored to the motor operating position until the points have been restored to the position in which the points control lever is placed, or in the case of motor points in Track Warrant Control territory associated with Two Position Colour Light Points Indicators, their normal position..

### 9.2.3 Alternative Train Crewing

A Locomotive Engineer in sole charge of a train may be instructed to hand operate motor points by Train Control.

The points will be left in the isolated position for, and after, the passage of the train.

Train Control must advise the crews of any trains moving into a section where points have not been restored and must also arrange for isolated points to be returned to normal.

## 9.3 Hand Operation Of Motor Points

### 9.3.1 Fixed Signals In Relation to Failure of Points

When motor points fail and are being hand operated, all fixed signals applicable to them must be considered to have failed also and all movements over the points must be hand signalled. Care must be taken to see the route has been correctly set up for the movement about to be carried out. Start from the furthest set of "failed" points and work towards the locomotive.

### 9.3.2 Restoration of Hand Worked Points to Power Operations.

When power is restored to motor points after a failure they must be tested in the "normal and reverse" positions before any movement is authorised over them.

### 9.3.3 Location of Crank Handles

The location of crank handles at a station is shown on the S&I Circular for that station, there may be one or more depending on the complexity of the layout. A crank handle must not be used on any motor points other than the one for which it is intended. The crank handle may be housed in a detection box. When the crank handle is removed from the detection box the power may be disconnected from all the points in a given area in addition to the motor points to be hand operated. Local Instructions to the Signalman or Train Control Officer concerned will detail this.

#### 9.3.3.1 Sealing of Crank Handles

Any member who breaks a seal to obtain possession of the crank handle must record the seal number, time, date and the purpose of which the handle was used in the train register.

### 9.3.4 Hand Operation

When motor points are hand operated the crank handle must be removed from its appointed place, inserted in the motor and turned to move the points to the required position. The first few turns of the handle unlock the points, the switch blades do not move. As the winding continues, the switch blades move to the opposite position. When this movement is complete, the last few turns of the crank handle lock them in the position to which they have been moved. It is important therefore that the crank handle is wound as far as it will go to ensure the points are locked. A visual check should now be made that the required switch blade is fitted against the stock rail.

**When it is necessary to isolate and hand operate motor points with the switch blades lying in the position in which it is required to run over them, the points should first be wound to the opposite position to which it is lying and then back again to the required position. This is required to ensure the switch blades and the locking device are fully in the desired position.**

### 9.3.5 Obstruction in Switches

When motor points fail through an obstruction such as ballast in the switches, hand crank the points over and clear the obstruction, restore the points to the position in which they failed, restore the isolating device to the power operating position and test the points from the lever in the signalbox before a train is allowed to pass over them.

When an obstruction in the switches prevents them from moving to the full normal or reverse positions, the motor may continue to run as long as the switch blades are in an intermediate position. It is therefore important that the isolating device is opened as soon as possible to stop the motor. Continued running of the motor may seriously damage it.

### 9.3.6 Cause of Failure not Apparent

When the cause of the failure is not apparent call Signals staff immediately and proceed to hand operate.

### 9.3.7 Position of Points Control Lever During Failure of Motor Points

The points control lever must be placed in the position it occupied before the failure occurred. If the points fail to operate from normal to reverse the points control lever must be restored to the normal position. Similarly if the points fail to operate from reverse to normal the points control lever is to be left in the reverse position. The lever must not be left in an intermediate position.

### 9.3.8 Points Failure when Local Control is in Operation

If motor points fail when being controlled from a Local Control Panel or Station Control Panel - it will not be possible to restore to central control if the points lever is in the reverse position.