Report RO-2013-105: *Capital Connection* passenger train,
departed Waikanae Station with mobility hoist deployed, 10 June 2013

The Transport Accident Investigation Commission is an independent Crown entity established to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future. Accordingly it is inappropriate that reports should be used to assign fault or blame or determine liability, since neither the investigation nor the reporting process has been undertaken for that purpose.

The Commission may make recommendations to improve transport safety. The cost of implementing any recommendation must always be balanced against its benefits. Such analysis is a matter for the regulator and the industry.

# Final Report

## Rail inquiry RO-2013-105
## Capital Connection passenger train, departed Waikanae Station with mobility hoist deployed, 10 June 2013

Approved for publication: April 2015

# Transport Accident Investigation Commission

## About the Transport Accident Investigation Commission

The Transport Accident Investigation Commission (Commission) is a standing commission of inquiry and an independent Crown entity responsible for inquiring into maritime, aviation and rail accidents and incidents for New Zealand, and co-ordinating and co-operating with other accident investigation organisations overseas. The principal purpose of its inquiries is to determine the circumstances and causes of the occurrences with a view to avoiding similar occurrences in the future. Its purpose is not to ascribe blame to any person or agency or to pursue (or to assist an agency to pursue) criminal, civil or regulatory action against a person or agency. The Commission carries out its purpose by informing members of the transport sector and the public, both domestically and internationally, of the lessons that can be learnt from transport accidents and incidents.

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| Commissioner | Jane Meares |

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# Important notes

## Nature of the final report

This final report has not been prepared for the purpose of supporting any criminal, civil or regulatory action against any person or agency. The Transport Accident Investigation Commission Act 1990 makes this final report inadmissible as evidence in any proceedings with the exception of a Coroner's inquest.

## Ownership of report



## Citations and referencing

Information derived from interviews during the Commission's inquiry into the occurrence is not cited in this final report. Documents that would normally be accessible to industry participants only and not discoverable under the Official Information Act 1980 have been referenced as footnotes only. Other documents referred to during the Commission's inquiry that are publicly available are cited.

## Photographs, diagrams, pictures

Unless otherwise specified, photographs, diagrams and pictures included in this final report are provided by, and owned by, the Commission.


Source: mapsof.net

Location of occurrence

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## Abbreviations

| | |
|---|---|
| Commission | Transport Accident Investigation Commission |
| the train | the *Capital Connection* passenger train travelling from Palmerston North to Wellington |

## Glossary

| | |
|---|---|
| event recorder | a device that records data about the operation of locomotive controls and performance in response to those controls |
| train controller | an operator in KiwiRail's national train control centre, Wellington, authorising train movements and track occupations on a defined section of track |

## Data summary

**Vehicle particulars**

| | |
|---|---|
| Train type and number: | southbound *Capital Connection* passenger Train 1203 |
| Operator: | KiwiRail Scenic |

| | |
|---|---|
| **Date and time** | 10 June 2013 at about 0730[1] |
| **Location** | Waikanae |
| **Passengers on board** | 297 |
| **Persons involved** | five |
| **Injuries** | nil |
| **Damage** | nil |

[1] Times in this report are New Zealand Standard Times (universal co-ordinated time plus 12 hours) and are expressed in the 24-hour mode.

# 1. Executive summary

1.1. At 0730 on Monday 10 June 2013, the KiwiRail Scenic[2]-operated passenger train the *Capital Connection* was en route from Palmerston North to Wellington and had stopped at Waikanae Station to exchange passengers. The train was fitted with a mobility hoist in the rear-most luggage van for boarding and alighting passengers in wheelchairs.

1.2. The train manager was monitoring the passenger exchange from the station platform adjacent to the leading passenger car near the front of the train. When he thought that the passenger exchange was complete, he re-entered the leading passenger car and closed all the passenger car doors from the local train door operating panel. After receiving an all-doors-closed green light, the train manager authorised the train driver to depart.

1.3. Meanwhile, at the rear of the train the train attendant was operating the mobility hoist to alight a passenger in a wheelchair and their support person. The train attendant deployed the mobility hoist with the two passengers onto the station platform, at which time the train began to move. The train attendant pressed the train emergency stop button, which stopped the train, it having travelled about 1.7 metres. No-one was injured and no damage resulted.

1.4. The Transport Accident Investigation Commission (Commission) found that the incident occurred because:

- the operation of the mobility hoist had not been written into the departure procedure being followed by the train manager
- there was no effective means for the train attendant who was operating the mobility hoist to communicate with the train manager
- the status of the luggage van doors was not interlocked with the train door status and control system, which allowed the train manager to receive a green all-doors-closed signal in spite of the luggage van door being open and the mobility hoist deployed onto the platform.

1.5. The Commission has not made recommendations because KiwiRail has taken the appropriate safety action to address these three safety issues.

1.6. The key safety lessons arising from this inquiry were:

- operational procedures must cover an entire operation if accidents and incidents are to be avoided
- good communication among all persons involved in safety-critical operations is essential if accidents and incidents are to be avoided
- technical solutions to mitigate human error, such as train door interlocking systems, are only effective if they protect all parts of the system.

[2] A division of KiwiRail's passenger group responsible for the operation of long-distance passenger services.

## 2. Conduct of the inquiry

2.1. The incident happened on Monday 10 June 2013 but was not reported to the NZ Transport Agency. The Commission learned of the incident through the media and opened an inquiry under section 13(1) of the Transport Accident Investigation Commission Act 1990 to determine the circumstances and causes of the incident, and appointed an investigator in charge.

2.2. An investigator gathered site information and obtained a witness statement when he travelled to Waikanae Station later that day.

2.3. On Thursday 13 June 2013 the investigator tested the mobility hoist fitted to the *Capital Connection* luggage van.

2.4. On Friday 14 June 2013 an illustrative reconstruction of the incident was carried out at Waikanae to observe the arrival and departure of the *Capital Connection* and the deployment of the mobility hoist from the luggage van.

2.5. The investigator held separate discussions with the train manager, the train assistant and KiwiRail's passenger carriage depot manager. He also met with the wheelchair-bound person and her support person.

2.6. The investigator reviewed the following records and recordings:

- KiwiRail policies and procedures
- the *Capital Connection's* event recorder[3] download
- Waikanae Station security camera recordings
- Waikanae Station signal data log download
- the train control desk voice recordings.

These records and recordings have been used to determine the sequence of events at Waikanae Station.

2.7. KiwiRail was unable to provide the Commission with complete training records for either the train manager or the person operating the mobility hoist.

2.8. On 25 February 2015 the Commission approved the draft final report for distribution to interested persons for comment.

2.9. Written submissions were received from KiwiRail, the NZ Transport Agency and the train manager. These submissions were considered and changes made to the draft final report.

2.10. The Commission approved the final report for publication on 23 April 2015.

[3] A device that records data about the operation of the locomotive controls and performance in response to those controls.

# 3. Factual information

## 3.1. Narrative

3.1.1. On Monday 10 June 2013 a train known as the *Capital Connection* was the KiwiRail Scenic passenger train travelling from Palmerston North to Wellington (the train). The train was 169 metres long and consisted of a locomotive hauling seven S-class passenger cars and a combined luggage/generator van (the luggage van) at the rear.

3.1.2. The luggage van had been modified with a mobility hoist on each side to facilitate boarding and disembarking passengers in wheelchairs (refer to Figure 1). The adjoining last passenger car was the "servery" car and it was fitted with securing arrangements for two wheelchairs.

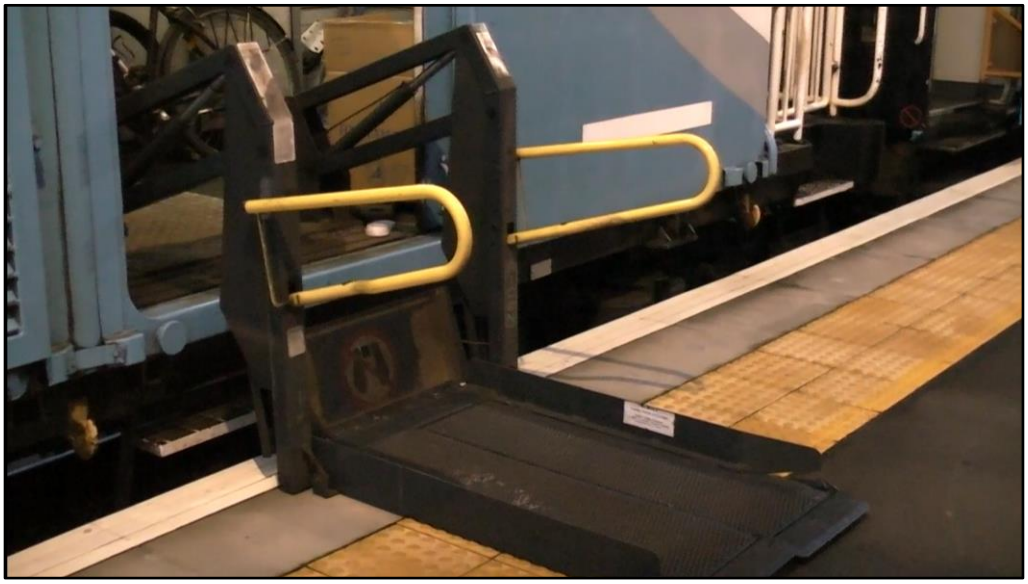

Figure 1
Mobility hoist deployed from the luggage van at Waikanae Station

3.1.3. The train departed Palmerston North with 157 passengers and a crew of two, the driver and a train manager. The train manager used the mobility hoist to board three wheelchair-bound passengers at Palmerston North. The *Capital Connection* made scheduled passenger stops at Shannon and Levin Stations, where the crew was joined by a train attendant.

3.1.4. The train attendant's duties included assisting with ticket sales, luggage handling, operating the food servery and operating the mobility hoist. When he boarded the train he asked each of the wheelchair-bound passengers travelling in the servery car what their destination was.

3.1.5. The train then made a stop at Otaki Station and again at Waikanae Station, where one of the wheelchair-bound passengers was to alight. Between Otaki and Waikanae the train manager was busy checking the tickets of the 43 passengers who had boarded the train at Otaki.

3.1.6. As the train approached Waikanae, the train attendant spoke to the wheelchair-bound passenger about to leave the train, then entered the luggage van to prepare the mobility hoist.

3.1.7. The train arrived at Waikanae at 0729, where there were about 100 passengers standing on the platform[4].

3.1.8. The train manager was in the leading passenger car as the train approached Waikanae Station. After the train had stopped he unlocked (at the door control panel) all the passenger car doors, which enabled the passengers boarding the train to open the doors using the

[4] Passenger numbers were estimated from station security closed-circuit television.

buttons provided. The luggage van doors were not connected to the same door-control circuitry. They were opened and closed locally by the train crew.

3.1.9. The train manager stepped off the train to observe the boarding process. Once it looked as though everyone had boarded, he crossed to the "Request for Signal" pushbutton on the station platform. The purpose of pushing this button was to inform the train controller[5] that the southbound train was ready to depart from Waikanae. This was a special arrangement designed to reduce the time that the bells and barriers at the adjacent road level crossing were activated while passenger trains were stopped at the station platform (see Figure 2). The train had been stopped at the platform for about 40 seconds when he pressed the button.

3.1.10. The train manager then re-entered the front passenger car and closed all the passenger car doors except his door on the lead passenger car. He then looked along the platform towards the rear of the train to confirm that there were no other passengers waiting to board the train before closing his door.


Figure 2
Request for signal mechanism

3.1.11. Meanwhile, the train attendant deployed the mobility hoist with the wheelchair-bound passenger and her support person onto the station platform at 0730:03[6].

3.1.12. As the train attendant deployed the mobility hoist onto the platform, the train manager was radioing the driver and giving him "right of way" to depart. At 0730:09 the train driver moved the throttle to notch 2 and the train started to move, dragging the mobility hoist along the platform with the wheelchair and two passengers still on it.

3.1.13. Seeing the train begin to move, the train attendant raised the mobility hoist off the station platform and activated the emergency stop button located beside the hoist control holder.

[5] A person in KiwiRail's national train control centre, Wellington, authorising train movements and track occupations on a defined section of track.
[6] Time taken from the station security camera.

The train movement lasted five seconds, during which time the mobility hoist was dragged 1.72 metres along the platform (see Figures 3 and 4).

Figure 3
Witness mark from the mobility hoist on Waikanae Station platform

3.1.14. Once the train had stopped the train attendant lowered the mobility hoist back onto the platform and the two passengers were disembarked. Neither was injured during the incident and no damage occurred other than the witness mark on the station platform.

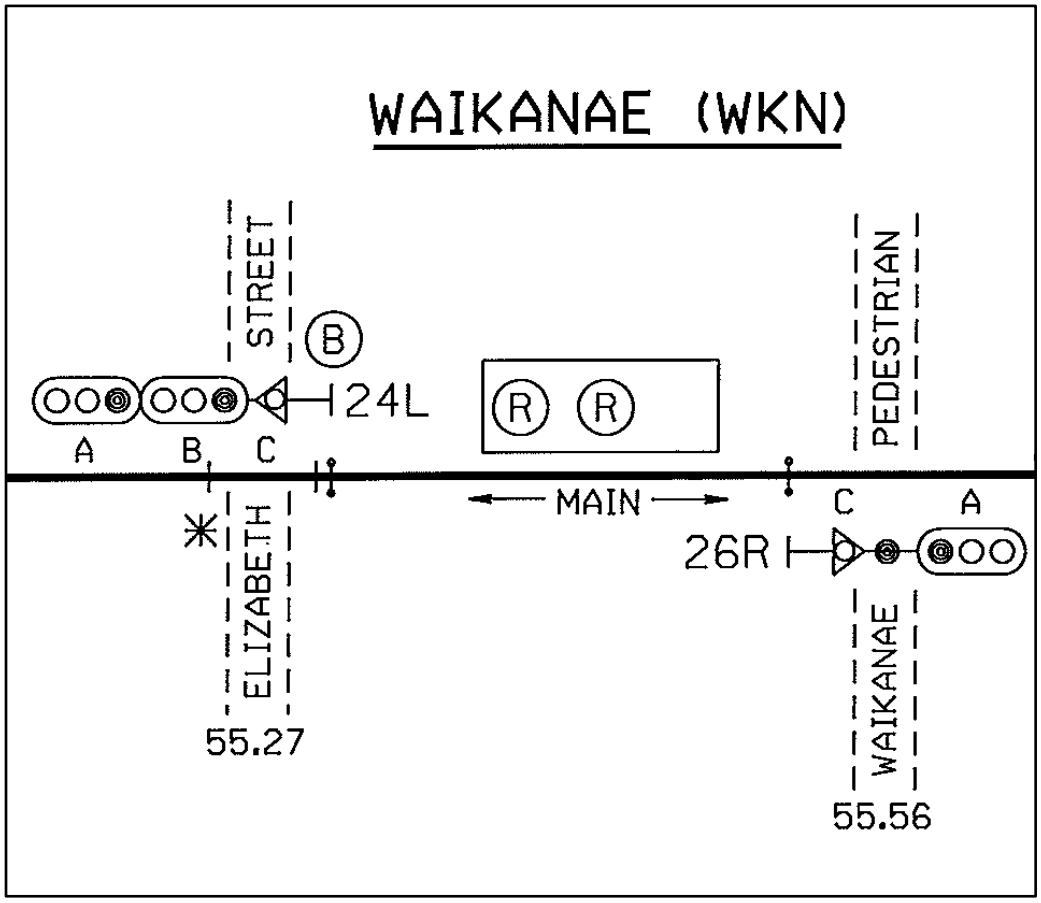


Figure 4
Waikanae Station signal layout

3.1.15. At the time of the incident KiwiRail had no documented procedures for operating the mobility hoist from the *Capital Connection's* dedicated luggage van. The instructions had been removed from the Rail Operating Code, when Section 1, Passenger Rolling Stock Restrictions, Issue 2 effective from 27 August 2012 was issued.

## 3.2. Environmental conditions

3.2.1. On the day of the incident the official time for sunrise at Waikanae was 0742, some 12 minutes after the *Capital Connection* started to move away from the station. The overhead conditions were partly cloudy.

## 3.3. Personnel

### The train manager

3.3.1. The Palmerston North-based train manager had been performing his train manager duties on the *Capital Connection* passenger train since 2000. His two most recent safety observations had been carried out on 16 February 2013 and on 21 May 2012. The assessor's summary comments from 16 February 2013 stated that "the train manager was confident in all aspects of his duties with both customers and staff".

3.3.2. He was one of three Palmerston North-based train managers who were rostered to work on the weekday *Capital Connection* passenger train. On a weekly roster the train manager's work was one of the morning southbound service, the evening northbound service or daytime platform duty at Palmerston North Station. In the week starting Monday 10 June the train manager was assigned to the southbound *Capital Connection* service, starting work at 0430.

### The train attendant

3.3.3. KiwiRail did not have a position description for the train attendant. He had a daytime job in Wellington and worked as a train attendant for the morning southbound trip and the return evening northbound trip each weekday. He understood his duties to include operating the servery car, assisting the train manager with revenue collection, loading and unloading luggage and operating the mobility hoist. He had performed these duties on the southbound *Capital Connection* from Levin to Wellington and again on the evening northbound service from Wellington to Levin, for 11 years.

3.3.4. The only training record for the train attendant that KiwiRail was able to provide to the Commission was his passenger rolling stock safety induction, dated 22 May 2002, which showed that he could:

- locate and use the emergency brakes
- locate and assist in the use of equipment for mobility-impaired passengers
- locate and demonstrate control of lighting and heating systems
- confer with the senior on-board staff member and assist with the evacuation of passengers from the train
- identify the location of the fire extinguisher and first aid kit.

# 4. Analysis

4.1. A train manager is required to ensure that all boarding and alighting passengers are clear of the train and that all doors are closed and secured before giving a "right away" clearance to the driver. The train manager did check the passenger activity on the platform, at which time there was none because the mobility hoist had not been deployed onto the platform. Having closed all the doors on the passenger cars, he received a green light indication on his panel, which meant to him that all was in order for him to give "right away" clearance for the driver to depart.

4.2. The main safety issue arising from this incident was that procedurally there was a disconnect between the operation of the mobility hoist from the luggage van at the rear of the train and the train manager's pre-departure checks near the front of the train:

- the stowing of the mobility hoist and securing of the luggage van doors did not feature in the train manager's pre-departure checks
- there was no means provided for the train attendant in the luggage van to communicate with the train manager near the front of the train
- the luggage van doors were not electronically connected to the train door status and control system.

4.3. KiwiRail did not have a procedure to cover the operation of the mobility hoist. It had had one in the past, but the instructions had been removed from the Rail Operating Code when the second issue of Section 1 (Passenger Rolling Stock Restrictions) came into effect on 27 August 2012.

4.4. The operation of the mobility hoist relied on the train manager knowing and/or remembering the stations at which any passengers in wheelchairs were to alight, then having good communication with the train attendant (in this case) to ensure that the operation was complete and the train secure before giving "right away" clearance to the driver.

4.5. In this case the train manager had operated the mobility hoist at Palmerston North to board the three wheelchair passengers, and he sold each of them tickets to their respective destinations. It was most likely that the train manager, when he gave "right away" clearance to the driver at Waikanae, had forgotten that one wheelchair passenger and her support person would be leaving the train there.

4.6. Human memory can be influenced by a number of factors, including high workload, late running, distraction and environmental conditions. Therefore it becomes important that controls are put in place to reduce the risk of human error. It would have been feasible for the train attendant, instead of the train manager, to have sold a ticket to a passenger requiring the mobility hoist, so even relying on the train manager's memory would not have ensured that they were aware of the stations at which the mobility hoist would be required.

4.7. Nor could the system rely on visually sighting whether the mobility hoist was in use, as this case demonstrated – it had only just been deployed when the train departed 71 seconds after having stopped at the station platform. The re-enactment following the incident revealed another issue. Under similar conditions it would have been difficult for the train manager to see the mobility hoist even if it had been deployed onto the platform. From the front passenger car there was about a 160-metre distance to the doorway of the luggage van. Other passengers waiting on the relatively narrow platform could obscure the train manager's line of sight. This incident occurred at dawn, about 12 minutes before sunrise. The day was overcast, and despite the station platform lighting the deployed mobility hoist was difficult to see from the forward passenger car.

4.8. This safety issue has since been resolved by KiwiRail. It has placed high-visibility reflective tape on the hand rails of the mobility hoist to improve its visibility. KiwiRail has also installed a light in the luggage van that shines out onto the platform when the luggage van doors are open.

4.9. Nevertheless, relying on the train manager to observe whether or not the mobility hoist is in use is not failsafe. KiwiRail has since provided the train attendant with a portable channel-one radio with which he can communicate directly with the train manager and the train driver when the mobility hoist has been or is to be deployed.

4.10. On 21 August 2014 KiwiRail issued an operational memo to all *Capital Connection* staff, updating its policy on identifying passengers requiring special assistance. Train managers must record on their daily running sheets the disembarkation requirements for those passengers and inform the train attendants of those details. The train attendants are required to contact train managers by portable two-way radio before and after operating the mobility hoist.

4.11. KiwiRail has also modified the train door status and control system to include an interlock between the mobility hoist control and the train door controls to give a "train door open" indication whenever the wheelchair hoist is deployed. It has also included the sliding door of the luggage van in the train door status circuitry, which means that as long as the door is open the train manager will not receive a green "doors-closed" indication at the local door control panel.

4.12. The modification to the train door status system, providing for radio communication between the train attendant and the train manager, and the improvements in the lighting and visibility of the mobility hoist should prevent a similar incident occurring in future. Accordingly the Commission has recorded these safety actions (see the safety action section below) and has not made any recommendations following this incident.

# 5. Findings

5.1. The train departed prematurely from Waikanae Station with two passengers (one in a wheelchair) positioned on the mobility hoist that was deployed onto the station platform. Safety issues that contributed to the incident were:

- the operation of the mobility hoist had not been written into the departure procedure being followed by the train manager
- there was no effective means for the train attendant who was operating the mobility hoist to communicate with the train manager
- the status of the luggage van doors was not interlocked with the train door status and control system, which allowed the train manager to receive a green all-doors-closed signal in spite of the luggage van doors being open and the mobility hoist deployed onto the platform.

5.2. The mobility hoist had not been deployed onto the station platform at the time the train manager made his final visual check before authorising the train driver to depart. However, even if it had been deployed, it might not have been visible to the train manager due to the distance, the low ambient light conditions and the lack of high-visibility marking on the hoist.

# 6. Safety actions

## 6.1. General

6.1.1. The Commission classifies safety actions by two types:

(a) safety actions taken by the regulator or an operator to address safety issues identified by the Commission during an inquiry that would otherwise result in the Commission issuing a recommendation; and

(b) safety actions taken by the regulator or an operator to address other safety issues that would not normally result in the Commission issuing a recommendation.

## 6.2. Safety actions addressing safety issues identified during an inquiry

6.2.1. On 11 April 2014 KiwiRail stated in part:

- the train assistant has access to a handheld radio for communicating with the train manager whenever the wheelchair hoist is deployed
- the wheelchair hoist control has been interfaced with the train door controls to give a "train door open" indication whenever the wheelchair hoist is deployed
- a management- of-change process has been drafted and is currently with [name] for peer review
- the side frame of the wheelchair hoist has been fitted with high-contrasting material to improve side profile visibility
- A light has been fitted above the luggage van door where the wheelchair hoist is located. The light stays illuminated until the door is closed (consistent with all other door open indicator lights on the passenger cars).

6.2.2. KiwiRail advised the Commission on 19 February 2015 of its updated policy on "the identification of disabled (wheelchair, partially sighted, deaf and elderly with walking aids) passengers and the procedures associated with recording their intended movements to include":

- the train manager to ask disabled passengers their disembarkation requirements
- the train manager to record this information on the daily running sheet as soon as practicable
- the train manager to inform the train attendant of those details
- the train attendant to contact the train manager via a two-way radio to advise that they are assisting a passenger and may be operating the mobility hoist
- the train attendant to advise the train manager that the passenger has disembarked and the mobility hoist has been stowed and the luggage van door has been closed.

## 6.3. Safety actions addressing other safety issues

6.3.1. None identified.

# 7. Recommendations

## 7.1. General

7.1.1. The Commission may issue, or give notice of, recommendations to any person or organisation that it considers the most appropriate to address the identified safety issues, depending on whether these safety issues are applicable to a single operator only or to the wider transport sector.

7.1.2. In the interests of transport safety it is important that recommendations are implemented without delay to help prevent similar accidents or incidents occurring in the future.

## 7.2. Recommendation made during this inquiry

7.2.1. None made.

# 8. Key lessons

8.1. Operational procedures must cover an entire operation if accidents and incidents are to be avoided.

8.2. Good communication among all persons involved in safety-critical operations is essential if accidents and incidents are to be avoided.

8.3. Technical solutions to mitigate human error, such as train door interlocking systems, are only effective if they protect all parts of the system.

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| 10-102 | collision between 2 metro passenger trains, after one struck a landslide and derailed between Plimmerton and Pukerua Bay, North Island Main Trunk, 30 September 2010 |
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