



Report 96-101

Train 701

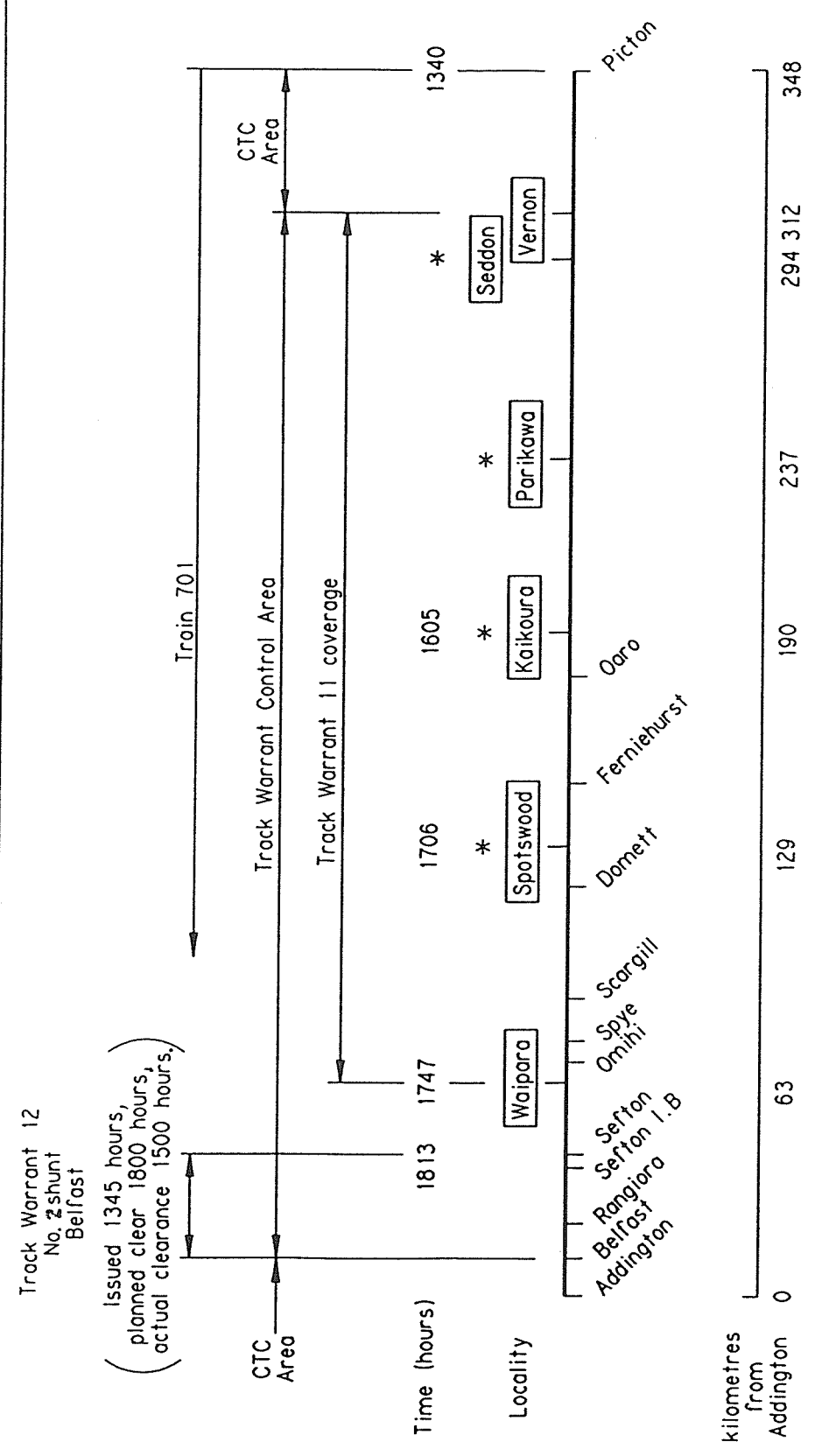
Track Warrant Control Irregularity

Waipara

8 January 1996

Abstract

On Monday 8 January 1996 Train 701, the southbound "Coastal Pacific" passenger service, overran Waipara without a valid track warrant and continued approximately 24 kms into the next section before the error was realised. There was no opposing traffic or obstruction and once the overrun was discovered a valid warrant was issued and Train 701 continued its journey. The causal factor was the Locomotive Engineer's failure to recognise the limits of his authority to proceed. Safety issues identified were the long distances for which track warrants were issued and the need to reinforce track warrant requirements, particularly following crew changeovers.



* = localities where Track Warrant 11 required a call to Train Control

Figure 1
Diagrammatic representation of MNL Addington to Picton
(Not to scale)

- 1.12 Reprogramming work was being carried out on the Track Warrant Assisted Computer System at Christchurch and the LE of Train 711 was advised that he would be called back in five minutes.
- 1.13 At 1747 hours the TCO called Train 701 to ascertain its position, and thus enable Train 711's progress to be authorised as far as the passage of Train 701 would allow.
- 1.14 The LE advised Train 701 was clear of Spye and almost at Omihi and Train Control issued Track Warrant 17 for Train 711 to proceed from Kaikoura to Scargill (for the relativity of the localities quoted refer to Figure 1).
- 1.15 At about this time the LE of Train 701 contacted the Train Manager to check on the passenger stops required prior to Christchurch.
- 1.16 Just prior to Waipara the Train Manager contacted the LE to request a stop at Sefton (a closed station and not a scheduled passenger stop) to let one of the hostesses disembark.
- 1.17 At 1812 hours the LE stopped the train at the old Sefton platform and the hostess disembarked.
- 1.18 At 1813 hours the TCO called Train 701 to ascertain his position since, as the TCO stated, "haven't heard from you that's all". The TCO was operating both the north and the south Train Control desks at Christchurch at the time. Traffic in both areas was light and he had noticed that Train 701 was apparently running slightly late prior to Waipara. The Train Control diagram plot showed the theoretical and planned time of Train 701 at Waipara as approximately 1808 hours, i.e. five minutes before the call was made. The actual time of Train 701 through Waipara was approximately 1755 hours, i.e. 18 minutes before the call was made.
- 1.19 The LE replied "I'm clear of Sefton, just dropped a hostess off there". At this stage the TCO became aware of the overrun, and Train 701 was stopped.
- 1.20 The LE stopped the train at the Sefton IB at approximately 38 km. Track Warrant 18 was then issued from Waipara to Belfast enabling Train 701 to proceed. (The No. 2 Belfast Shunt had cleared the Belfast - Sefton IB section and Track Warrant 12 had been cancelled at 1500 hours.) The LE asked Train Control whether he was to continue on Train 701 and was told, "yes". He then took Train 701 into Christchurch.
- 1.21 The authority for the LE to remain on Train 701 and complete the journey to Christchurch was given by the Network Control Manager on duty in Wellington.

Personnel

- 1.22 The LE joined New Zealand Railways as a Locomotive Trainee in 1980, and was appointed LE (Grade 2) in 1987 and LE (Grade 1) in 1993. He had spent 14 years based at Kaikoura, the last three years including the working of passenger trains. He was appropriately certified for the duties being undertaken.
- 1.23 The LE had some days off prior to commencing a shift pattern on Wednesday, 3 January at 2330 hours. From then to the day of the incident his shifts were:

3 - 4 January	2330 hours to 0810 hours
4 - 5 January	2330 hours to 0810 hours
5 - 6 January	2330 hours to 0810 hours

Sunday, 7 January was a rostered day off before he commenced his shift at 1520 hours Monday, 8 January on Train 701.

- 1.24 During the weekend prior to the incident the LE was on call for volunteer ambulance service but was not called out. His sleep and recreational patterns were normal prior to the day of the incident. He recalled feeling tired on the Saturday and over the weekend, which he spent moving furniture, but felt better and fit for duty when he rose at 0700 hours on Monday, 8 January.
- 1.25 The LE was not taking any medication and considered that he was not under any particular personal stress at the time of the incident.
- 1.26 The LE could not explain why he had not stopped at his track warrant limit to obtain a new track warrant before proceeding but considered three factors may have contributed. These were:
- His understanding that there were no opposing trains (as he was to crew the next northbound train) reducing his alertness.
 - The call from the Train Manager just prior to Waipara.
 - The fact that to his recollection, all of his previous track warrants on Train 701 to Christchurch over the Christmas period were from Kaikoura to Belfast.

A roster check revealed the LE had crewed Train 701 on five occasions during December, three of which were to destinations just south of Kaikoura (Oaro and Domett). The remaining two trips involved taking Train 701 from Kaikoura to Christchurch on a single track warrant newly issued at Kaikoura and terminating at Belfast.

- 1.27 It was normal for TRL to carry less freight traffic over the Christmas holiday period. This was reflected at the time of the incident by the fact that the Kaikoura LEs were still operating on the Christmas supplementary roster due to the cancellation of some scheduled trains. In addition, Monday was traditionally a light traffic day compared with Tuesday to Friday, due to the lack of freight loading activity over the weekend. As a result of these factors when Track Warrant 11 was issued for Train 701 at 1329 hours on 8 January the Train Control diagram indicated a clear path from Vernon to Belfast with no opposing trains and no preceding trains limiting the track warrant length available (by contrast the Train Control diagram for Wednesday 10 January, showed two trains opposing Train 701 and a late-running freight train preceding Train 701 necessitating the issue of seven separate track warrants to optimise the progress of Train 701 from Vernon to Belfast).
- 1.28 Prior to issuing Track Warrant 11, the TCO on duty had been in discussion with Middleton Yard and was aware that No. 2 Belfast shunt was going to operate to Sefton that day and would conflict with Train 701's maximum track warrant limits. Therefore he elected to limit Track Warrant 11 to Waipara.

2. Analysis

- 2.1 There was nothing to indicate that circumstances prior to the LE commencing his shift may have influenced his action in passing Waipara without authorisation. This focused attention on the particular circumstances on the day in question, which may have contributed to the irregularity.

2.2 An analysis of the number of times the LE concerned had taken Train 701 south of Kaikoura in the three months preceding the incident, and the track warrants which applied, showed:

- The LE had taken Train 701 south of Kaikoura 14 times in three months.
- Four of these were short trips from Kaikoura terminating between Oaro and Domett on Train 701 with the shift completed on freight trains. In three cases the LE had joined Train 701 with an open track warrant and in one case a new track warrant was required.
- Two were long trips commencing at or near Picton and terminating at Oaro and Ferniehurst, both of which required the issue of a new track warrant at Kaikoura.
- Of the remaining eight:
 - Two involved open track warrants at Kaikoura valid to Belfast.
 - Three included the issue of a new and long track warrant at Kaikoura valid to Belfast.
 - One required new track warrants at Kaikoura and Tormore.
 - One required new track warrants at Kaikoura, Oaro and Rangiora.
 - One required new track warrants at Kaikoura, Spotswood, Tormore and Rangiora.
 - None involved a track warrant terminating at Waipara.
 - All long track warrants south of Kaikoura were to Belfast (36% of all trips on Train 701).

Although the procedures for issuing track warrants are identical for freight trains and passenger trains the analysis was limited to Train 701 in recognition of its particular importance as the only scheduled southbound passenger service crewed by Kaikoura based LEs. Because of this it formed, from the LE's perspective, a distinctive subset of total roster duties as indicated by the LE's recollections (refer paragraph 1.26).

2.3 A track warrant may terminate at any locality to suit operational demand and the decision to terminate Track Warrant 11 at Waipara was justified under the rules applying. However for the LE concerned Waipara had not been a track warrant limit when crewing Train 701 for at least three months, and it is highly likely that this was a factor in the overrun which occurred. Unless such variations in track warrant limits are coupled with safe-guards to reinforce them to the LE concerned, potential exists for the LE to ignore the short limit due to force of habit.

2.4 Notwithstanding the manner of handover of Train 701 at Kaikoura there appears little doubt that the LE was well aware of the track warrant limits prior to departure by his:

- Telephoning Train Control (not a mandatory requirement);
- Radioing the LE to be relieved and discussing handover;
- Reading the track warrant after boarding Train 701 and before departing Kaikoura.

2.5 After leaving Kaikoura at 1605 hours the LE's only call to Train Control, before the overrun was discovered, was at Spotswood (as required by Track Warrant 11) at 1706 hours. The LE's message to Train Control at this time was "clear of Spotswood" which was acknowledged. The LE was not required to reinforce his understanding of the limits of his track warrant.

2.6 When the TCO called the LE at 1747 hours, once again it was only for location details and the LE was not required to reinforce his understanding of the limits of the track warrant. The only information given by the LE was that he was clear of Spye and almost at Omih.

2.7 At 1813 hours, when the call from Train Control to Train 701 enabled the irregularity to be discovered, Train 701 had been travelling approximately 18 minutes, including the Sefton stop, since passing through Waipara and had covered approximately 24 km in that time.

- 2.8 When the irregularity was discovered, the LE had covered approximately 152 km since leaving Kaikoura, two hours eight minutes earlier, without a need to reinforce the details of the track warrant he had “inherited” at Kaikoura. It is considered that this, in conjunction with the fact that all long warrants issued to him on Train 701 for travel south of Kaikoura for the previous three months terminated at Belfast, probably contributed to the LE’s action in overrunning his track warrant limit at Waipara.
- 2.9 In the event the next scheduled northbound train on that day was a freight train to be crewed by the LE of Train 701 after his arrival in Christchurch, and no opposing movements were scheduled between Belfast and Waipara after No. 2 Belfast Shunt had cleared the section at 1500 hours. However this did not preclude the possibility of a conflict with track work or a Hi-rail vehicle movement which could have been authorised south of Waipara.
- 2.10 TRL’s failure to relieve the LE once the irregularity was discovered conflicted with its stated policy confirmed during the investigation of a TWC irregularity involving Train 701 which occurred at Claverly-Oaro on 31 October 1994 (Railway Occurrence Report 94-125). The following safety action was recorded with this report.
- 4.2 During the course of the investigation NZRL advised that the appropriateness of the relief arrangements following the incident had been reviewed and operating staff had been made aware of the need to critically assess all immediately available sources of information and to immediately relieve all staff in cases where their possible involvement in serious operating irregularities was indicated.

In the case in question at Waipara there was no doubt the LE was involved in a serious operating irregularity.

3. Findings

- 3.1 Train 701 was being operated normally prior to the incident.
- 3.2 The LE was appropriately certified for the duties being carried out.
- 3.3 Train 701’s overrun of its track warrant limits by approximately 24 km did not conflict with other train movements or track obstructions.
- 3.4 The LE failed to recognise the limits of his authority to proceed despite the fact that he was aware of his location and had been made aware that the limit of the track warrant had been set at Waipara.
- 3.5 The lack of opportunity for the LE’s awareness of the track warrant limits to be reinforced with Train Control probably contributed to this failure.
- 3.6 The LE’s knowledge that he would be crewing the next northbound train may have affected his level of attention to the track warrant limits.
- 3.7 The LE may have been distracted by the request from the Train Manager just prior to Waipara to make an unscheduled stop at Sefton.
- 3.8 The pro-active use of the Train Control diagram by the TCO allowed the overrun to be discovered although the timing of Train 701 through Waipara compared with its plotted path meant a considerable overrun occurred.

- 3.9 The LE should have been relieved of duty and a replacement driver arranged to complete Train 701's journey from Sefton IB to Christchurch.

4. Safety Actions

- 4.1 TRL took immediate appropriate follow-up action to reinforce to the Network Control Manager concerned the relief arrangements which must be made following such an incident.
- 4.2 The application of the TWC system to the Main North Line had received detailed attention over the past two years. This included a safety audit carried out by the Land Transport Safety Authority (LTSA) in July 1995 entitled "Special Safety Audit Regarding Kaikoura New Zealand Rail Limited Employees Report to Mr Anderton". Included in this report was the identification of the danger of collision associated with an LE entering territory which could be occupied by another train. The report emphasised the principle that "no opportunity should be lost to establish the whereabouts of the train and the state of mind of its LE" and suggested the following opportunities available to achieve this.
- a. LE's could be required to report clear of every station so that the Traffic Controller can plot progress and check for slips of the tongue or breaches of a warrant.
 - b. Lengthy through warrants could be restricted, as has been done in another case known to the Auditors. Not only do such warrants lead to loss of interaction between LE and Controller, but by regular use they create an expectation that the pattern will be the same today as it was yesterday and the day before. This creates high probability that the eventual "shorter" warrant will be ignored through force of habit.
 - c. Train Controllers could, as a matter of routine, use the train graph pro-actively, by regularly challenging LE's who have not called in (see proposal above) within ± 2 minutes, say, of the predicted station arrival times.

TRL has advised that to put the above in proper perspective it should be recorded that the auditor's ultimate finding was that the track warrant system was "not judged to be unsafe but is heavily dependent on human input". TRL took note of the safety audit report as part of their ongoing review system for operating procedures and has been investigating several options and implementing measures found appropriate.

- 4.3 LTSA recently commissioned GHD-Transmark to carry out a Risk Assessment exercise of TWC. In their report the authors stated they were satisfied TWC is not an unsafe method of working, but remains capable of being reinforced by certain low cost initiatives which would provide 'stimuli' to LEs and enhance alertness and awareness.
- 4.4 On 12 April 1996, TRL advised they had approved and were implementing the following specific actions which are relevant to the Waipara incident but were not in force at the time.
1. A procedure to be introduced whereby Train Control Officers will be required to specify a check call on all warrants where the expected running time from issue of the warrant is over two hours long. The call is to be specified for a recognised track warrant location in the range 25 to 30 kilometres from the terminating limit of the warrant held.

The purpose of this is to provide a trigger to remind the LE of the limits of his warrant as he nears that point. It is expected that the call to Train Control would advise he is at the call location and his warrant takes him to the location specified as the terminating limit. Train Control's involvement would be to

acknowledge the call and check the limits drawn on the diagram to confirm he agrees with those being called and where practicable to call the LE if the call is not received in a reasonable time.

2. The procedure for ALL clause 10¹ calls on a warrant to Train Control will be modified so that in addition to reporting his location, as is the present requirement, LE's will also be required to state the limits to which the current warrant applies. This will help to form the habit of referring to the warrant.
3. A recommendation will be issued to LE's that they get into the habit of always checking their warrant as a matter of course as they approach a warrant station to check they have limits for the next section. A reminder about the procedures for handing over track warrant information at crew change will also be made.

In addition TRL advised they were considering the application of new technology as follows:

Investigations into the use of in cab displays of a track warrant are being considered given the current radio system and the developments overseas. Initial design work has proved to date, that our Automatic Train Crewing radio system is capable of data transmission. Local trials have confirmed this but this will need to be validated over the whole network. There is considerable design and development work to be undertaken before a prototype could be evaluated in the field. This development work is on going and continuing.

5. Safety Recommendations

- 5.1 As a result of the investigation of this incident it was recommended to the Managing Director of TRL on 29 January 1996 that he:

Introduce procedures governing the issue of track warrants to limit the length over which a track warrant is issued. (003/96)

Introduce procedures governing the issue of track warrants to require a Locomotive Engineer taking control of the train after a crew change to have to "accept" an open track warrant with the same "double check" procedures associated with the issue of new track warrants. (004/96)

- 5.2 TRL responded to the safety recommendations on 23 February 1996 and 12 April 1996 advising of action carried out to date (Section 4.4) which met the intent of recommendation 003/96, and 004/96 as related to long open track warrants, and advising they proposed a review of options to achieve the intent of recommendation 004/96 for crew changes involving track warrants with only short distances to be run.

¹ "clause 10 calls" refers to the localities, nominated by the TCO and written onto the track warrant by the LE at the time of issue, at which the LE is required to call Train Control and thus enable Train Control to keep check of the train's progress.

On 30 July 1996 TRL further advised, inter alia:

We are however considering the situation in regard to TWC areas, to see if in fact where we know that a crew change is going to take place and both the Locomotive Engineers will not have a face to face changeover, that we restrict the issue of the track warrant only up to and including the location where the changeover will take place. This will then require the outgoing Locomotive Engineer to obtain his necessary track warrant for continuing the journey.

23 October 1996

M F Dunphy
Chief Commissioner

