



**Report 98-114**

**Train GR7**

**near collision**

**Pines, near Kaikoura**

**10 September 1998**

### **Abstract**

On Thursday, 10 September 1998, an on-track maintenance group had just finished packing up their two hi-rail vehicles for off-tracking when they noticed Train GR7, the EM80 track evaluation car, approaching from the north and approximately 2.7 km distant. The ganger managed to contact the locomotive engineer using the train control radio and the train was brought to a stop well clear of the hi-rail vehicles. The cause of the near collision was the drawing of a maintenance occupation on the train control diagram approximately 10 km south of its actual location. The safety deficiency identified was the lack of procedures to ensure that movements and occupations were correctly plotted on the train control diagram.

# Transport Accident Investigation Commission

## Rail Incident Report 98-114

<b>Train type and number:</b>	Track evaluation car, GR7
<b>Date and time:</b>	10 September 1998, 1222 hours
<b>Location:</b>	217.8 km Main North Line (MNL) near Pines
<b>Type of occurrence:</b>	Near collision
<b>Persons on board:</b>	Train GR7: crew : 3 Hi-rail vehicles: crew : 4
<b>Injuries:</b>	Nil
<b>Damage:</b>	Nil
<b>Investigator-in-Charge:</b>	R E Howe

# 1. Factual Information

## 1.1 Narrative

- 1.1.1 On Thursday 10 September 1998 Train GR7, the EM80 track evaluation car, was travelling south between Wharanui (257.86 km MNL) and Kaikoura (190.17 km MNL). It was recording all loops and had departed Wharanui at approximately 1155 hours. The train was under the control of a locomotive engineer (LE), with a fitter and operator also on board, and was travelling under the authority of a track warrant.
- 1.1.2 At 0900 hours a track maintenance group with two hi-rail vehicles had obtained clearance from Train Control for track occupancy to carry out maintenance work from 212 km to 217 km between Hapuku and Pines.
- 1.1.3 A Tranz Rail Limited (Tranz Rail) employee under training as a train controller (trainee) mistakenly pencilled in the hi-rail occupation on the train control diagram approximately 10 km south of its proposed location. Scaling from the diagram the occupation was drawn between 204 km and 207 km, although the hand written annotation below was “216 - 217”.
- 1.1.4 This occupancy was extended to 0950 hours to enable the maintenance gang to complete the work and the two hi-rails off-tracked at 217 km MNL.
- 1.1.5 At 1024 hours the ganger again contacted train control for occupancy and stated:
- . . . we're at the 217, Hapuku and Pines, when the express [Train 700, northbound passenger express] gets past we'll on-track 68877<sup>1</sup> and head round and work around at the 216 300 for about 45 minutes.
- 1.1.6 The train controller supervising the trainee acknowledged the call and confirmed their working between “the 217 up to the 216” and indicated that there would be nothing around until Train 726 or GR7 and to make a check call at 1130 hours. The ganger then advised that he would on-track two hi-rail vehicles.
- 1.1.7 The train controller drew in the second occupation at the same level as the original occupation (i.e. at 207 km) without specifically checking the kilometrage and assuming that the top line represented 217 km.
- 1.1.8 At approximately 1050 hours, after the passage of Train 700, the ganger on-tracked two hi-rail vehicles (62144 and 68877) at 217 km and commenced maintenance work between the 217 km and the 215 km.
- 1.1.9 At 1135 hours the ganger made a base call to Train Control which was acknowledged by the automatic receiver but not answered by the train controller until 1143 hours. The ganger sought information on train whereabouts and was advised that GR7 was the next train due and to be off and clear by 1230 hours.
- 1.1.10 The track gang occupation was extended on the train running diagram from 1130 hours to 1230 hours at the incorrect kilometrage of 207 km (instead of 217 km).
- 1.1.11 Work finished at approximately 1220 hours at the 215.08 km and both hi-rail vehicles had been packed when one of the gang members brought to the ganger's attention the approach of Train GR7 at 217.8 km.

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<sup>1</sup> 68877 was the fleet number of one of the hi-rail vehicles.

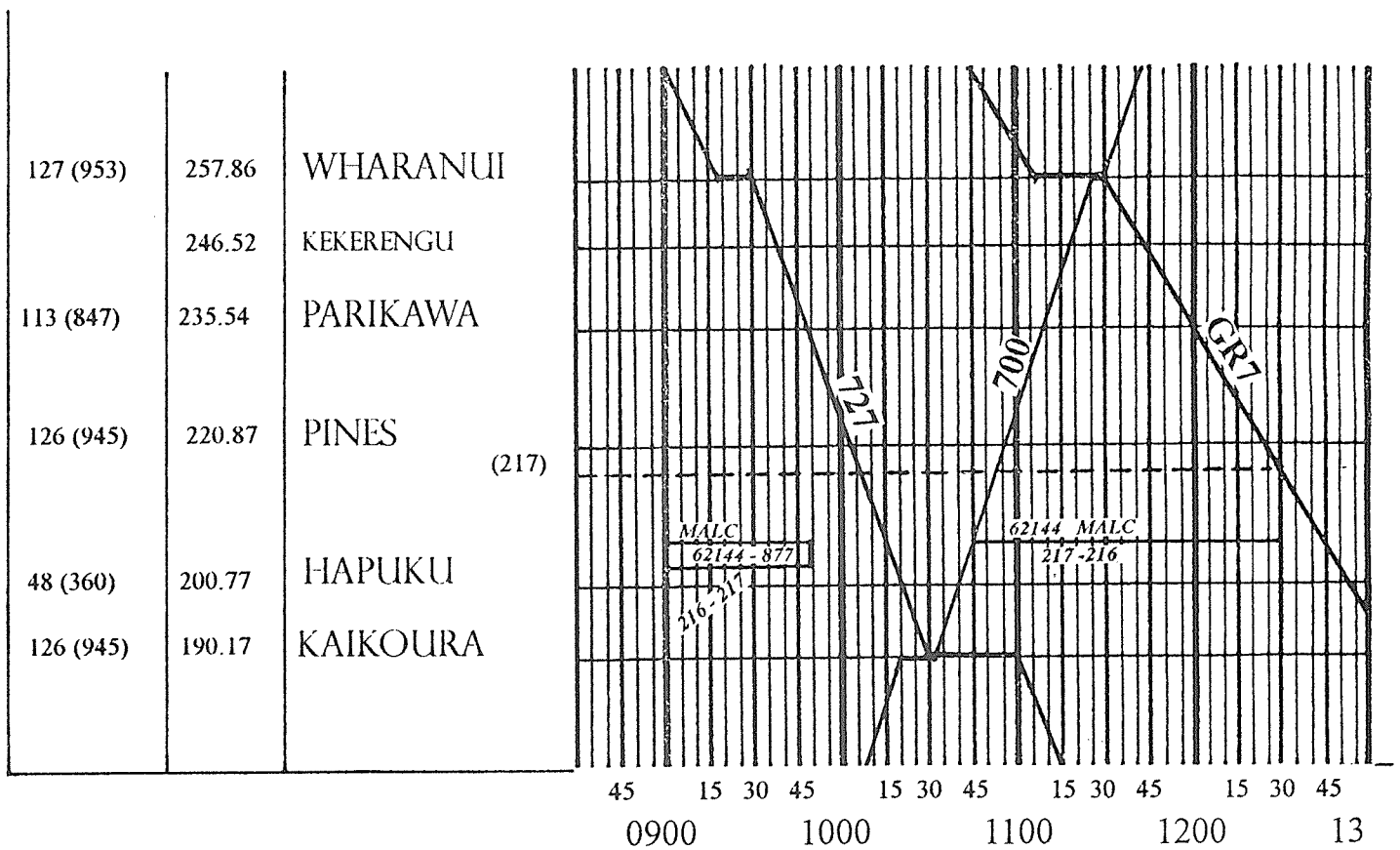


Figure 1

Diagrammatic representation of the section of the train control diagram covering the incident

(For clarity only the plot of actual train movements are shown and the dashed line indicating 217 km has been added)

- 1.1.12 The ganger immediately tried to contact the LE of GR7 on the train control radio channel to stop the train. The LE stated that he heard the call but because he was unsure of the identification of the caller he did not know if it applied to him. As a precaution he slowed Train GR7 down to a walking pace.
- 1.1.13 The trainee heard the emergency call from the ganger, realised the error on the train control diagram, and contacted the LE of Train GR7 and requested him to stop.
- 1.1.14 The positioning of both the hi-rail vehicles and Train GR7 was such that the gang member was able to obtain a long distance view of the approach of the train which initiated the action to stop the train. Train GR7 was able to be brought to a stop well clear of the hi-rail vehicles. The track in the area traverses the narrow coastal strip in a series of reverse curves where cuttings, a tunnel and tree growth allowed only intermittent long distances view lines.

## **1.2 Train control diagram**

- 1.2.1 Figure 1 is a diagrammatic representation of a segment of the train control diagram covering the section of track between Wharanui and Kaikoura as used on 10 September 1998. The full diagram covered 24 hours of operation, starting at midnight, and depicted all train movements and track occupations between Christchurch and Picton. It is the basic document that train controllers use in controlling all movements on the single line track.
- 1.2.2 The vertical axis of the diagram gave the order of stations and crossing loops from Christchurch to Picton, scaled in relation to their running kilometrage from Christchurch. By direct measurement the scale was approximately 1 mm to 1 km of track.
- 1.2.3 The column immediately to the left of the station names gave the kilometrage to the centre of each crossing loop and the far left column gave details of the length of each loop (in metres) and standard wagon crossing capacities. The horizontal line across the diagram at each station locality was scaled to represent the kilometrage for that station.
- 1.2.4 The angled lines across the diagram represented the planned and actual progress of each of the scheduled trains in the area on that day and showed horizontal sections at each of the loops where a crossing was required. The details of a train's position with respect to time was made known to the train controller by the LE via a direct radio telephone channel link.
- 1.2.5 Occupation by maintenance gangs were shown on the diagram by either:
- a blocked out section where the gang required to occupy a significant length of track, or
  - a single horizontal line where the occupation was localised.
- 1.2.6 Hand-written onto the diagram were details of the occupations pertaining to the caller, the call sign, and the kilometrages requested for working between.

## **1.3 Train control transcript**

- 1.3.1 Appendix 1 attached gives a summary of the Train Control transcript covering the period from 0900 hours to 1225 hours on 10 September 1998. Question marks on the transcript indicate areas that could not be heard clearly from the recording tape (bracketed comments represent subsequent interpretations).
- 1.3.2 At 0901 hours the ganger requested a work area between 212 km and 217 km. He was required to give a check call at 0930 hours and when this was done (at 0931 hours) the ganger sought another 15 minutes to complete the job. At 0945 hours the ganger advised Train Control that he was "off and clear at the 217".

- 1.3.3 At 1023 hours the ganger indicated to Train Control that he would on-track after the passage of the express (Train 700) to work around the 217 km to the 216.3 km for 45 minutes. After ascertaining from Train Control that he could possibly have until 1215 hours, the ganger received authority to on track both hi- rail vehicles and make a check call at 1130 hours.
- 1.3.4 At 1135 hours the ganger placed a call to Train Control which was responded to at 1143 hours. The ganger sought the whereabouts of the next train and was advised by the train controller that it was GR7 and to be “. . . off and clear at 1230 please . . .” also confirming their location as being 216/217 Pines/Hapuku. The ganger acknowledged the call.
- 1.3.5 Just south of Parikawa (at approximately 1205 hours) the LE of Train GR7 had experienced difficulty in contacting Train Control on the radio channel. He initially tried a direct voice call and getting no response he operated the base call button which was designed to generate an incoming call message on the computer monitor in Train Control.
- 1.3.6 At 1221 hours Train Control finally contacted the LE of Train GR7 to ascertain that he had just cleared Pines. After advising that his call had not been coming up on the monitor, Train Control obtained the LE’s cell phone number in case he could not be contacted on the radio.
- 1.3.7 At 1222 hours, Train Control became aware from communication over the train control radio channel that an emergency stop was being requested. Initially this was thought to apply to Train 700 but then it was realised that the ganger was attempting to contact Train GR7 direct. Train Control then contacted the LE of Train GR7 and confirmed the emergency request for him to stop the train.

## 1.4 Operating rules

- 1.4.1 Tranz Rail’s Rule 198 (amendment No 11) stated:

### **Requirements for on-track movements of Trolleys and Hi-Rail Vehicles**

- (a) **Inquiries-** Every employee in charge of a trolley, hi-rail vehicle or group of such vehicles who proposes to on-track on the main line, must personally advise Train Control of his requirements including the metrage, locations between, i.e. stations, sidings, intermediate boards and time required before off tracking.
- (b) **Authority-** Train Control will refer to train movements plotted on the diagram and, after taking account of requested on track time will either authorise the movement or will instruct that the movement must not take place. If the movement is authorised, then the completion time agreed to for track occupancy will become the nominated time for the movement to be clear of the line.

Before the movement proceeds, Train Control will give the employee in charge full information regarding the running of all trains and the presence of all other on-track movements which may affect the safety of the movement. It will be the responsibility of the employee in charge to have the trolley or hi-rail vehicle under sufficient control to enable him to stop clear of those movements when encountered.

Train movements are not to be forecast for unreasonably long periods. Where a proposed movement of a trolley or a hi-rail vehicle is to be of considerable duration, Train Control and the employee in charge should agree when the next enquiry is to be made.

The movement of all trolleys and hi-rail vehicles are to be recorded on the Train Control diagram . . .

- (c) **All on Track Movements MUST be Clear of the Line by the Nominated Time-** If the employee in charge is unable to clear the line by the nominated time, he must again check with Train Control.

#### **199. On-Track Operation or Trolley and Hi-Rail Vehicles**

- (a) **Safe Operation-** The driver is responsible for the safe operation of the trolley or hi-rail vehicle, and must operate it in accordance with these rules and any other current instructions . . .

1.4.2 Tranz Rail's Rail Operating Code Section 6: Operating Instructions for Train Control (issue 4 dated 3 February 1997) stated:

#### **11.0 Inquiries from Maintenance Workers, Hi-Rail Vehicles and Trolley Users**

##### **11.1 Accurate and Up-dated Information**

The necessity for absolute accuracy when dealing with inquiries from trolley, Hi-Rail vehicle users and maintenance staff working on or near the track is vital. There is no margin for error, oversight or indifferent approach concerning the movement of trains, Hi-rail vehicles, or trolleys when handling enquiries from these members. Their lives depend on the accuracy of information supplied by the TCO and there should be no possibility of misunderstanding by the inquirer. Abbreviated speech or short cuts in procedure must not be adopted by a TCO when handling these inquiries.

The following matters must be watched carefully by a TCO when dealing with the movement of Hi-Rail vehicles, trolley and maintenance work:-

11.1.1 The employee in charge must personally advise requirements for the proposed movement including the time required before off tracking.

11.1.2 The identity of the caller and the location from which the call is made must be established beyond any possible doubt. The TCO MUST insist upon callers advising "Stations, Sidings or Intermediate Boards between" in addition to metrage, when calls are made from track locations.

Likewise the same requirements are to apply when a movement involving either a Hi-Rail vehicle or a trolley is going to terminate at a track metrage.

11.1.3 Reference must be made to the train control diagram in regard to train movements within the area of the proposed movement. After taking account of the requested track time, together with train movements plotted, TCO will either authorise the movement or will instruct that it must not take place . . .

## **1.5 Train speed**

- 1.5.1 The maximum authorised train speed for the EM80 track evaluation car was 60 km/h.
- 1.5.2 The operating speed for recording loops was 20 km/h. The EM80 had to be stopped at the beginning and end of each loop to lower and raise the recording gear.
- 1.5.3 The EM80 was required to reduce speed to 10 km/h when negotiating all public level crossings.
- 1.5.4 For scheduling purposes, Train Control allowed an average speed of approximately 40 km/h between stations for the EM80 and the actual progress followed this very closely.
- 1.5.5 The EM80 track evaluation car is not fitted with an event recorder. Train GR7 had just departed from Pines loop and the crew estimated the speed as 35 km/h when the LE first heard the gang's request for an "urgent stop".

## **1.6 Personnel**

- 1.6.1 The train controller had 18 years railways experience with the last 10 years being with train control. He obtained his initial train control experience in Christchurch and was one of the first controllers to move to Wellington with the centralisation of the train control system 18 months prior to the incident. He had current certification as a Train Control Officer to cover the Main North Line, and on the shift concerned was controlling the area Picton to Christchurch on the North desk.
- 1.6.2 The trainee had approximately four years freight experience with Railways before electing to start the train controller course and had completed the preliminary trainee train control course, the intermediate examination and had attended a four week train control school. It was during the final phase of "on the job training" that the incident occurred. The expectation was that a further three weeks training was required. The train controller stated that the trainee had made good progress and was performing well.
- 1.6.3 Both the train controller and the trainee had been working the same eight hour shifts for some days prior to the incident. They both stated they were in good health and their work and recreational patterns were normal.
- 1.6.4 The Ganger had 18 years of railway experience with the last nine being the Grade 1 Ganger for gang MN3 at Kaikoura. He had all appropriate certification for the position including hi-rail vehicle certification.
- 1.6.5 The LE had 35 years of railway experience, the majority of it being in the Picton area, and held current certification for the duties being carried out.

## **1.7 Training of train control officers**

- 1.7.1 At the time of the incident, the train controller was involved in the on the job training of a trainee who had been under his jurisdiction for about five weeks. During this period of training the onus of responsibility for day to day operations was acknowledged to be with the train controller.
- 1.7.2 The training consisted of completing a trainee train control correspondence course, intermediate examinations, a four week train control school and between six to ten weeks on the job training with an instructor (a qualified train controller). Periodic assessments were made by the instructor throughout the on the job training to ensure that the trainee was fully conversant with all aspects of the job.
- 1.7.3 At the end of the practical on the job experience, the trainee was then required to pass a written examination of the rules and code followed by a further detailed assessment by a certifying officer.



- 1.7.4 At the time of the incident the train controller assessed that the trainee still had about another three weeks to go before being eligible to sit for the final examination and be fully certified.

## 2. Analysis

- 2.1 Train GR7 was being operated in accordance with Tranz Rail's operating requirements.
- 2.2 The hi-rail vehicles were occupying the line in accordance with Train Control requirements with two exceptions:
- the 1130 hours check call was five minutes late
  - the vehicles were working approximately 1 km outside the area advised to Train Control.

In the event, neither of these contributed to the incident. It is pertinent that in finishing up at 215.08 km, the ganger was approximately 1 km south of the area originally agreed with Train Control at 1024 hours and confirmed during the check call at 1143 hours. Had the gang been between the kilometrages originally agreed with Train Control (i.e. 217 to 216) it was likely that they would not have been in a position to see the approach of Train GR7 and would have had less time to take avoiding action. The general view distance available in this area did not normally allow the benefit of such a long warning time and it was fortuitous that the gang were able to see the approaching train some 2.7 km away before it moved out of sight.

- 2.3 Although the temporary absence of radio communication (between approximately 1200 hours and 1221 hours) between Train Control and the LE of Train GR7 near Parikawa did not contribute to the incident it could have been an important factor if communication had not been re-established by the time of the emergency call at 1222 hours.
- 2.4 In deciding to move outside the area advised to Train Control, the ganger was making himself vulnerable to any other movements that may have been scheduled in that area although in this particular case it is likely to have resulted in a greater view distance.
- 2.5 The critical 10 km misplacement of the 217 km position on the train running diagram equated to a collision course between the hi-rail vehicle and Train GR7. At an average speed of approximately 40 km/hour for Train GR7, the 10 km distance would be covered in 15 minutes which would consume the customary float time allowed by train controllers in scheduling occupations.
- 2.6 Had the train involved been a freight train hauling heavy tonnage, considerably longer braking distances would have been involved and the outcome could have been more serious.
- 2.7 In entering a track kilometrage on the train running diagram, it was necessary for the train controller to interpolate from the crossing loop kilometrages either side. For the case under investigation this involved Pines (220.87 km) and Hapuku (200.77). Presenting kilometrage information in this fashion did not provide an easy method of entering an occupation or readily cross checking it's accuracy.
- 2.8 While Tranz Rail's Operating Code, section 6, clause 11.1 stressed the need for accuracy in recording information, there was no formal procedure for ensuring the accuracy of the information plotted.
- 2.9 The transcript also showed non-compliance with code requirements for references to "stations between" although this did not contribute to the incident.

### **3. Findings**

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

- 3.1 Train GR7 was being operated in accordance with Tranz Rail's operating rules and instructions and had complied with the track warrant requirements.
- 3.2 The maintenance occupation of the track was in general conformity with the train controller's instructions and occupying track approximately 1 km outside the designated work area did not contribute to the incident.
- 3.3 The temporary absence of radio communication between Train Control and the LE of Train GR7 near Parikawa did not contribute to the incident.
- 3.4 The incident was caused by the track kilometrage being incorrectly entered on the train control diagram.
- 3.5 The train control diagram did not provide for a ready and easy method of entering and checking kilometrage details. This could have been provided by a regular calibrated distance scale on the vertical axis of the train control diagram.
- 3.6 There were no procedures to minimise possible mistakes when entering kilometrage details.

### **4. Safety Actions**

- 4.1 Following the incident Tranz Rail advised that it had reviewed aspects of non-compliance with both the trainee and the train controller.
- 4.2 A random ten days of track calls prior to the event were reviewed by tape playback and assessed with the trainee. No errors or omissions were detected as a result of this review.
- 4.3 Tranz Rail advised the controller's responsibility with regard to the trainee had been reviewed and reinforced.

### **5. Safety Recommendations**

- 5.1 On 11 November 1998 it was recommended to the Managing Director of Tranz Rail that he:
  - 5.1.1 Reviews the format of the train control diagram to provide improved kilometrage information on the vertical scale, (100/98); and
  - 5.1.2 As part of the train control diagram format review introduces a formalised system to ensure that plotted track occupation limits are subject to a specific checking procedure. (101/98)

5.2 On 22 December 1998 the Managing Director of Tranz Rail responded as follows:

5.2.1 Tranz Rail does intend to adopt the safety recommendations 100/98 and 101/98.

The format of the train control diagram is currently under review and intent of the recommendations will be incorporated into the process and operating procedures.

Approved for publication 3 February 1999

Hon. W P Jeffries  
**Chief Commissioner**

# Appendix 1

## Train Control Transcript Main North Line (partial extraction) Channels 16 & 18

10 September 1998

Time Stamp	Radio/ Mic	Who *	Transcription
09:00:48	R	TC1	621 double-4 receiving your base call go ahead please
09:00:52	R	G	Good morning Fiona, Malcolm here we're at the 212 between Hapuku and Pines what trains are about please over
09:01:01	R	TC1	212, ... Malc your next train through is actually 700 into Kaikoura he's due in there at about 20 past 10 and also 727 from Picton due in there at about the same time
09:01:27	R	G	Roger on that, could we get say at this stage 45 minutes working between the 212 and the 217
09:01:51	R	TC1	Yeah roger that Malc that's not a problem, working between the 212 and the 217 between Hapuku and Pines, I'll put you through there until 9.30 if you could give us a check call then please, or else be clear, just to see how these other two guys are going
09:02:10	R	G	Roger on that check call at 9.30 and we'll have two high railers on track 62144 and ????
09:02:24	R	TC1	Roger that thanks very much Malc we'll catch you at 9.30
09:02:29	R	G	Roger ?
09:30:57	R	TC1	62144 receiving the base call go ahead please
09:31:00	R	G	?? we're at the 214.5 at the moment this is a check call everything's clear
09:31:08	R	TC1	He said a check call and then he said something about clear
09:31:17	R	TC1	Sorry Malc, is this a check call or are you calling clear over
09:31:23	R	G	This is only a check call over
09:31:30	R	TC1	How much more time are you looking for there Malc?
09:31:33	R	G	Another 15 if we can get it please
09:31:42	R	TC1	Roger that Malc, what if we give you until 10 to 10?
09:31:46	R	G	Roger clear at, 9.50 that's fine
09:31:59	R	TC1	Lovely stuff thanks Malc we'll have you off and clear there at 9.50, Control out
09:32:06	R	G	Roger ?
09:44:59	R	TC2	62144 over
09:45:02	R	G	?? Malcolm here, we've got both highrainers off and clear at the 217 over
09:45:10	R	TC2	Thanks Malcolm, all off and clear thank you
10:23:52	R	TC2	62144 over
10:23:58	R	G	Yeah Malcolm here we're at the 217 Hapuku and Pines, when the express gets past we'll on track 68877 and head 'round and work around at the ?? 216 300 for about 45 minutes
10:24:16	R	TC2	Yeah roger once 700 goes past you'll go from the 217 up to the 216 area you'll be working there for 45 minutes on track say up to about 11.30, after 700 yeah there won't be anything around until either 726 or this GR7 over
10:24:35	R	G	Roger on that ok, in that case, ?? what time would we be likely to get, any idea?
10:24:44	R	TC2	Yeah roughly at this stage you probably could get up to about quarter past 12 as a roughy at this stage over
10:24:52	R	G	Right ok in that case we'll on-track both high railers 62144 as well, and we'll make another check call at 11.30 if that's OK with you?
10:25:03	R	TC2	Yep that'll be fine check call 11.30, once you go on track after 700, thank you
10:25:10	R	G	Roger that
11:35:21			Incoming base call from 62144 acknowledged on the MSP log
11:42:31	R	TC2	Ah 62144 over
11:43:45	R	TC2	Yes 62144 over
11:43:10	R	TC2	144 over

(? = 6887

(? = 217

11:43:26	R	G	?? Gary
11:43:33	R	TC2	Yeah roger coming through loud and clear there now, over
11:43:38	R	G	I had the back end of the truck parked into a row of ... come right again I can hear you ... check call for our next train please
11:43:50	R	TC2	I presume you're still 217 216 Pines Hapuku, GR7 will be your train, how about, off and clear at 12.30 please, off and clear 12.30 over
11:44:12	R	G	Off and clear at 12.30 ... that's fine
11:44:19	R	TC2	Thank you
12:21:05	R	TC1	Control to Track Evaluation Car are you receiving over
12:21:10	R	<del>R</del> L.E	Yeah we're, clear of Pines we've been trying to get you all the way but I don't know we don't seem to be having much luck over
12:21:22	R	TC1	Roger that that's terrific we were wondering where you were, you haven't actually been coming up on here, do you have a cell phone that we can get you on if we can't get you on the radio?
12:21:33	R	L.E <del>R</del>	Yeah the cell phone number will be 025 429 067 over
12:21:44	R	TC1	Yeah roger that look thanks very much, if we have any problems we'll give you a call, otherwise you're making really good time
53	R	<del>R</del> L.E.	Yeah how's 726 is he on good time or are we going to be sitting a while at Kaik or what over
12:22:02	R	TC1	Yeah, 726 is making good time as well he'll actually be waiting for you at Kaikoura
12:22:08	R	L.E <del>R</del>	Roger thank you
12:22:11	Mic	TC1	Great
12:22:13			<i>Set call tone</i>
12:22:21	Mic	TC1	Yeah but you see he's not come up
12:22:23	R	G	?? Kaikoura driver urgent stop where you are over
12:22:31	Mic	TC1	What the ? was that
12:22:34	Mic	TC1	Shall we interrupt that, and find out what's going on
	Mic	TC2	??
12:22:47	Mic	TC1	No he wasn't, he was calling 700 and telling him to stop where he is ... someone's just called 700 and said stop where you are
12:22:57	R	G	??? are you receiving
	Mic	TC2	??
12:23:14	Mic	TC1	Oh ****
	Mic	TC2	??
12:23:25	R	TC1	Driver GR7 are you receiving over
12:23:35	Mic	TC1	He's not coming up
12:23:40	Mic	TC1	429 067
12:24:02	Mic	TC2	Just try him again
12:24:03	R	TC1	Control to GR7 are you receiving Control to GR7, over
12:24:11	R	LE	Yeah GR7 receiving over
12:24:15	R	TC1	Yeah hi did you catch Malcolm's call then?
12:24:18	R	LE	I heard someone say, I heard someone say stop where y'are but he didn't say who or anything else who he wanted, over
12:24:29	R	TC1	Are you stopped if you're not could you please now, there's actually a gang I drew them too far down on the graph, I'll get hold of Malcolm and get him clear
12:24:39	R	LE	Yeah roger we can see a couple of railway trucks up further over
12:24:48	R	TC1	If you draw up to them really slow we'll get hold of the guys and find out how much longer they're going to be there
12:24:56	R	LE	We'll stay here until they get here we can see someone on the move
12:25:02	R	TC1	Roger that then fine thanks

(? = Ganger)

- \* TC1 = Trainee Train Control Officer
- TC2 = Train Control Officer
- G = Ganger
- LE = Locomotive Engineer GR7

