



NO 94-129

TRAIN 702

COLLISION WITH MOTOR VEHICLE

NEAR OMIHI

23 DECEMBER 1994

ABSTRACT

On 23 December 1994, at 1745 hours Train 702, the Christchurch to Picton "Lynx Express" collided with a car on a level crossing over State Highway 1 just north of Omihiri. A passenger in the car was killed and the driver and other passenger received serious injuries in the accident. The effectiveness of the road signs preceding the crossing was the only safety issue identified. Safety recommendations were issued in respect of the signage at railway level crossings.

TRANSPORT ACCIDENT INVESTIGATION COMMISSION

RAIL ACCIDENT REPORT NO. 94-129

Train Type and Number: Christchurch to Picton Express
Passenger, 702

Date and Time: 23 December 1994, 1745 hours NZDT

Location: 1 km west of Omihi, at 73.91 km Main
North Line

Type of Occurrence: Collision with motor vehicle

Persons on Board: Crew: 4
Passengers: 24

Injuries: Crew: Nil
Passengers: Nil

Others: # 1 fatal
2 serious

Nature of Damage: Car: destroyed
Crossing alarm control box: substantial

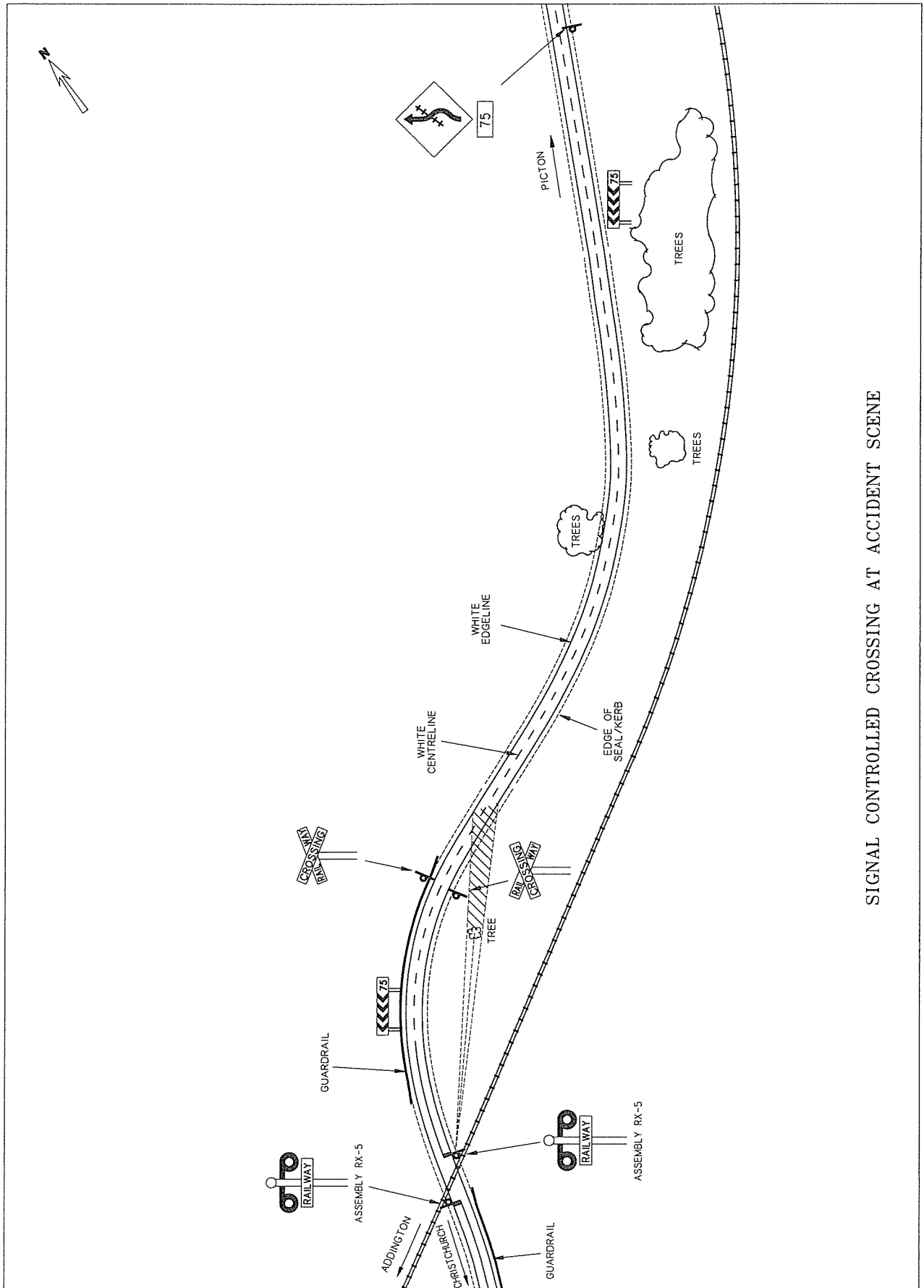
Information Sources: Transport Accident Investigation
Commission field investigation

Investigator in Charge: R Chippindale

Occupants of motor vehicle

1. NARRATIVE

- 1.1 On 23 December 1994 at 1745 hours the Christchurch to Picton “Lynx” passenger service (train 702) operated by New Zealand Rail Limited was approaching the level crossing over State Highway 1 one kilometre north of Omihi from the south at a recorded speed of 92 to 93 km/h.
- 1.2 The locomotive’s headlight was illuminated and the locomotive was hauling three passenger cars and a buffet car, short hood leading.
- 1.3 The locomotive engineer (LE) was sitting in his normal position on the right hand side of the cab and was unaccompanied. In addition to the LE the train staff comprised a Train Manager and two Assistants.
- 1.4 As the train approached the level crossing the LE sounded the train’s horn in the normal manner then saw a southbound Honda Civic car slow and then stop as it reached the “stop” lines for the crossing. As he was still watching he saw a blue Ford Falcon car collide with the rear of the Honda and shunt it onto the crossing. When he realised that it was not going to clear the path of the train the LE sounded the locomotive’s horn and applied emergency braking but was unable to avoid colliding with the Honda car.
- 1.5 As the train was stopping the LE notified Train Control of the accident and requested they arrange for emergency services to respond to the mishap. As soon as the train came to a stop the LE made his way back to the crossing to see if he could assist with rendering first aid to the casualties. In the event the other train staff assisted by members of the public with nursing experience were doing all that could be done with the first aid boxes and blankets from the train.
- 1.6 The emergency services started to arrive some 20 minutes after the accident occurred.
- 1.7 The various road signs (See Figure 1) which were intended to draw the Falcon driver’s attention to the existence of a railway crossing the highway were not noticed by him. As a consequence he was puzzled by the action of the driver of the car in front in slowing down on the highway. While he was adjusting to the apparently erratic behaviour of the driver of the Honda his wife, who was sitting beside him, drew his attention to the crossing alarm lights operating and he braked heavily. He was unable to prevent his car colliding with the rear of the Honda which the Falcon shunted onto the track.
- 1.8 The driver and passenger in the car following the Falcon also failed to realise they were approaching a railway crossing and when they saw the dust, created by the collision between the car and the locomotive, believed it was the result of the car driving on an unsealed side road. The driver of this car anticipated that the road would parallel the rail line rather than cross it.
- 1.9 After the Falcon collided with the Honda its driver sat for a moment ruing the fact that a “minor” accident had spoiled the start of his holiday. He expected the occupants of the shunted car to vacate their vehicle when it appeared they could not drive clear. His concern mounted when he saw them moving within the car but not succeeding in their efforts to vacate it. As a result he started to leave his car and contemplated attempting to push the Honda clear. He abandoned this idea when it became apparent that the locomotive would collide with the car before he could provide any worthwhile assistance.



SIGNAL CONTROLLED CROSSING AT ACCIDENT SCENE

Figure 1
Signal Controlled Crossing at Accident Site

- 1.10 The locomotive's collision with the car drove it into the crossing alarm control box. In the process the car's roof separated virtually intact, the rear of the right side of the car separated at the driver's door pillar and became aligned with the left side of the car. The locomotive coupling's impact on the driver's door crumpled the door and the driver's seat but the occupied rear seat area was not reduced significantly.
- 1.11 The occupants of the Honda were the driver in the right front seat a passenger in the left seat, beside him and another passenger seated on the right of the rear bench seat.
- 1.12 The rear seat occupant was killed in the accident and the other two occupants received serious injuries.
- 1.13 The occupants were all overseas nationals the driver having been a professional driver and mechanic in his native country. The Honda car was owned by one of the occupants.
- 1.14 The deeply corroded and exfoliated condition of the steel body work of the Honda compromised its strength as was evidenced by the nature of the damage resulting from the locomotive's impact. The car had a current Warrant of Fitness.
- 1.15 It is possible that the impact from the following Falcon car on the Honda's rear may have jammed the Honda's doors. The surviving passenger who was interviewed indicated the occupants had been dazed by the impact but were struggling to undo their seat belts and vacate the car. After the impact the driver tried to drive the vehicle forward but failed. He then attempted to undo his seat belt to leave the car. However the driver was found to be wearing his seat belt when the rescuers arrived to extricate him from the vehicle and none of the occupants were able to make their way out of the car prior to the locomotive colliding with it.
- 1.16 The approach to the level crossing from the north is through a "cup hook" configuration of roadway. The straight approach has trees to the left which camouflage the rail track on the left side of the road. At the end of the straight is a standard PW 13, yellow, road sign (Illustration 1) which depicts, accurately, the alignment of the road and shows a rail crossing ahead. The curve of the road is dominant on the sign and the indication of the rail track not readily apparent to a driver approaching the curve at normal driving speed. The drivers interviewed stated that they saw it only as advice of a bend in the road. Transit New Zealand confirmed the primary purpose of the sign is to provide warning of a road alignment requiring a reduction in speed.
- 1.17 The PW 13 sign precedes the crossing by 500 m and is followed 183 m later by a further 75 km/hr speed advisory alongside black and silver chevrons in a horizontal sign for the right hand curve of the "cup hook". Further on are two black on white St Andrews railway crossing signs at 116.5 m before the crossing. Next is a further horizontal 75 km/hr speed advisory for the left hand bend which completes the cup hook. Finally the double white limit line alongside the mast for the flashing lights and bells is situated 2.3 m back from the nearest rail of the railway track. (See Figure 1)
- 1.18 The above layout is given in detail as it does not compare favourably with the proposed code for Road Signs and Markings for Railway Level Crossings published in a discussion document by the Land Transport Safety Authority and Transit New Zealand in February 1994. While that document is no more than a discussion document it highlights inter alia the human factors which are involved in the perception of a level crossing and the signage based on international experience which is proposed to take such factors into account.

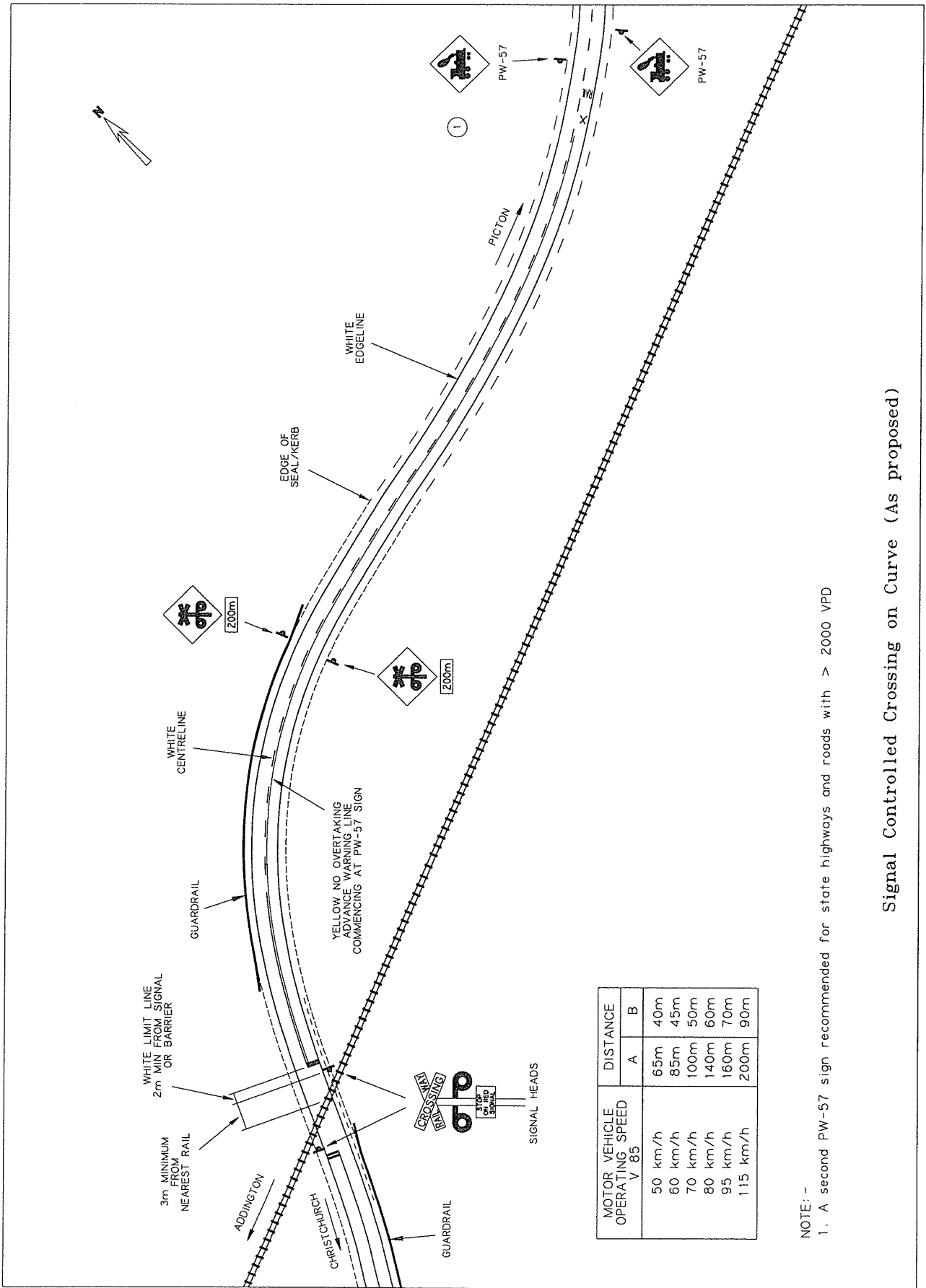


Illustration 1

1.19 Of relevance to this situation are:

- the existence of the curved approach to the crossing at the scene is within the safe stopping sight distance (about 175 m at 100 km/hr). The curve continues to within about 60 m of the crossing. The safe stopping sight distance is the distance taken to sight the crossing warning light and stop before reaching the intersection at the maximum speed permitted on the road. (Although the approach to this crossing was subject to 75 km/h advisory speed signing the motorists interviewed indicated that on a dry road they found it practicable to maintain 100 km/h).
- the absence of a “no overtaking line” in the centre of the road on the approach to the crossing. The new code proposes a no overtaking centre line commencing 200 m from the crossing stop line.
- the absence of painted information on the road surface. The word “rail” and a large white “X” are proposed in the approach lanes.

- the alignment of the white “Stop” limit lines on the road, with the mast for the bells and flashing lights. LTSA and Transit recommend these lines precede the crossing alarms by a minimum of 2 m.
 - the siting of the St Andrews railway crossing notices well within the safe stopping sight distance for 100 km/hr and thus closer to the crossing than proposed. (ie 117 m versus the 175 m which is proposed).
 - the use of a combined road curve and railway track sign as the first indication of the level crossing. A separate railway crossing ahead sign in the form of a silhouette of a steam locomotive on a yellow background is proposed.
- 1.20 There are other proposals in the discussion document for a new type of warning sign depicting a steam locomotive in black on a yellow background, a rearrangement of the existing signage to have the St Andrew’s Cross actually on the warning light mast together with a sign “Stop on Red Signal” and a black on yellow sign with a silhouette of the St Andrew’s Cross combined with a stylised depiction of the crossing alarm lights to be positioned in advance of the warning lights. (See Figure 2) These are only proposals at present but point to the recognition of shortcomings in the present signage.
- 1.21 It was clear from the evidence of drivers proceeding south at the time of the accident that the traffic flow was light, the driver of the Falcon had not been driving in a manner which drew attention to himself and that the signage leading to the railway crossing was not achieving its intended purpose.
- 1.22 At a crossing with flashing lights and bells as crossing alarms drivers depend on the operation of these devices rather than the visual detection of an approaching train. Prior to this however they must be aware that they are approaching a level crossing of a rail track. Where the approach is around a curve particularly one which reverses direction and requires advisory signs to drivers to regulate their speed, the driver’s attention is focused on negotiating the curve and maintaining a safe distance from other vehicles.
- 1.23 The road in question is a State Highway and the main north/south road link in South Island. It carries an annual average daily traffic flow in excess of 1000 vehicles. It is important therefore that motorists’ attention be drawn to the existence of the crossing sufficiently far in advance to allow them to absorb the information on the warning signals and react to them in time to stop clear of the crossing irrespective of any distractions which occur in the course of the other normal driving vigilance.
- 1.24 In this case the driver of the Falcon, not being aware of the railway crossing ahead was perplexed by the behaviour of the driver of the Honda in front of him. The other road conditions did not require the Honda to be slowing to a stop and the driver’s behaviour irritated the driver of the Falcon. The driver of the Falcon was assessing the practicalities of passing the vehicle in front when his wife alerted him to the activated crossing alarms. The Road Code does however require that “when..... following another vehicle you must drive so that you can stop short of the vehicle in front”.
- 1.25 It could not be determined whether the driver of the Honda was slowing for the crossing before the warning lights activated but this is a possibility. Certainly the lights were operating before the Falcon collided with the Honda.



NOTE: -
 1. A second PW-57 sign recommended for state highways and roads with > 2000 VPD

Signal Controlled Crossing on Curve (As proposed)

Figure 2
 Signal Controlled Crossing on Curve (as proposed)

- 1.26 During the on-site investigation it was noticed that a small bushy tree reduced the effectiveness of the flashing lights by reducing the arc through which a motorist could observe them when approaching from the north by some 4 degrees or approximately 7% of the available viewing distance. As soon as the rail operator was aware of the obstruction created by the tree it was removed.
- 1.27 The sky was clear and the road dry at the time of the accident. The sun was casting clear shadows but was behind the southbound motorists in the latter stage of their approach to the crossing lights

2. FINDINGS

- 2.1 The train was being operated correctly.
- 2.2 The driver of the Honda car acted correctly during his approach to the level crossing.
- 2.3 The driver of the Falcon had not appreciated that he was driving toward a railway level crossing prior to his passenger's advice that the warning lights were operating.
- 2.4 The marking of the roadway and attendant signs was in accord with present practice
- 2.5 The marking of the roadway and attendant signs was not adequate to advise motorists that they were approaching a railway crossing.
- 2.6 The standard of road marking and signage at this crossing did not meet the applicable criteria of the proposed code for such information to drivers.
- 2.7 The weather and sun conditions were not a factor in this accident.
- 2.8 The structural condition of the Honda car may have been a factor in the nature of the injuries sustained by its occupants in the collision with the train.
- 2.9 Although the doors of the car may have been jammed prior to the collision with the train at least one of the occupants did not release his seat belt prior to that collision.
- 2.10 The existence of a small bushy tree reduced the effectiveness of the flashing warning lights on the level crossing for motorists approaching from the north.

3. SAFETY RECOMMENDATIONS

- 3.1 As a result of the investigation into this accident it was recommended to the General Manager of Transit New Zealand that:

Until the proposed "Code for Road Signs and Markings for Level Crossings" is ratified, he arrange for the presence of the railway level crossing 1 km north of Omihi be drawn to the attention of motorists by enhanced signage and/or roadmarking. (026/95)

3.2 The General Manager of Transit New Zealand responded that:

“Upgrading of signage (was) undertaken in 1989/90. Subsequent to this, high intensity “railway crossing” signs (PW14) were erected on 10 January 1995.

Changes to be Implemented

“I have approved the following to enhance the railway level crossing conspicuity:

- (a) review with NZ Rail the alignment of the flashing lights and adjust as necessary;*
- (b) install red backing boards to the “Railway Crossing” signs (PW-14) and adjust position of the northbound direction to maximise driver awareness; and*
- (c) paint the message “Rail X” on the road on either side of the crossing point, again ensuring adequate prior warning for drivers.*

It is expected that this work will be completed by the end of August 1995.

Other points raised in your recommendation have been carefully considered and it is my intention to take up with the Land Transport Safety Authority progress on finalising the proposed “Code for Road Signs and Markings for Railway Level Crossings”. I am reluctant to introduce changes relating to this new code on a one off basis as this may prove confusing for drivers who are only familiar with current practice. When the new code is introduced it will need to be implemented widely and be subject to publicity so that awareness of the changes is well understood.”

3.3 As a result of the investigation into this accident it was recommended to the Director of Land Transport Safety that:

He facilitate the ratification by the appropriate parties of the proposed new code for Road Signs and Markings for Railway Level Crossings and their agreement in regard to implementation. (029/95)

3.4 The Director of Land Transport Safety responded that:

The Land Transport Safety Authority is currently seeking the agreement of the appropriate parties to the proposed new code for Road Signs and Markings for Railway Level Crossings and their agreement to proposed implementation and cost sharing.

17 October 1995

M F Dunphy
Chief Commissioner