



**NO. 93-126**  
**TRAIN 210**  
**PAPATOETOE**  
**10 DECEMBER 1993**

## **ABSTRACT**

Express freight train 210 encountered a "stop and proceed" signal at Stop at Puhinui, 1.5 km south of Papatoetoe. In accordance with the signalling rules, the Locomotive Engineer stopped, and after a short interval, proceeded. He subsequently had to make an emergency brake application to avoid a collision with a stationary train ahead of him. The safety issues identified in this report were the need for guidelines for Locomotive Engineers to assess their fitness for duty and rest facilities for Locomotive Engineers while waiting for trains.

# TRANSPORT ACCIDENT INVESTIGATION COMMISSION

## RAIL INCIDENT REPORT NO. 93-126

<b>Train Type and Number:</b>	Wellington-Westfield Express Freight, 210
<b>Locomotive:</b>	DX5039/DC4227
<b>Date and Time:</b>	10 December 1993, 0800 hours
<b>Location:</b>	Papatoetoe 660.32 km, North Island Main Trunk
<b>Type of Occurrence:</b>	Near-collision
<b>Persons on Board:</b>	Crew: 1 Passengers: Nil
<b>Injuries:</b>	Crew: Nil Passengers: Nil Others: Nil
<b>Nature of Damage:</b>	Nil
<b>Information Sources:</b>	Transport Accident Investigation Commission field investigation
<b>Investigator in Charge:</b>	Mr W J D Guest

## 1. NARRATIVE

1.1 Train 210 was a Wellington-Westfield express freight service of New Zealand Rail Limited (NZRL) with a gross weight of 740 tonnes on 10 December 1993.

1.2 Just before 0800 hours the train was approaching Wiri, about three kilometres south of Papatotē. The Locomotive Engineer observed a signal which indicated that a train was travelling ahead of him.

1.3 He switched his cab radio from the “scanning” or listening mode to Channel 1 which was the channel used by Wiri Station for communications, and attempted to call Wiri to advise of his approach. He received no response to his call.

1.4 As the train drew closer to Wiri, the Locomotive Engineer saw the Wiri home signal change from Stop to Caution, and then saw that the starting signal was also at Caution.

1.5 The Locomotive Engineer interpreted the signals correctly as meaning that a train had left Wiri ahead of him. He thought that it might be a shunting service travelling from Wiri to Otahuhu.

1.6 The Locomotive Engineer did not switch the radio back to scanning.

1.7 Near Puhinui the Locomotive Engineer observed a “Stop and Proceed” signal at “Stop”.

1.8 The NZRL signalling rule pertaining to a Stop and Proceed signal at “Stop” required the Locomotive Engineer to stop at the signal for at least 10 seconds. After this interval he was permitted to proceed cautiously, not faster than the speed from which he could stop the train in the distance which he could see ahead, and clear of any obstruction. The rule does not stipulate a maximum speed. The complete rule is reproduced in Appendix 1.

1.9 The Locomotive Engineer stopped the train, and took the opportunity to pack his bag in preparation for leaving the locomotive at Westfield. He therefore stopped for longer than the 10 seconds required by the rule. The locomotive event recorder indicated that the train was stationary for between one minute and one minute and twenty seconds.

1.10 After proceeding past the signal, the train entered a stretch of straight track which was over a kilometre

long. At the end of the straight the track curved to the left under a road overbridge, and was lost to sight. However, the view of the track along the straight was unobstructed.

1.11 The Locomotive Engineer kept a lookout for broken rails, but did not envisage any other form of obstruction. He was still expecting that the train in front was a shunting service which was still moving.

1.12 About half-way along the straight he felt that the speed of the train was faster than he felt appropriate, and he made an application of the air operated train brakes to slow it. As the speed began to fall he released the brakes, knowing that the speed would continue to fall for a few seconds before the brakes fully released. The train was then approaching the road overbridge at the end of the straight.

1.13 The Locomotive Engineer did not recall looking at the speedometer prior to applying the brakes, but noted that when he released them, the speed of the train was falling towards 40 km/h.

1.14 A few seconds later the Locomotive Engineer obtained a view around the curve in the track under the overbridge. Approximately 160 m ahead was a stationary diesel multiple unit (DMU) passenger train at Papatotē Station.

1.15 The Locomotive Engineer had not expected to find a DMU stopped in front of his train. He had continued to expect that a shunting service was still moving ahead of him.

1.16 Had he returned the locomotive radio to scanning mode after attempting to contact Wiri Station, he may have overheard the Locomotive Engineer of the DMU advise Train Control that the DMU had a mechanical problem.

1.17 Conscious of the possibility that the air reservoirs on the train may not yet have fully recharged after the earlier brake application, he made an emergency brake application to ensure that maximum air brake pressure was utilised, and that sand was applied to the rails to give added grip.

1.18 The Locomotive Engineer also sounded the locomotive’s horn to warn of his approach.

1.19 The train stopped approximately 15 m behind the DMU.

1.20 The Locomotive Engineer left his train and conferred with the Locomotive Engineer of the DMU.

1.21 The DMU had a mechanical problem, and would not normally have been at Papatoetoe at that time. A few minutes later, it was able to proceed, and both trains continued to their destinations.

1.22 No report of the incident was made to Train Control at the time, but at 1000 hours, after his shift concluded, the Locomotive Engineer of the DMU did report it as an operating incident.

1.23 As the locomotive event recorder was not disconnected immediately after the incident, the “short term” detailed data of speed and brake applications at one second intervals was lost. The “long term” data, of speed at ten second intervals, was all that was available after the incident was reported.

1.24 The locomotive event recorder showed that the speed of train 210 had reached 54 km/h after passing the Stop and Proceed signal. Under full or emergency brake application, it would have taken approximately 150 m to 200 m to stop a train from this speed on a level track.

1.25 At the time of the incident, the Locomotive Engineer had been on duty for over 10 hours. He had booked on at 2145 hours on 9 December, and had driven train B36 from Westfield to Te Rapa, arriving about 0030 hours. He was scheduled to take over driving train 210 at 0200 hours on 10 December, but the train was late arriving, and it was 0430 hours before he was able to join it.

1.26 He had not felt well for several days prior to the incident, as he was suffering from a boil on his face. On 8 December he had seen his doctor, who had prescribed two antibiotics of the erythromycin group to control the infection. An earlier attempt to treat the complaint with a penicillin drug had been discontinued when the Locomotive Engineer had shown an allergic reaction.

1.27 The Locomotive Engineer was not used to illness of this kind, and had taken only 15 days Sick Leave in 16 years’ service with New Zealand Railways.

1.28 He felt tired and “off colour”, but judged that he was well enough to work.

1.29 NZRL deals with employees’ fitness for duty in Rule 8 of the General Rules in the “Rules and Regulations to be Observed by All Employees who are Connected With Train Services”. Rule 8 is reproduced in full in Appendix 1. Essentially it requires employees who report for duty to be fit for work, and instructs supervisors to check employees for illness, alcoholic liquor, or harmful drugs. It does not give any guidelines for the assessment of the effects of illness or medication.

1.30 The four hours spent at Te Rapa between 0030 and 0430 hours was described by the Locomotive Engineer as “very boring”. There was no amenity to wait in other than the lunch room with its hard chairs and laminate tables. There were no easy chairs. Television had ceased broadcasting, and he did not feel like reading because he was tired.

1.31 A booklet issued by NZRL in 1992 to staff working shifts gave advice on strategies for coping with the effects of shift work on sleeping, eating and social life. The section on sleeping includes the following:

“Napping during breaks is also beneficial, eg Locomotive Engineers in a depot for a couple of hours between services should take a small nap to refresh themselves.”

1.32 Drivers waiting for trains at Te Rapa during the night sometimes used the slatted shelves in the warm drying room as a place to lie down, especially in winter. Another location which was used to lie down was the vinyl floor of the landing at the top of the stairs of the operations building. Some drivers preferred to sit in the cab of any available locomotive.

## 2. FINDINGS

2.1 The Locomotive Engineer stopped correctly at the Stop and Proceed signal at Puhinui.

2.2 The Locomotive Engineer was familiar with the signalling rule about Stop and Proceed signals.

2.3 The Locomotive Engineer kept a lookout for broken rails as he drove towards Papatoetoe, but did not consider the possibility of a broken down train obstructing the line in front of him.

2.4 The Locomotive Engineer had an erroneous expectation that the train in front of him after Wiri was a shunting service which would travel without stopping to Otahuhu.

2.5 The locomotive radio was not essential for operations within the area, but had it been returned to the scanning mode, the Locomotive Engineer may have learned that the DMU was having mechanical problems in front of him.

2.6 The Locomotive Engineer allowed the speed of his train to rise to 54 km/h, which was higher than was prudent, and did not take firm enough action to reduce it as the train approached the curve under the road overbridge,

at which point his forward visibility was reduced significantly.

2.7 The Locomotive Engineer observed the DMU and was able to stop his train 15 m from it, but the margin for error was insufficient to ensure the safety of the train.

2.8 The Locomotive Engineer was suffering from an infection for which his doctor had prescribed antibiotics, and was feeling tired.

2.9 Although the Locomotive Engineer considered himself fit for duty, the combined effects of the illness and the antibiotic probably rendered him unfit, and may have contributed to his errors of judgement.

2.10 NZRL had no guidelines to help Locomotive Engineers to make a decision about their fitness for duty.

2.11 The Locomotive Engineer spent approximately four hours waiting for his train at Te Rapa in the early hours of the morning, with no facilities for rest or relaxation, and this period aggravated his feeling of fatigue.

## 3. SAFETY RECOMMENDATIONS

3.1 It was recommended to New Zealand Rail Limited that:

3.1.1 They prepare medical guidelines for Locomotive Engineers (and other operating staff as appropriate) concerning fitness for duty (043/94).

3.1.2 They review the amenities available for operating staff while waiting for duty during unsociable hours, with a view to reducing the boredom and fatigue that inadequate facilities can aggravate (044/94).

New Zealand Rail Limited responded (inter alia):

3.1.1 "There is a general requirement in the NZRL Behaviour Code known to all our employees that no one shall 'be affected by drug or alcohol to an extent which causes concern or distress to customers, pas-

sengers or other staff, or which raises doubts about the ability of the employee to carry out his or her duties safely and competently'. This includes prescription drugs. Rule 8 of the NZRL operating rules refers to similar requirements.

The obligation remains with the locomotive engineer to advise the Company when, in his view, he considers himself unfit for duty.

NZRL plans to review the current rule for all employees and to be more specific about the employee's obligation to alert their controlling office of any factors rendering that person unfit for duty. The need to prepare additional medical guidelines for locomotive engineers is not considered necessary. (043/94)"

3.1.2 *“The rest facilities provided for locomotive engineers while waiting for trains is, in NZRL’s view, a minor issue to the incident. While NZRL lunchrooms are not the height of comfort, they are considered adequate for their purpose. They are not required to be*

*places where employees can sleep; an employee who presents himself as fit for duties is expected to remain fit throughout his work period, without the need for sleep. (044/94)”*

## 4. OBSERVATIONS

4.1 NZRL had no guidelines to help Locomotive Engineers to assess their fitness for duty when they were ill or taking medication.

4.2 The aviation industry does use such guidelines. An Aeronautical Advisory Circular issued in 1980 by the Civil Aviation Authority of the United Kingdom, reproduced as Appendix 2 to this report, sets out the reactions which pilots and air traffic controllers may experience to illness and medication.

4.3 A pilot can be subjected to visual phenomena and altitude effects which would not be experienced by a Locomotive Engineer. However, a Locomotive Engineer, especially if driving a train on his or her own, must be alert at all times and be capable of making quick judgements to ensure safe operation.

4.4 Train 210 on the day of this incident had a gross weight of 740 tonnes, and a maximum permissible speed of 80 km/h on most track. The Locomotive Engineer was required to observe all signals and take the correct train handling action for the section in which he was travelling in order to prepare for the next signal.

4.5 Fatigue can cause lapses in concentration, slow reactions, and errors of judgement.

29 June 1994

M F Dunphy  
Chief Commissioner

**RULE 3 OF THE DOUBLE LINE AUTOMATIC SIGNALLING REGULATIONS**  
**(See paragraph 1.8 of the Narrative)**

**3. Train Stopped at an Intermediate Stop and Proceed Signal**

(a) When a Locomotive Engineer observes a Stop and Proceed signal at “Stop” he must stop the train; if, at the expiration of 10 seconds, the signal is still at “Stop” the train may proceed cautiously past the signal, the Locomotive Engineer being prepared to find the section occupied or obstructed, points wrongly set, or a broken or displaced rail.

Where there are points in the section ahead of a Stop and Proceed Signal which has been passed at “Stop” the Locomotive Engineer before the train passes over the points, must examine them and see that they are so secured that the train may pass safely over them.

(b) After passing a Stop and Proceed signal at “Stop” the Locomotive Engineer must not assume that any obstruction in the section is protected, but must regulate the speed of the train so that it can be stopped within the distance he can see ahead and clear of any obstruction.

NOTE—In connection with the passing of these signals Locomotive Engineers must ensure that the train proceeds cautiously, being prepared to find the section obstructed or a displaced rail or points wrongly set and must not assume that any obstruction is protected. Level crossings in the section equipped with automatic warning devices must also be approached with caution as the alarms may not operate correctly.

If the signal next in advance is observed to be at “Caution” or “Clear” the Locomotive Engineer must not relax vigilance but must, until he reaches the signal, be prepared to stop the train clear of any obstructions.

(c) If, after passing a Stop and Proceed signal at “Stop”, a Locomotive Engineer becomes aware that there is a train stopped in the section he must stop his train and except when verbally instructed or handsignalled by a responsible member of the crew of the train in front to draw cautiously

forward, must wait until the train has proceeded on its journey before again starting his train.

If, however, the preceding train is observed to be moving through the section the second train may follow it at a safe interval.

NOTE—In view of the possibility of a train which has passed a Stop and Proceed signals at “Stop” being in the same section as another train, strict attention to and observance of tail lamps after dark, or when visibility is bad, is of the utmost importance.

**RULE 8 OF THE GENERAL RULES**  
**(See paragraph 1.29 of the Narrative)**

**8.(a) Employees’ Fitness to Perform Duty**—Employees booked for duty must attend in a fit condition to perform such duty.

(b) Whenever an employee is booked for duty, either at the commencement of or during a shift, the Officer in Charge at the station or depot at which the employee takes up such duty must satisfy himself that the employee is fit to carry out his duties.

(c) No employee shall be allowed to take up or continue duty if—

(i) He shows any sign of illness which is likely to render him unfit to carry out his duties;

(ii) He shows any effects whatsoever of having consumed alcoholic liquor or taken harmful drugs;

(iii) It is known that he has recently consumed alcoholic liquor, or taken harmful drugs; or

(iv) It is known that he has in his possession any alcoholic liquor or harmful drugs that is not being conveyed by New Zealand Rail Ltd in the ordinary course of its business.

(d) The Officer in Charge must report immediately to his Controlling Officer (or if the Controlling Officer is not on duty to the Officer Controlling Train-running in the area) for directions whenever it has been necessary for him to prohibit, in accordance with this rule, an employee from taking up duty.

**EXTRACT OF AERONAUTICAL INFORMATION CIRCULAR 1/1980, UNITED KINGDOM CIVIL AVIATION AUTHORITY**

**MEDICATION, ALCOHOL AND FLYING**

1. Accidents and incidents have occurred as a result of pilots flying whilst medically unfit and the majority have been associated with minor ailments rather than overwhelming medical catastrophes. Although the symptoms of colds, sore throats, diarrhoea and other abdominal upsets may cause relatively little problem whilst on the ground, they may become dangerous when flying by distracting the sufferer from the various flying tasks. Symptoms may also increase in severity in the altered environmental conditions in flight. The side effects of medication prescribed or bought over the counter for the treatment of such ailments may also be highly undesirable. The following are some of the more widely used medicines which are normally considered incompatible with flying.

2. **Antibiotics**, such as the various Penicillins, Tetracyclines etc. may have short term or delayed side effects which affect pilot performance. More importantly, their use usually indicates that a fairly severe infection is present and apart from any effect of the medication taken, the effects of the infection will almost always mean that the pilot is not fit to fly.

3. **Tranquillizers, anti-depressants and sedatives** affect the ability to respond to a particular situation. Anxiety is a normal response to danger which alerts and primes the body for action. Inability to react due to the use of this group of medicines has been a contributory cause to fatal aircraft accidents. You must not fly when taking them.

4. **Stimulants** such as caffeine, amphetamines etc. (often called 'pep' pills) used to maintain wakefulness or suppress appetite are often habit forming. Susceptibility to the various drugs varies from one individual to another, but all of them may cause dangerous overconfidence. Overdosage causes headaches, dizziness and mental disturbance. The use of 'pep' pills while flying cannot be permitted. If coffee is insufficient, you are not fit to fly—and remember that excessive coffee-drinking has harmful effects.

5. **Anti-histamines** can cause drowsiness. They are widely used in 'cold cures' and in the treatment of hay fever, asthma and allergic rashes. They may be in tablet form or be a constituent of nose drops or sprays. In many cases the condition itself may preclude flying, so that if treatment is necessary expert advice should be sought.

6. **Drugs for the relief of high blood pressure** can cause a change in the mechanisms of blood circulation which could be disastrous when flying. If the blood pressure is such that drugs are needed the pilot must be temporarily grounded. Any treatment instituted should be discussed with an expert in Aviation Medicine before returning to flying.

7. Following **local and general dental and other anaesthetics** a period of time should elapse before returning to flying. This period will vary depending on individual circumstances but will usually be at least 24 hours. The dentist or anaesthetist should be asked about this.

8. The more potent **analgesics** may have marked effects on performance. In any case the pain for which they are being taken indicates a condition which is a bar to flying.

9. Many preparations are now marketed containing a combination of medicines. It is essential therefore that if there is any change in medication or dosage however slight, the effect should be observed by the pilot on the ground prior to flying. Although the above are the commonest medicines with adverse effects on pilot performance it must be noted that many other forms of medication, although not normally affecting pilot performance, may do so in individuals who are 'over-sensitive' to the particular preparation. You are therefore exhorted not to take any medicines before or during flight unless you are completely familiar with their effects on your own body. If you are in doubt at all ask a Doctor experienced in Aviation Medicine.

10. Recent blood donation is incompatible with flying. The resulting disturbance to the circulation takes several weeks to return completely to normal and although effects are slight whilst at ground level, there are risks when flying during this period. It is recommended that pilots do not volunteer as blood donors whilst actively flying. If blood



has been given an appropriate doctor should be consulted before returning to flying.

11. If you are taking any medicine you should ask yourself the following three questions:

1. Do I feel fit to fly?
2. Do I really need to take medication at all?
3. Have I given this particular medication a personal trial on the ground of at least 24 hours before flight to ensure that it will not have any adverse effects whatever on my ability to fly?

Confirming the absence of adverse effects may well need expert advice and the assistance of Airline Medical Officers, Medical Examiners authorized by the Civil Aviation Authority, both in the United Kingdom and Overseas, Royal Air Force Medical Officers and the Medical Department of the Civil Aviation Authority should be sought if in doubt.

12. If you are ill and need treatment do make sure the Doctor you consult knows you are a member of an aircrew and whether you have recently been abroad.

### 13. **DRUGS OF ADDICTION**

Drugs in this group cover a wide field ranging from heroin and morphine to barbiturates and marijuana. All have a basic effect which is to 'detach' the person, taking them from the realities of their environment. As such they are not compatible with control of an aircraft, and a person using them is not fit to be a member of a flight crew.

### 14. **ALCOHOL**

Alcohol is a contributory factor in at least one aircraft accident almost every year. It is well established that even small amounts of alcohol in the blood produce a

measurable deterioration in the performance of skilled tasks. Research has confirmed that blood alcohol concentrations of 40 mgs per 100 millilitres are associated with highly significant increases in the errors committed by both experienced and inexperienced pilots even in simple aircraft. This is half the legal driving limit, and may result from drinking one double whisky or 1 pint of beer.

Alcohol is removed from the body at a relatively constant rate regardless of the concentration present. Pilots should not fly for at least 8 hours after taking small amounts of alcohol and proportionately longer if larger amounts are consumed.

15. Your attention is drawn to the following articles in the Air Navigation Order (1976):

**Article 46(2)** Under this article it is an offence for a person to be on board an aircraft as a member of its Flight Crew if under the influence of alcohol or a drug to an extent which will impair his/her ability to perform his/her duties.

**Article 20(8)** requires the holder of a medical certificate for an aircrew licence to inform the Authority in writing of:

- (a) any personal injury involving incapacity to undertake his/her crew duties;
- (b) any illness involving incapacitation to undertake his/her crew duties for 20 days or more;
- (c) presumed pregnancy.

It also notes that a person shall not be entitled to act as a member of the flight crew of a UK-registered aircraft if he/she knows or has reason to believe that his/her physical or mental condition renders him/her temporarily or permanently unfit to perform his/her duties.