

Report 01-112

shunt 84

runaway wagon

Stillwater

13 September 2001

Abstract

At about 0615 on Thursday, 13 September 2001, an unattached loaded log wagon on the leading end of a shunt being propelled into a siding at Stillwater was routed onto the main line at a damaged turnout and rolled 450 m downgrade on the Midland Line. Thick fog was present at the time; the loss of the wagon was not realised until 0645, and it was not located until 0700. The safety issues identified included:

- rail service operations being carried out by non-qualified contractors at Stillwater
- the Land Transport Safety Authority not proactively ensuring rail service operations were carried out by a licensed rail service operator under appropriate safety system provisions
- lack of compliance with Tranz Rail Limited shunting procedures.

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Abbreviations

| km | kilometre(s) |
|------------|---------------------------------|
| LE | locomotive engineer |
| LTSA | Land Transport Safety Authority |
| m | metre(s) |
| RO | rail operator |
| T Croft | T Croft Limited |
| Tranz Rail | Tranz Rail Limited |

Data Summary

| Train type and number: | Shunt 84 | | |
|------------------------|--|--|--|
| Date and time: | 13 September 2001 at about 0615 | | |
| Location: | Stillwater, 197.05 km Midland Line | | |
| Persons on board: | crew: 1 | | |
| Injurioge | NT'1 | | |
| Injuries: | Nil | | |
| Damage: | moderate damage to points interlocking equipment | | |
| | | | |

1 Factual Information

1.1 Narrative

- 1.1.1 At about 0600 on the morning of 13 September 2001 shunt 84 from Greymouth arrived at Stillwater, some 14 km east of Greymouth on the Midland line. The shunt was operated by a locomotive engineer (LE), with the rail operator (RO) completing the 2-person crew for shunting duties.
- 1.1.2 The shunt consist included 17 empty USL log wagons to be placed onto the old main line (also known locally as Tom Croft's siding) at Stillwater. The old main line was part of Stillwater yard allocated by Tranz Rail to log loading. The log loading was carried out by a contractor, T Croft Limited (T Croft).
- 1.1.3 Thick fog was present when Shunt 84 arrived, and this remained during the shunting movements that followed.
- 1.1.4 The old main line siding was normally empty when the morning shunt arrived, as loaded log wagons were usually uplifted at the end of each day. However, on the previous evening 3 loaded log wagons had been rejected for uplift by Tranz Rail due to a lack of tie downs, and logs protruding into handgrip areas. These 3 wagons, USL 3678, 4052 and 3584 from east to west, had been cut out by the Tranz Rail shunt the previous evening and left standing together in the centre of the old main line siding.
- 1.1.5 The crew of Shunt 84 were unaware of the presence of the 3 wagons until their shunt arrived at Stillwater. Shunting into the siding was carried out from the east end of the yard. The intended movement was to detach the 17 wagons to be placed, propel from the east end through the old main line, attach to the 3 loaded wagons and then propel the combined rake of 20 wagons into Gillman's siding to obtain sufficient head room to leave the empty wagons clear of the old main line siding. Figure 1 shows the yard layout and the sidings concerned.
- 1.1.6 The 17 wagons were detached from the shunt with the Westinghouse Brakes coupled and operating. Having set the east end route to propel in, the RO rode on the end of the shunt towards the 3 loaded wagons. He dismounted short, walked to wagon USL 3678 and dropped the hook ready to couple up. He then guided the shunt by radio from the adjacent platform until the wagons met and the hook engaged on contact. The RO assumed the 3 loaded wagons were coupled together and did not check that this was so before coupling up the shunt to USL 3678. He returned to the coupling to drop the bridle (which ensured the hook remained engaged) but could not achieve this due to the height difference between the couplings. He did not attempt to connect the air to USL 3678.
- 1.1.7 The LE said that he knew when air was being connected to additional wagons because his cab controls reacted, with the dial giving a "flicker and hiss" and the train air pipe indicating a surge of air. He did not get this indication before the propelling movement into Gillman's siding, and said that not having air connected was not unusual during shunting that involved "just pushing a couple of wagons into a dead end siding".
- 1.1.8 Having been unable to place the bridle the RO stepped back onto the platform and guided the propelling movement by radio into Gillman's siding. He believed the turnout leading to Gillman's siding (turnout 1 on Figure 1) was set for that route because the points were interlocked with the main line turnout (turnout 2 on Figure1). Turnout 2 had been set for the main line when Shunt 84 arrived, which meant turnout 1 should have been set for Gillman's siding.

- 1.1.9 From his position on the platform the RO could not see turnout 1 in the fog as he guided the shunt in by radio. His first indication of a problem was when the LE advised him he could not push in any further. The RO walked about 100 m to turnout 1 and found wagon USL 4502 at the end of the rake with its leading bogie derailed (refer Figure 2) and fouling the main line at turnout 2.
- 1.1.10 The derailment occurred at about 0615. The RO contacted the Greymouth fitter for assistance to rerail and the fitter arrived on site at about 0640. During discussion between Tranz Rail staff and the logging contractor a question was asked regarding a third loaded wagon, as there were only 2 loaded wagons coupled to the west end of the rake. This was the first time the RO became aware that one of the 3 loaded log wagons was missing. An immediate search resulted in USL 3584 being found on the main line some 450 m west of turnout 1 (refer Figure 1). The wagon was recovered by the shunt, having been sitting undetected on the main line for about 45 minutes.
- 1.1.11 The first train through the main line following the incident was westbound Train 829. The Train control diagram scheduled Train 829 through Stillwater at 0400 but it was running over 3 hours late and arrived at Stillwater at 0715, as the runaway wagon was being recovered, and was held there until recovery was completed.

1.2 Site information

- 1.2.1 Turnout 1 at which USL 4052 was found derailed was a frame-lever controlled turnout which was interlocked with a main line turnout (turnout 2) as shown in Figure 1. The interlocked turnouts were locked when not in use and could only be operated by authorised Tranz Rail staff.
- 1.2.2 Both switch rails of turnout 1 were found open following the incident (refer Figure 3). The inside of the left-hand switch had recent heavy score marks at the point of the switch (refer Figure 4) and about 1 m from the point of the switch (refer Figure 5).
- 1.2.3 The tip of the right-hand switch of turnout 2 was broken off, and showed a recent fracture surface.
- 1.2.4 The exit from the yard from turnout 1 through turnout 2 to the main line was on a 1 in 400 down grade for 50 m. The main line was then level for 80 m before a 1 in 65 down grade for 300 m followed by 200 m level track before a rising grade. Wagon USL 3584 was found just beyond the bottom of the 1 in 65 down grade.
- 1.2.5 Entry into the gantry siding was normally controlled by hand-operated points using levers. T Croft staff operated the levers controlling these points as required when it was necessary to use the gantry siding.
- 1.2.6 Some 3 days before the incident Tranz Rail track staff had removed the levers from the turnouts at each end of the gantry siding due to damage from the log loader operations. The turnouts had been spiked¹ to stop them being used until repairs were completed. Due to a misunderstanding between Tranz Rail track and operating staff, T Croft were not advised of the planned removal of the levers for repair, or of any interim arrangements to ensure log operations could continue while the gantry siding was out of action. The levers were replaced and the siding returned to use on Saturday, 15 September 2001. Between the removal of the levers and the day of the incident T Croft staff had been using the gantry siding by moving the points over when required using the tines on the log loader.

¹ The switch held in the closed position by a spike driven into a sleeper near the point of the switch

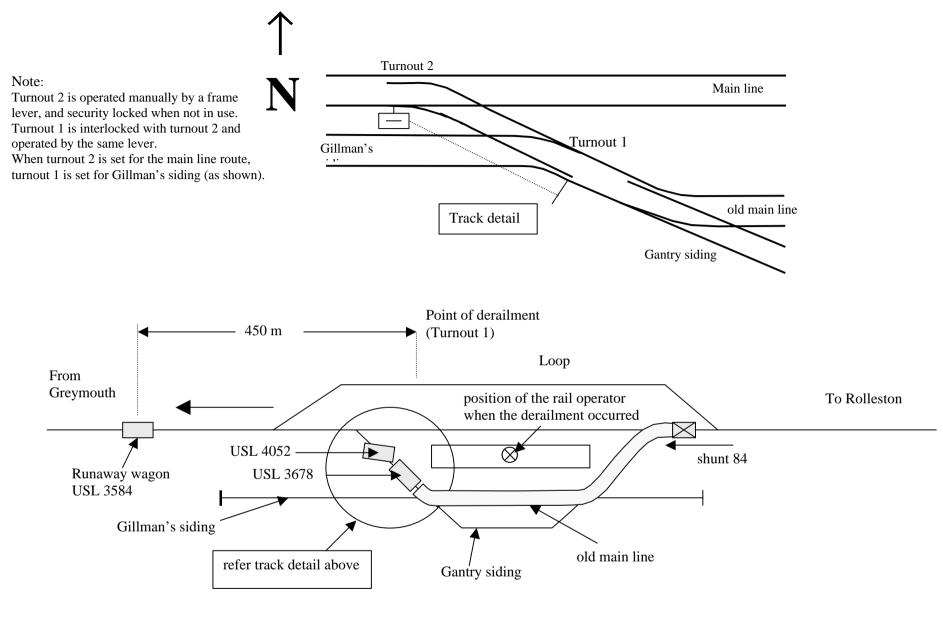






Figure 2 Looking east at the derailed wagon (taken shortly after the derailment with fog still evident)



Figure 3 Looking west from the turnout which initiated the derailment, showing both switches open



Figure 4 Score marks at the point of the switch



Figure 5 Score marks 1 m from the point of the switch

1.3 Shunting procedures

- 1.3.1 The formal "Joint Operating Plan" covering the use of the Stillwater siding for log traffic is attached as Appendix 1. As implemented on the ground T Croft moved wagons between the old main line, the gantry siding, Gillman's siding and the east end back shunt as necessary for loading demand. The rubber tyred vehicle used at Stillwater was a log loader fitted with tines.
- 1.3.2 T Croft held neither a rail service licence nor an exemption from holding such a licence, but for reasons discussed later in the report, was permitted by Tranz Rail to operate without either under the Joint Operating Plan. Tranz Rail did hold a valid rail service licence.
- 1.3.3 Stillwater came under the Greymouth area for Tranz Rail operational purposes. The "Local Instructions and Operating Plan" required:

2. Shunting

All shunting will be carried out as follows:

- 2.1 The Westinghouse Brake must be coupled and operating through all wagons being shunted. The only exception is when using the TR Shunt Locomotive.
- 1.3.4 Section 5 of Tranz Rail's Rail Operating Code, "Operating Instructions for Yard Shunting and Allied Staff" included under clause 3.2 "Shunt Operating Procedures" the following recognised procedures to be followed when shunting:

Range of Vision

Range of vision means that a member of the shunt crew must signal the movement from a position at or near the head of the movement in the direction of travel from which a clear view of the intended route can be obtained.

The range of vision will be influenced by such conditions as the weather, buildings, grade, time of day etc and may require significant movement on the part of the shunter for the range of vision to be maintained...

Shunting Dead End Roads or Roads Where Other Vehicles are Standing

When shunting dead end roads or roads where other vehicles are standing, always make sure a member of the shunt crew is in a position to judge the distance between the leading vehicle and the end of the road or other vehicle and signal the movement to stop. In the case of dead end roads the movement should be stopped short of the end of the road...

Bridles

To ensure vehicles remain connected when shunting, bridles are to be placed over hooks at all times...

Shunting with Rubber Tyred Vehicles

Before commencing shunting the operator will ensure the wagons are fully connected, i.e., draw hooks, bridles and, when fitted, slot protectors are in place...

1.4 Personnel

- 1.4.1 The RO had 35 years' rail experience, including guard, locomotive assistant and shunting experience. He held current certification for the shunting duties involved.
- 1.4.2 Formal A-level Safety Observations of the RO had been carried out on 12 September 2000 and 22 May 2001, the latter during duties at Stillwater. On both occasions the RO met requirements. The frequency and nature of the observations met Tranz Rail code requirements.
- 1.4.3 T Croft had 3 regular log loader drivers who were used at Stillwater when a large number of wagons were being handled that required shunting. None were qualified by Tranz Rail for "Stationary Shunting and Shunting with rubber-tyred vehicles" at the time of the incident as required by the Joint Operating Plan.

1.5 Licensing requirements

1.5.1 To carry out the requirements of the Transport Services Licensing Act 1989 the LTSA formulated criteria for the licensing of rail service operators as defined in the Act. These criteria were advised to known operators of a rail service by letter from July 1995 and stated in part:

If your siding and rail operations meet any of the following three criteria then you will require a rail service licence:

- i. If any movement (other than a minor alignment of rail wagons with the loading/unloading facility) of any railway wagon/s by your company (i.e. under the direct control of your management, employees, contracted staff, etc) is by means of a railway locomotive, a rubber tyred or tracked road vehicle; or fixed winch.
- ii. If there is breaking up and/or assembly of rail wagon consists by your company.
- iii. If there is any movement of rail wagons by your company over and/or immediately adjacent to a public road; and/or there is any public access to your private railway siding.

If your operation complies with any of the above criteria then you will require a rail service licence under the Transport Service Licensing Act 1989.

An exemption clause was included in the letter as follows:

However, if your siding does not meet any of the above three criteria then you can be exempted from the railway provisions of the Transport Services Licensing Act 1989. In order for us to be able to confirm that your organisation does not require a licence would you please:

- 1. Ensure that the details shown on the attached LTSA reply form regarding the contact details of your company is correct.
- 2. Supply LTSA an update on the attached reply form regarding the nature and scale of your operations on your railway siding.
- 3. Sign the attached form that includes a written undertaking from your company that:
 - (a) To the best of your knowledge your company does not require a rail service licence as your rail siding and associated operation do not meet with any of the above criteria (i-iii); and
 - (b) That you will promptly advise LTSA should any of the above information regarding your company and/or your rail operation change.
- 1.5.2 The LTSA advised that implicit in the above was that an optimal way of meeting the requirements of the Act was for the responsibility for such a rail service to be accepted by an appropriate licensed rail service such as Tranz Rail, and its operation covered in the approved safety system of that licensed operator. The LTSA was not aware of T Croft operations at Stillwater as at 13 September 2001. For this reason no contact regarding licensing had been made with either Tranz Rail or T Croft. The LTSA advised that based on information they now have on the Stillwater operations an exemption was unlikely and licensing would have been required.

2. Analysis

2.1 The damaged switch

- 2.1.1 As a result of the removal of the levers controlling entry to the gantry siding, and the lack of communication regarding this and any alternative arrangements for operations, T Croft staff had for some days been setting a route to the gantry road when required by using the tines of the log loader to push the switch rails to the desired position. The spikes holding the switches closed had either been taken out or dislodged by the log loader operation. Marks on the switch of turnout 1, some 10 m from the west gantry siding turnout, showed that tines had also probably been used to attempt to move these points by mistake. As they were interlocked mechanically with the main line turnout they could not move freely. However, the pressure applied was probably sufficient to have damaged the control rods and opened up the right-hand switch without the log-loader driver realising this had happened.
- 2.1.2 The use of a log loader to move switch rails is an undesirable and potentially hazardous practice. The fact that the contractor permitted such an operation shows a lack of understanding of basic railway safety principles. This lack is mainly attributable to the uncontrolled environment the contractor was permitted to work in.
- 2.1.3 To comply with the Joint Operating Plan T Croft staff should have been qualified by Tranz Rail. In addition their operations should have either been covered by the approved Tranz Rail safety system as part of the Tranz Rail licence requirement, or by licensing of T Croft. Neither of these safeguards was in place. These two omissions are significant safety issues. The damage to turnout 1 created a risk of a main line runaway from either Tranz Rail or T Croft operations. Although the runaway that did occur involved Tranz Rail shunting, the incident highlighted the need for control over the contractor's operations, and in particular the need for a safety system covering these operations. These issues are addressed in Section 2.3 of this report.

2.2 The runaway

- 2.2.1 The runaway occurred because shunting was not being carried out in accordance with Tranz Rail local instructions, which required the Westinghouse Brakes to be coupled and operating. Compliance with this requirement would have ensured USL 3584 was coupled to the other wagons before shunting commenced, and would have avoided an uncontrolled runaway.
- 2.2.2 USL 3584 followed a route incorrectly set to the main line due to damage to the points equipment leaving the right-hand switch open. The damage to the switch of turnout 2 occurred when USL 3584 trailed through the turnout and the wheels forced the switch open. Although the shunt was only moving slowly the steepening downgrade was sufficient to allow the unconnected USL 3584 to roll approximately 500 m. The passage of USL 3584 through the turnout caused the leading bogie of USL 4052, the second wagon, to take 2 roads at the split points and derail. The rest of the shunt followed the route to the main line before being stopped by the derailed wagon.
- 2.2.3 The runaway went undetected for some time because range of vision was not maintained to ensure a clear view of the intended route was obtained in the fog.
- 2.2.4 The RO was an experienced shunter familiar with correct shunting procedures, including those requiring air connection and range of vision requirements. His actions were influenced by 3 factors:
 - his understanding that turnout 1 must be set for Gillman's Siding if turnout 2 was set for the main line (the events of the day proved this was not necessarily the case)
 - his assumption that the 3 loaded wagons were connected
 - his desire to work in with contracting staff by leaving the air unconnected through the 3 loaded wagons to avoid the need for the contractors having to bleed the air off before moving the wagons.

- 2.2.5 It is likely that this example of a simple shunt movement to place wagons in a dead end siding without the air connected was not uncommon, despite the procedures laid down. When this occurs without ensuring all wagons are coupled an unacceptable risk of a runaway is created.
- 2.2.6 The Tranz Rail code included a requirement to ensure all wagons were fully connected before shunting with rubber-tyred vehicles. There was no such requirement for normal shunting, presumably because coupling and operating the Westinghouse Brake achieved this. However, staff indicated that shunting without air connected was not uncommon. Tranz Rail need to either amend procedures, or ensure compliance with existing procedures, to avoid the possibility of other loose wagons being shunted out of control and creating an unacceptable main line risk. Safety action taken by Tranz Rail (refer Section 4) addresses this safety issue.
- 2.2.7 Had the RO maintained range of vision during the propelling movement the derailment and runaway would most likely have still occurred, but the runaway would have been immediately apparent and the risk to main line trains reduced.
- 2.2.8 Had Train 829 arrived at Stillwater between 0615 and 0645 while Tranz Rail shunting staff were unaware of the runaway wagon on the main line, there would have been no reason for Train Control not to have issued a track warrant, and a collision would have occurred. This incident highlights the risk of runaway wagons in track sections with no track circuiting to detect their presence, and the need for licensing and control of private operators involved in wagon movements in these areas.

2.3 Licensing of rail service operators

2.3.1 The issue of identifying and licensing rail service operators had been raised previously by the commission in Railway Occurrence Report 99-121 regarding, coincidently, an incident at Stillwater in 1999 involving a fall from a wagon. As a result it was recommended to the director of the LTSA that he:

improve methods of identifying rail service operators and ensure that all identified operators are licensed or exempted as appropriate (048/00).

ensure that exemptions are only granted when LTSA is satisfied that operating methods meet approved criteria (049/00)

ensure that licensed rail siding holders have an approved operating plan that includes appropriate training and procedures to minimise damage to safety critical wagon components (050/00).

On 27 June 2000 the Director of LTSA responded as follows:

(a) LTSA intends to accept all three recommendations:

(048/00): LTSA considers the identification of current rail siding holders to be an ongoing process with LTSA seeking to correctly identify all such organisations.

(049/00): This recommendation has been in place since July 1995.

(050/00): This recommendation has been a requirement on all licensed rail siding holders since the introduction of the rail safety regulatory regime by the Transport Services Licensing Act in April 1993.

2.3.2 In spite of assurances given by the Director of LTSA in response to the recommendations, this incident indicates that the LTSA needs a more proactive approach to identifying and licensing rail service operators to ensure all non-exempt rail service operations are carried out by rail service operators within an approved safety system. Safety actions taken by Tranz Rail and the LTSA following this incident (refer Section 4) should, if followed, address this safety issue. Until this is achieved, the 3 safety recommendations remain open awaiting LTSA advice to enable a change to "closed-acceptable" status.

- 2.3.3 The Joint Operation Plan did not require T Croft to be a licensed rail service operator. Tranz Rail had therefore elected to accept responsibility for the rail service being carried out by T Croft, although this responsibility was not appropriately reflected in the Tranz Rail safety system.
- 2.3.4 Following this incident Tranz Rail has elected not to accept responsibility for T Croft rail service operations and operations have ceased until an exemption or licence is granted to T Croft by the LTSA. Other similar operations by non-Tranz Rail staff found during the safety action detailed in Section 4.3 will be similarly actioned.
- 2.3.5 The action now being taken by Tranz Rail and the LTSA working together to identify which operations are being carried out under the Tranz Rail rail service licence and which require separate licensing is timely. Impending changes to the Tranz Rail structure which will see areas such as track maintenance separate from Tranz Rail will require similar clear definition to ensure an appropriate licence and safety system are in place to ensure safe integrated separation.
- 2.3.6 In the absence of an appropriate licence and safety system the control of licensing, the Joint Operating Plan requirement that the movement of any wagons must be by a qualified person could have provided a level of understanding that may have avoided the damage to turnout 1. Regrettably even this lower level of operational control was not being followed.

3. Findings

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

- 3.1 The runaway was caused by lack of compliance with shunting procedures. Had the Westinghouse Brake been coupled it would have prevented an uncontrolled runaway on to the main line.
- 3.2 The late discovery of the runaway was due to lack of compliance with the shunting requirement to maintain range of vision.
- 3.3 The LTSA not ensuring that T Croft operations at Stillwater were carried out under the safety requirements of the Transport Services Licensing Act 1989 created an avoidable risk to main line operations.
- 3.4 The failure of Tranz Rail and T Croft to ensure that only qualified contractor staff moved wagons at Stillwater added to the avoidable risk.
- 3.5 Under the current system for licensing rail service operations there is a risk that other rail service operations are being carried out by non-Tranz Rail staff that are not adequately covered by the safety provisions of the Transport Services Licensing Act 1989.

4. Safety Actions

- 4.1 On 27 September 2001, a member of T Croft staff was qualified by Tranz Rail for stationary shunting duties and the operation of rubber-tyred vehicles.
- 4.2 On 23 November 2001, Tranz Rail advised:

On 22 November 2001 T Croft were advised by Tranz Rail to cease shunting operations at Stillwater.

The cessation is permanent until T Croft obtain a Rail Service License from the Land Transport Safety Authority or until the Land Transport Safety Authority grant a Rail Service License exemption.

- (i) Tranz Rail and the Land Transport Safety Authority are working together to identify customers who move rail service vehicles without rail service licences.
- (ii) During the process of identifying customers that move rail service vehicles, any customers without a rail service licence are being immediately prohibited from moving rail service vehicles.
- (iii) Tranz Rail has implemented 5 key safer shunting behaviours. One of these behaviours is: "Shunting must be undertaken with the air brake in operation, except: Where specifically permitted by local instruction, or where the air brake is inoperative and has been cut out.
- (iv) Tranz Rail's policy is that all shunting is undertaken with the air brake in operation unless the shunting occurs in a mechanical depot, with a TR locomotive not equipped with a train brake, or with a shunting tractor. Shunting with the air brake in operation has been implemented at all marshalling yards with the exception of Picton. Implementation will occur at Picton when compressor modifications are completed on local shunt locomotives.

4.4 On 21 November 2001, the LTSA advised:

- 1. TRL advise that T Croft Contractors will now cease shunting operations at Stillwater (and wherever else they operate).
- 2. TRL have agreed to supply LTSA with a list of contractors (including their contact details) etc. similar to T Croft for us to consider whether or not those listed will require a rail service licence. LTSA will then contact these contractors directly.
- 3. It has been agreed that a system will be established where TRL will advise LTSA the name and contact details of contractors (who will be moving rail service vehicles) who are likely to be commencing operations on the system.
- 4.5 In view of the safety actions taken, no new safety recommendations are included with this report.

Approved for publication 10 April 2002

Hon. W P Jeffries **Chief Commissioner**

Tranz Rail

18th August 2000

JOINT OPERATING PLAN TRANZ RAIL - T CROFT LIMITED STILLWATER SIDING

Physical Hazards :

 Trucks and Heavy Machinery operating near railway line / wagons being loaded and discharged.

Vehicles must not be parked or objects stored foul of any rail lines (a clearance of 3 metres either side from the center of the railway line must be kept at all times).

T Croft Limited and Tranz Rail staff working in the vicinity of each others operation.

Railway track protruding above the ground surface.

Shunting Operation :

- Shunting can be carried out at any time.
- Before wagons are placed or pulled from the siding the Rail Operator is to advise any loading / unloading to cease.

All vehicles and objects must be kept clear of the railway lines until the shunting has been completed.

The movement of any wagons **must** be by a person qualified by Tranz Rail for Stationary Shunting and Shunting with rubber tyred vehicles.

NO loose shunting is permitted

Staff :

• Hi-Visibility clothing must be worn when working in the vicinity of railway lines.

Damage :

• Any damage to Tranz Rail property or equipment must be reported immediately to the National Service Centre on 0800 351 351.

Emergency Telephone Numbers :

| Tranz Rail Service Delivery Greymouth | (03) 768 1402 (025) 243 6532 | | | |
|--|----------------------------------|----|-----|--|
| NZ Police | (03) 768 1600 | or | 111 | |
| Ambulance | 0800 222 600 | or | 111 | |
| Fire Service | (03) 768 5066 | or | 111 | |
| Train Control | 0800 808 400 | | | |