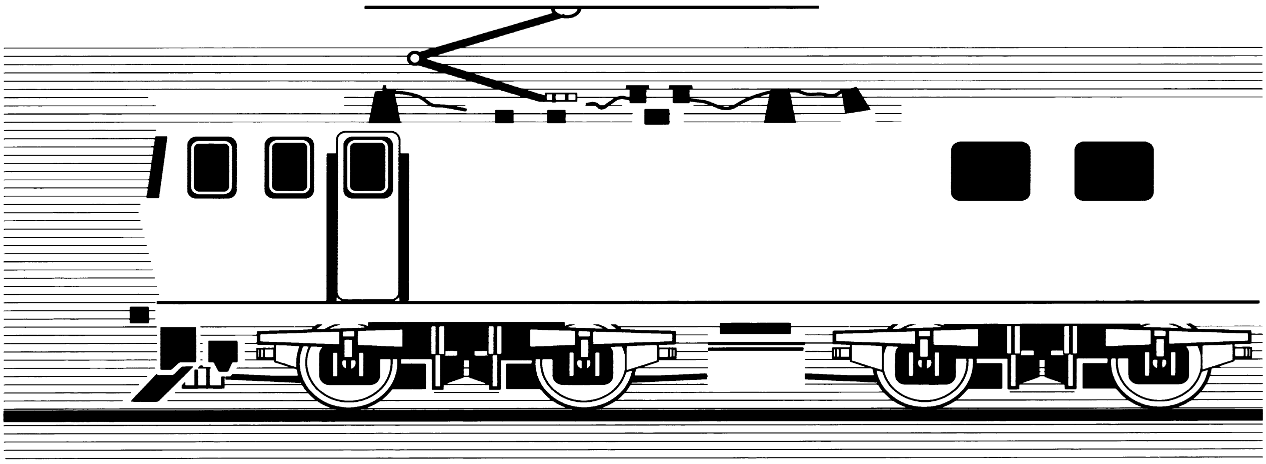

RAILWAY OCCURRENCE REPORT

05-117 express freight Train 211, signal passed at stop, Rangitawa 12 May 2005

TRANSPORT ACCIDENT INVESTIGATION COMMISSION
NEW ZEALAND

Report 05-117

express freight Train 211

signal passed at stop

Rangitawa

12 May 2005

Abstract

On Thursday 12 May 2005, at about 0410, Train 211, a southbound express freight service, passed signal 8L at the north end of Rangitawa at Stop. The train continued on the main line until the locomotive engineer regained situational awareness and stopped the train.

Train 230, a northbound express freight train, was approaching Rangitawa from the south end and had been signalled to enter the loop at the time. When Train 211 passed Signal 8L at Stop, the signal governing the entry of Train 230 into the loop reverted to Stop and Train 230 stopped about 100 m short of the signal.

Safety issues identified included:

- the reporting of sudden incapacitation through fatigue while on duty
- fatigue awareness and management.

Two safety recommendations covering these issues were made to the Chief Executive of Toll NZ Consolidated Limited.

Contents

Figures

Abbreviations

CTC	centralised traffic control
km/h	kilometres per hour
kPa	kilopascals
m	metre(s)
NIMT	North Island Main Trunk
t	tonne(s)
Toll Rail	Toll NZ Consolidated Limited
VDU	visual display unit
UTC	coordinated universal time

Data Summary

Train type and number:	express freight Train 211
Date and time:	12 May 2005, at about 0410[1]
Location:	Rangitawa
Persons on board:	crew: 1
Injuries:	nil
Damage:	nil
Operator:	Toll NZ Consolidated Limited (Toll Rail)
Investigator-in-charge:	D L Bevin

[1] Times are New Zealand Standard Time (UTC + 12) and are expressed in the 24-hour mode.

1 Factual Information

1.1 Narrative

1.1.1 On Thursday 12 May 2005, Train 211 was a scheduled southbound express freight service from Auckland to Wellington on the North Island Main Trunk (NIMT). Train 211 had departed from Auckland on Wednesday 11 May. Departing from Hamilton the train consisted of an EF class electric locomotive and 21 wagons, with a gross weight of 714 t and total length of 359 m. Train 211 was crewed by a locomotive engineer.

1.1.2 On Thursday 12 May 2005, Train 230 was a northbound express freight service from Wellington to Auckland on the NIMT. Departing from Palmerston North the train consisted of 2 EF class electric locomotives and 43 wagons, with a gross weight of 745 t and total length of 645 m. Train 230 was crewed by a locomotive engineer.

1.1.3 At about 0410 Train 211 approached and passed Signal 8L Down Home Signal at Rangitawa which was at Stop and continued on to the main line inside station limits before the locomotive engineer stopped the train.

1.1.4 The locomotive engineer of Train 230 stopped his train short of Signal 4R Up Home Signal at Rangitawa when it reverted to Stop in front of him.

1.1.5 Train 211 stopped at about 168.653 km and Train 230 stopped at about 168.030 km, making a separation of about 623 m between the stationary trains.

1.2 Site and signalling information

1.2.1 Rangitawa was a crossing station located at 168.66 km between Palmerston North and Marton on the NIMT. The points and signalling were remotely controlled from the national train control centre in Wellington.

1.2.2 The length of the main line at Rangitawa between Departure Signals 4LA and 8RA was 750 m (see Figure 1).

1.2.3 The following descriptions applied to the signalling arrangements at Rangitawa:

- Intermediate Signals - were provided in centralised traffic control (CTC) areas to advise the locomotive engineer of the indications on the signal next in advance, the Home Signal
- Home Signals - were provided to authorise entry to a station
- Departure Signals - controlled the exit from a station and entrance to a single line block section in CTC signalling areas.

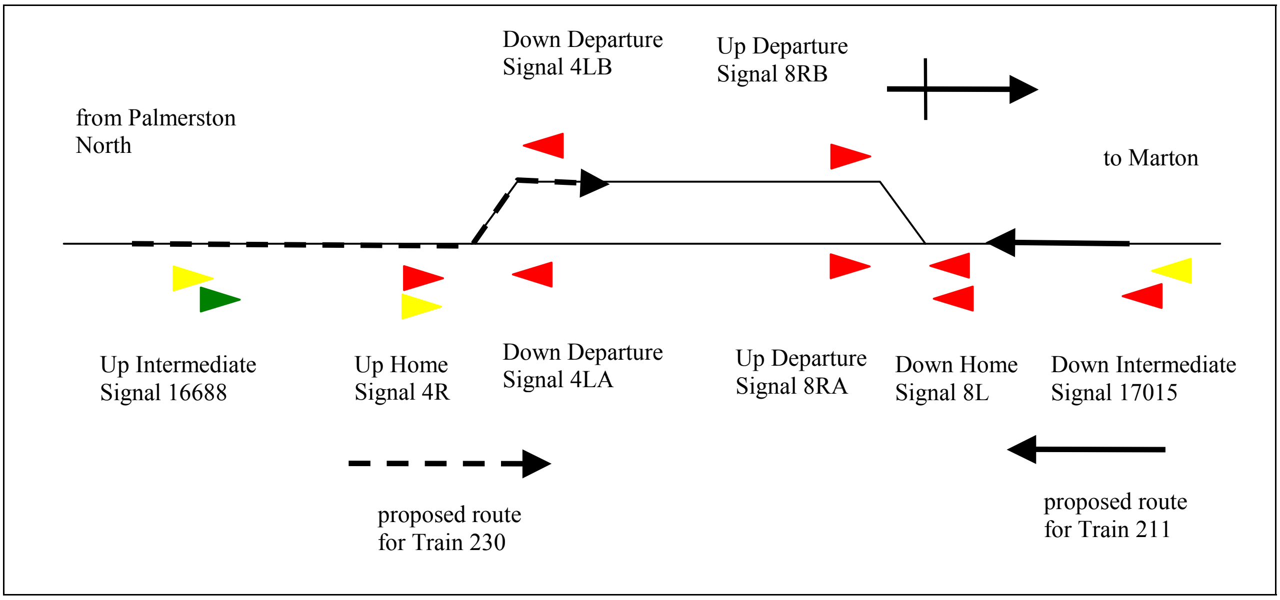

Figure 1
Site diagram of Rangitawa showing routes and signalling indications
(not to scale)

1.2.4 Signal indications displayed in Figure 1:

For Train 230:

- Up Intermediate Signal 16688 - proceed at normal speed, prepared to reduce to medium speed at next signal (Signal 4R)
- Up Home Signal 4R - proceed at medium speed, prepared to stop at next signal (Signal 8RB)
- Up Departure Signal 8RB - Stop

For Train 211:

- Down Intermediate Signal 17015 - proceed at normal speed, prepared to stop at next signal (Signal 8L)
- Down Home Signal 8L - Stop

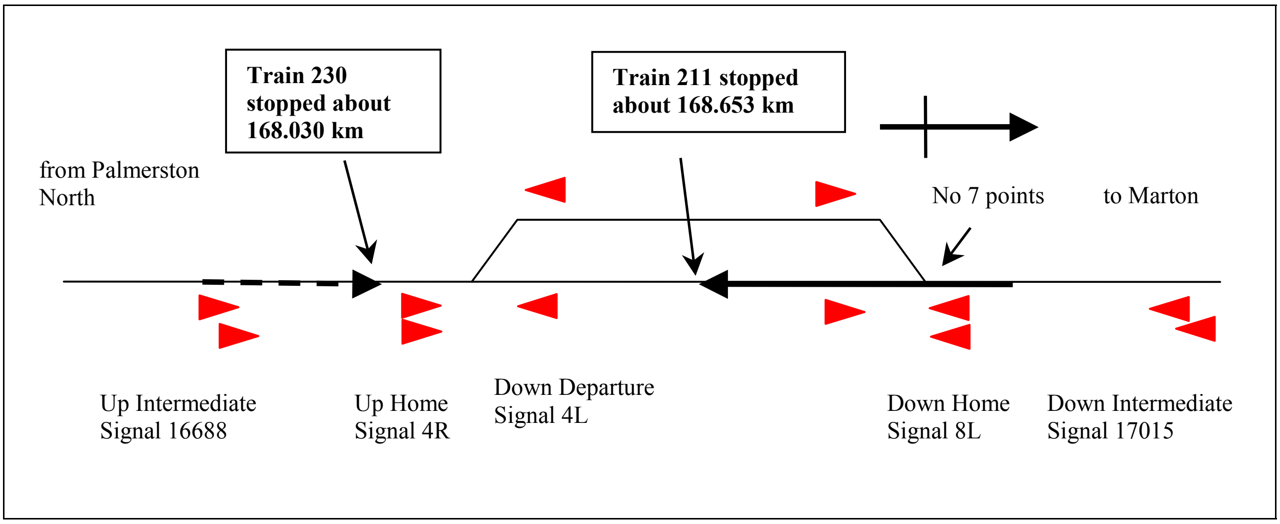

Figure 2
Site diagram of Rangitawa after signal overrun
(not to scale)

1.2.5 Signal indications displayed in Figure 2:

- Up Home Signal 4R - Stop (reverted)
- Down Home Signal 8L - Stop (unchanged)
- Down departure Signal 4L - Stop (unchanged)

1.2.6 Up Home Signal 4R reverted to Stop in front of Train 230 as soon as Train 211 passed Down Home Signal 8L at Stop.

1.3 Locomotive event recorder

1.3.1 The locomotive event recorder from Train 211 was downloaded and made available for analysis.

1.4 Locomotive vigilance device

1.4.1 The locomotive vigilance device went through a cycle of a light illuminating every 50 seconds if no locomotive controls were moved. If there was no response to the light within 10 seconds, a buzzer sounded in the cab. If there was no response to the buzzer within the next 10 seconds, braking was automatically applied and an alarm sounded in train control.

1.4.2 The locomotive engineer could reset the vigilance device at any time, by either manually pushing the cancel button, or operating the controls of the locomotive.

1.5 Personnel

The locomotive engineer of Train 211

1.5.1 The locomotive engineer had been driving for about 30 years, 17 years of that as a grade 1 locomotive engineer. He had been based in Palmerston North for all of that time.

1.5.2 He started work on Wednesday 11 May at 2040 for his rostered shift, which involved driving Train 210 north on the NIMT and returning to Palmerston North on southbound Train 211.

1.5.3 The locomotive engineer said that he had felt fine while travelling north on Train 210 and was anticipating taking his break at Horopito, where he expected to meet and changeover on to Train 211. However, after changing on to Train 211 he then had to pull forward to allow Train 210 to depart from the north end, and because he had a proceed indication on the south end departure signal for his train, and he was feeling reasonably wide awake, he decided to forgo his break and continue on.

1.5.4 He said he had felt wideawake for most of the return trip but recalled he had fallen asleep near Mangaweka (see Figure 3). He had awakened and corrected the speed of the train. He recalled passing through Marton and he thought he had passed through Kakariki at about 0400, after which he had fallen asleep again. He recalled waking up just after his train had passed the Down Home Signal at Rangitawa and entered the main line.

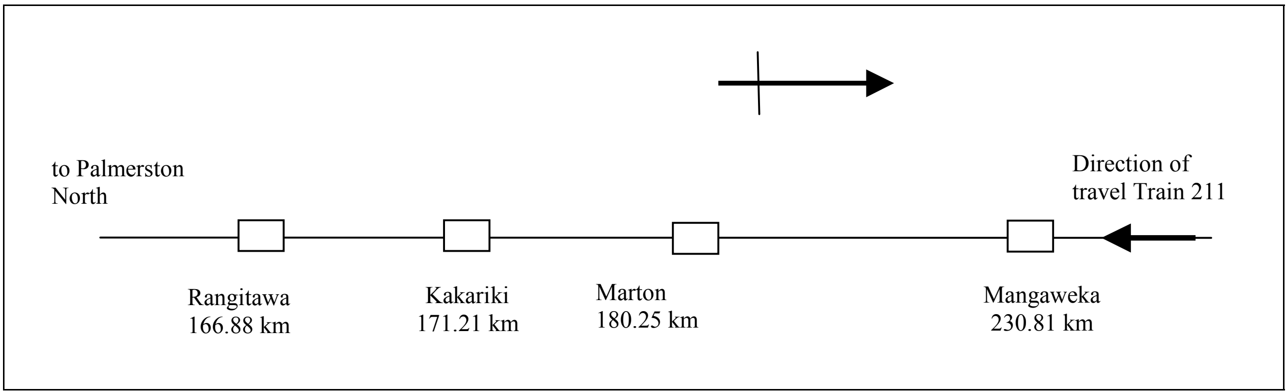

Figure 3
Locations of respective stations (not to scale)

1.5.5 The locomotive engineer realised what he had done and immediately stopped the train. By this time, the train controller was trying to contact him by radio. He did not recall seeing Down Intermediate Signal 17015 as he approached Rangitawa.

1.5.6 The locomotive engineer was rostered off duty on Monday 9 May and Tuesday 10 May. On Tuesday he had travelled to Wellington to collect guests from the airport. He had arrived back at his home in Palmerston North at about 2200 and had helped his wife put their children to bed before he retired at about midnight. He said that one of the children had a restless night so he only got about 3 hours of broken sleep during the night.

1.5.7 The locomotive engineer said that the combination of having extra people in the house, together with his disturbed sleep the previous night, meant he was feeling fatigued on Wednesday and he felt he needed to have a lie-down to prepare for his shift later that evening. He went to bed about 1300 while his guests were out but they arrived back about 1430, which woke him up. He felt he should entertain them rather than stay in bed so he took them for a drive in the country and returned home about 1600, after which he helped prepare dinner. He left home at about 2010 to go to work.

1.5.8 The locomotive engineer said he had completed an internal company fatigue management course. He had not considered staying at home as he had felt fine, although he said that he has since realised that he was fatigued before he started his shift.

The locomotive engineer of Train 230

1.5.9 The locomotive engineer of Train 230 said that as he approached Up Intermediate Signal 16688 at Rangitawa it was displaying a yellow over green indication (proceed at normal speed, prepared to reduce to medium speed at next signal). He had responded by slowing down accordingly.

1.5.10 Up Home Signal 4R was displaying a red over yellow indication (proceed at medium speed, prepared to stop at next signal) as he approached it. He thought that he was about 100 m from the signal when it reverted back to Stop, but he was able to stop his train before he overran the signal[2].

1.5.11 He base-called[3] train control on the radio then heard the train controller advising the locomotive engineer of Train 211 that he had overrun a signal. The train controller then asked the locomotive engineer of Train 230 if he had had a proceed indication to enter the loop, to which the locomotive engineer confirmed that he had.

[2] A measure-up following the incident established that Train 230 had stopped at 168.030 km, about 108 m before Up Home Signal 4R.
[3] An automatic selective calling (Selcall) system used on very high frequency (VHF) radio to send the locomotive identification number and a status or alarm indication to train control.

The train controller

1.5.12 The train controller had about 10 months experience in train control. He was certified for the Manawatu desk, which directed train movements from Otaki to Marton and New Plymouth and from Palmerston North to Woodville.

1.5.13 His shift had commenced at 2300 on Wednesday 11 May and was due to finish at 0700 on Thursday 12 May. It was the third of 5 consecutive night shifts for which he was rostered.

1.5.14 He said the shift had been quiet. Train 230 had been late departing from Palmerston North so he decided to advance the train to Rangitawa to cross Train 211. He knew it would be a tight crossing but considered it was a better option than holding Train 230 back at the crossing loop south of Rangitawa and delaying the train even further. He entered the automatic crossing command into the CTC computer but did not watch the crossing take place on the CTC visual display unit (VDU) in front of him.

1.5.15 He was alerted by the radio base-call from the locomotive engineer on Train 230. Before responding he looked at the VDU and saw that No 7 points indications at the north end of Rangitawa were illuminated. This indicated to him that Train 211 was passing over them, although he had not seen Train 211's unauthorised passing of Down Home Signal 8L on the VDU.

1.5.16 The train controller immediately base-called the locomotive engineer of Train 211, followed by a voice call. As soon as the locomotive engineer responded the train controller told him to stop his train. He said he did not know if this was what alerted the locomotive engineer to the situation.

1.5.17 Although he had not responded to the radio base-call from the locomotive engineer of Train 230, the train controller concluded that the reason for the call was probably that Up Home Signal 4R had reverted to stop in front of him.

1.5.18 The train controller discussed the incident with the network control manager before authorising Train 230 to continue.

1.6 Rostering

1.6.1 The locomotive engineer of Train 211 had been rostered off duty on Monday 9 May and Tuesday 10 May. The shift on which the incident occurred started at 2040 on Wednesday 11 May.

1.6.2 In the fortnight leading up to the incident, the locomotive engineer had been rostered on duty for 47 hours 40 minutes and had actually worked 53 hours.

1.6.3 The incident happened about 7 hours 30 minutes into his shift, which had commenced at 2040 on Wednesday 11 May. He was on his first shift after 2 consecutive days off duty.

1.7 Sleep and fatigue

1.7.1 Fatigue can be defined as a progressive loss of mental and physical alertness that can end in sleep. Lack of sleep, sleeping at different times of the day, mental stress or high mental workload will quickly result in mental fatigue. One becomes increasingly inattentive while trying to concentrate on tasks[4].

---

[4] Source - Fatigue Management Guide for Canadian Pilots, Transport Canada, 2003.

1.7.2 Fatigue is used as a catch-all term for a variety of different experiences, such as physical discomfort from overworking a group of muscles, difficulty concentrating, difficulty appreciating potentially important signals, and problems staying awake. In the context of an investigation, fatigue is important if it potentially reduces efficiency, erodes the safety margin, or otherwise impairs cognitive or physical performance.[5]

1.7.3 Every aspect of human performance can be degraded by sleep loss and sleepiness, including physical and mental performance. Once sleep debt or fatigue builds, only sleep can maintain or restore performance levels.

1.7.4 Lack of sleep and/or a reduction in sleep quality is one of the main factors affecting levels of fatigue, mood, health, and ultimately, performance. We loose sleep either by reducing a single sleep period by a large amount (acute sleep loss) or by building up a sleep debt over time by reducing sleep on consecutive sleep periods (accumulated sleep loss). Attempting to sleep at times when the body is less inclined to do so will disrupt sleep. The duration of the sleep period will be shorter, and the sleep structure will be altered, resulting in further lost sleep[6].

1.7.5 A paper entitled "Fatigue Management in the new Millennium"[7] stated that:

> - Night work – as the amount of night work increases, so does the amount of sleep that must be attempted at biologically inappropriate times. Sleeping 'out of synch' with the body's biological clock results in reduced duration and quality of sleep. This in turn reduces the restorative value of sleep obtained.
> - Research data indicates that shift workers obtain significantly less sleep than those who are not shift workers. Moreover, the quality of that sleep is also significantly reduced. Sleep loss during night work is typically 1 – 3 hours per day. Furthermore, sleep deprivation can accumulate across a block of shifts, which leads to higher fatigue.
> - Taken together, both employers and employees have clear responsibilities with respect to managing fatigue. The basic responsibilities of both parties relate to ensuring that adequate sleep can be obtained between shifts so that fatigue does not reach dangerous levels during shifts. Thus, lack of sleep causes fatigue and sleep allows recovery from fatigue.
> - Research by the Centre for Sleep Research at the University of SA has clearly demonstrated that fatigue-related impairment is not dissimilar to the effects of moderate alcohol intoxication. That is, significantly delayed response and reaction times, impaired reasoning, reduced vigilance [and] hand-eye co-ordination.

1.7.6 Most people who are fatigued do not realise how tired and impaired they are. We often disregard the warning signs of fatigue. Major indicators of severe fatigue include:

- incorrect reading of equipment
- missing a reference point
- not remembering the last command given
- giving wrong commands
- degraded mental abilities (including memory, decision making and perception)[8]

---

[5] Source - A Guide for Investigating for Fatigue, Transportation Safety Board of Canada, 1997.
[6] Source - Fatigue Management for Canadian Pilots, Transport Canada, 2003.
[7] Author Professor Drew Dawson, University of South Australia Centre for Sleep Research.
[8] Source - Fatigue Management Guide for Canadian Pilots, Transport Canada, 2003.

2 Analysis

2.1 Biological sleepiness[9] waxes and wanes across the daily cycle of the body clock. There is clear evidence from laboratory studies that people are most prone to falling asleep inadvertently in the early hours of the morning and again in mid-afternoon[10].

2.2 A German study confirmed[11] that locomotive engineers' are no different and that their vigilance is at its worst in the early hours of the morning. Automatic brakings (caused when locomotive engineers failed to push a vigilance device while passing a signal pre-set in the warning position) were most likely to occur at around 0300 and again in the early afternoon. A similar pattern was found for the warning hooter that sounded when locomotive engineers failed to respond to a warning light, that switched on every 25 seconds, as a vigilance device. The warning hooter was most likely to sound around 0300 and again in the early afternoon.

2.3 The overrun by Train 211 occurred at about 0400, which corresponded to the time in the locomotive engineer's circadian body clock when the biological urge to fall asleep was at its strongest.

2.4 Insufficient prior sleep increases biological sleepiness at all times in the circadian body clock cycle. To be alert and to function well, each person requires a specific amount of nightly sleep. If individual sleep need is not met, the consequences are increased biological sleepiness, reduced alertness and impaired physical and mental performance.

2.5 Laboratory studies consistently show that biological sleepiness increases the longer a person stays awake[12]. The overrun occurred nearly 14 hours after the end of the locomotive engineer's last reported sleep period, so extended wakefulness probably contributed to his biological sleepiness at the time.

2.6 The locomotive engineer had been off duty on Monday 9 May, and it was likely that he had a normal sleep that night. Assuming that he woke at 0700 on Tuesday 10 May, that was about 37 hours before he was required to commence his shift on Wednesday 11 May. However, during that time he had only 3 hours of broken sleep during the Tuesday night and one and a half hours sleep on Wednesday afternoon before commencing his shift, making a total of 4 and a half hours sleep out of 37 hours available. The quality of sleep he would have achieved, firstly with unsettled children and then trying to sleep in the middle of the day, meant that his biological sleep requirements in preparation for his shift were not met and the sleep periods were probably of little value.

2.7 Once he awoke from his first microsleep, the locomotive engineer should have stopped his train at the nearest location where it was safe to do so and reported that he was no longer fit for duty. Procedures existed for this situation and staff need to be aware of their responsibilities to immediately stand themselves down as soon as it is safe and prudent to do so if they become ill or fatigued while on duty.

---

[9] Biological sleepiness is effectively a message from the brain that it requires sleep, similar to hunger indicating need for food or thirst indicating a need for water. Biological sleepiness eventually becomes overwhelming, leading to falling asleep uncontrollably.

[10] Dinges DF, Kribbs NB1991 Performing while sleepy: effects of experimentally-induced sleepiness. In: Monk TH, *Sleep, Sleepiness and Performance*.

[11] Hildebrandt G, Rohmert W, and Rutenfranz J, 1974. 12 and 24 h rhythms in error frequency of locomotive engine drivers and the influence of tiredness. International Journal of Chronobiology.

[12] The increases in biological sleepiness associated with increasing time awake is superimposed on the rises and falls in sleepiness associated with the cycle of the circadian biological clock.

2.8 On 12 September 2003, Tranz Rail Limited[13] accepted a safety recommendation to this effect as a result of Occurrence Report 02-120 covering a collision between 2 electric multiple units in Wellington in August 2002. However, given the potential serious consequences arising from situations such as this, the safety recommendation has been renewed to the Chief Executive of Toll NZ Consolidated Limited.

2.9 While the operator was responsible for ensuring that rostered hours of work, and actual hours worked by locomotive engineers, did not produce circumstances to induce potential fatigue situations, individual locomotive engineers were ultimately responsible for how they spent their off-duty time between and prior to commencing at-risk shifts. It is therefore important that an operator provides appropriate training to ensure shift workers are both aware of their responsibilities in this regard and of the effect injudicious use of off-duty time may have on them working at-risk shifts. Toll Rail's alertness management training programme covered this issue.

2.10 Despite having attended the alertness management training programme, the locomotive engineer, for whatever reason, had not applied the lessons learned from the course relating to the management of off-duty time. This would indicate a need for ongoing refresher training, and a safety recommendation covering this issue has been made to the Chief Executive of Toll NZ Consolidated Limited.

2.11 Time-on-task fatigue refers to reduced performance as a consequence of continuously performing mental or physical tasks[14].. Complex tasks and tasks involving vigilance are particularly susceptible to this type of decrement[15] . Time-on-task fatigue is exacerbated by both acute sleep loss and a cumulative sleep debt[16 17] . Time-on-task fatigue can be minimised with the provision of adequate rest breaks within a shift and limiting the duration of a shift. The length of a work period before a rest break occurs, and the duration of the rest break, is somewhat dependent on the type of task being performed. Early work done in this area demonstrated that performance declined consistently over time and that breaks of as little as 5 minutes could improve performance[18] (5).

2.12 Analysis of the locomotive event recorder from Train 211 showed that the time sequence of events during the 360 seconds (6 minutes) leading up to the incident and until the train stopped was as follows:

- at about 360 seconds, Train 211 was travelling at about 57 km/h in regenerative[19] braking mode
- at about 324 seconds, while Train 211 was travelling at 64 km/h and still in regenerative braking mode, the locomotive engineer took 1 second to respond to and cancel the light cycle of the vigilance device
- at about 219 seconds, while Train 211 was travelling at 56 km/h in idle mode, the locomotive engineer took 5 seconds to respond to and cancel the light cycle of the vigilance device

---

[13] Predecessor to Toll Rail as the operator of the railroad.
[14] Sanders, MS and McCormick, EJ, *Human Factors in Engineering and Design*, 7th ed. 1993, Singapore; McGraw-Hill.
[15] Holding, DH, *Fatigue, in Stress and Fatigue in Human Performance*, G.R.J Hockey, Editor. 1983, Wiley: New York. p. 145 – 167.
[16] Dorrian, J, Rogers, NL, and Dinges, DF, *Behavioural alertness as measured by psychomotor vigilance performance: a neurocognitive assay sensitive to the effects of sleep loss, in Sleep Deprivation: Clinical Issues, Pharmacology and Sleep Loss Effects*, C.A. Kushida, Editor. 2005, Marcel Dekker: New York. P.39-70.
[17] Van Dongen, HPA, *Time-on-task fatigue with increasing chronic sleep loss*, T.L. Signal, Editor. 2005.
[18] Mackworth, JF, *Vigilance and Attention: A Signal Detection Approach*. 1970, Middlesex: England: Penguin Books Inc.
[19] The traction motors are used as generators to create a braking force with the resulting electrical energy being directed back into the overhead wire and is available for use by other locomotives in the vicinity.

- at about 159 seconds, while Train 211 was travelling at 67 km/h in throttle notch 2, the locomotive engineer took 7 seconds to respond to and cancel the light cycle of the vigilance device
- at about 88 seconds, while Train 211 was travelling at 75 km/h in throttle notch, 2 the locomotive engineer took 10 seconds to respond to and cancel the light cycle of the vigilance device
- at about 43 seconds, while Train 211 was travelling at 72 km/h in throttle notch 2, the locomotive engineer made a full service brake application of about 160 kPa.

2.13 Train 211 had stopped at about 168.653 km. It was calculated from locomotive event recorder data that, after the brakes were applied, the train had stopped in about 400 m, taking about 43 seconds to do so. The locomotive engineer had therefore probably been awakened and applied the brakes at about 169.053 km. At that time the locomotive vigilance device was 36 seconds into its cycle and 14 seconds from the light next illuminating. The locomotive engineer had taken 10 seconds to respond to the vigilance during its previous light cycle 36 seconds earlier. It was therefore unlikely if he had he not been awakened that he would have responded to the light. Instead he would probably have continued to sleep until the start of the audio alarm on completion of the light cycle.

2.14 It could not be determined what had woken the locomotive engineer but it may have been the locomotive lurching as it crossed over No 7 points. These points were calculated as being in the immediate vicinity of where the locomotive engineer woke up. However, for whatever reason, had he not been awakened at that time, Train 211 would probably have continued travelling at about 72 km/h beyond 169.053 km, for the 24 seconds remaining in the vigilance cycle, until the audio alarm started. That would likely have woken him, but there could have been an additional 2 seconds allowance for reaction time before he would have made the brake application.

2.15 While travelling at 72 km/h Train 211 was covering 20 metres per second. Therefore, in 26 seconds it would have continued 520 m beyond 169.053 km to about 168.533 km where the locomotive engineer would probably have been awakened by the vigilance audio cycle and applied the brakes. If Train 211 then took 400 m to stop it would have come to rest at about 168.133 km; Train 230 was stationary a further 103 m away.

2.16 Analysis of the available information suggested that a head-on collision between Trains 211 and 230 would probably still have been averted in this scenario. However, unknown variables such as the locomotive engineer's response to the audio alarm, his reaction time when he was wakened and the exact position of Train 230 could potentially have reduced the estimated 103 m separation distance, and possibly have been sufficient to have resulted in a collision with Train 230.

2.17 The inability of the locomotive vigilance device to prevent short-duration microsleeps and the potential consequences raises doubts as to its suitability in its present form. However, despite its limitations it does provide a warning and ultimate response system which must be weighed against the loss of a defence if it were not present in the locomotive cab.

3 Findings

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

3.1 Train 211 overran Down Home Signal 8L at Rangitawa as a result of the locomotive engineer's having fallen asleep uncontrollably.

3.2 The extent of the locomotive engineer's tiredness was probably due to the effects of an accumulated sleep debt arising from poor quality sleep from causes not related to work and conflicting demands on his time before starting his shift on Wednesday 11 May 2005.

3.3 Time-on-task fatigue caused by a lack of insufficient breaks during the locomotive engineer's shift would have been further compounded by the effect of the sleep loss.

3.4 The overrun occurred at a time when the locomotive engineer's biological sleepiness would be expected to be increasing rapidly towards its daily maximum.

3.5 Neither rostered hours, nor the hours actually worked by the locomotive engineer, would have caused excessive sleep debt.

3.6 The existing locomotive vigilance device may not provide an effective defence against short microsleeps, or prevent similar occurrences in the future.

3.7 The actions of the locomotive engineer of Train 230 and the train controller did not contribute to the incident.

3.8 The alertness of the locomotive engineer of Train 230 averted a potential collision between the trains.

4 Safety Actions

4.1 On 6 October 2005, Toll Rail advised that safety actions taken since the incident included:

- Linehaul Operations Manager initiated meetings with the Locomotive Engineer and his family to review sleep strategies.
- Linehaul Operations Manager provided the Locomotive Engineer with further tuition for Alertness (Fatigue) management training and in particular counselling on the benefits of strategic use of caffeine, short naps, etc.
- A SPAD briefing issued to Locomotive Engineers includes information on ensuring they are fit for duty taking into account medical issues, fatigue and significant personal issues that may impact on their ability to safely perform their tasks. This includes events that may occur mid-shift. In the case of feeling the effects of fatigue enroute the advice is recognise the early warning and request to be stopped at the next station.
- Toll Rail's present "Rule Of The Week process is being changed, in conjunction with the split of Codes implemented 3 October 2005, to incorporate regular briefings on critical training supporting rules and procedures, such as fatigue management, crew resource management etc.

4.2 Issue #8 of the joint Toll Rail / Tranz Metro[20] bulletin entitled "Reducing SPAD's – a team effort" dated October 2005 included the section:

> Should you be out there?
>
> A number of SPAD's during the past few years have occurred because the person controlling the locomotive was struggling because of the effects of :
>
> - A medical condition.
> - Fatigue.
> - Significant personal problems.
>
> If you know your ability to work safely during a shift has been impacted by any of the above or a similar situation – let your manager / supervisor know immediately.
>
> If your manager / supervisor cannot be contacted ask to be put in contact with the Linehaul Services Manager who will arrange for someone who can help to call you.
>
> If the problem develops during your shift STOP what you are doing and tell someone as outlined above.
>
> In the case of fatigue – if you think a nap is all you need ask to be pulled out at the next station for a break – when you realise you could be succumbing do it sooner rather than later.
>
> "We would rather wear a delay – your safety and the safety of others cannot be compromised".

5 Safety Recommendations

5.1 On 14 October 2005 the Commission recommended to the Chief Executive of Toll NZ Consolidated Limited, that he:

> ensure that the alertness management training programme includes provision for ongoing refresher training (091/05).

5.2 On 2 November 2005 the Chief Executive of Toll NZ Consolidated Limited replied in part:

> Toll Rail already has a process to test Locomotive Engineer knowledge relating to fatigue. We are in the process of reviewing the theory test papers to ensure that we have all critical elements covered.

Approved on 27 October 2005 for Publication

Hon W P Jeffries
Chief Commissioner

[20] Tranz Metro was the group within Toll Rail with responsibility for the operation of suburban train services in Wellington.

Recent railway occurrence reports published by
the Transport Accident Investigation Commission
(most recent at top of list)

05-117	Express freight Train 211, signal passed at stop, Rangitawa, 12 May 2005
05-111	Express freight Train 312, school bus struck by descending barrier arm, Norton Road level crossing, Hamilton, 16 February 2005
04-103	Shunting service Train P40, derailment, 43.55 km near Oringi, 16 February 2004
04-116	Passenger express Train 1605, fire in generator car, Carterton, 28 June 2004
04-127	Express freight Train 952 and stock truck and trailer, collision, Browns Road level crossing, Dunsandel, 19 October 2004
04-126	Express freight Train 244, derailment inside Tunnel 1, North Island Main Trunk, Wellington, 11 October 2004
04-125	Collision between an over-dimensioned road load and rail over road bridge No.98 on Opaki-Kaiparoro Road, between Eketahuna and Mangamahoe, 2 October 2004.
04-123	Electric multiple unit traction motor fires, Wellington Suburban Network, 7 May 2004 – 30 September 2004
04-121	Locomotive DBR1199, derailment, Auckland, 24 August 2004
04-120	Express freight Train 726, collision with runaway locomotive, Pines, 18 August 2004
04-119	Diesel multiple unit passenger Train 3358, signal passed at Stop and wrong line running irregularity, between Tamaki & Auckland, 28 July 2004.
04-118	Express freight Train 725, track occupation irregularity leading to a near collision, Tormore-Scargill, 20 July 2004
04-112	Diesel multiple unit passenger Train 2146, fire in auxiliary engine, Boston road, 16 April 2004
04-111	Express freight Train 736, track occupation irregularity involving a near collision, Christchurch, 14 April 2004
04-110	Shunt L9, run away wagon, Owen's Siding Onehunga, 5 April 2004

Transport Accident Investigation Commission
P O Box 10-323, Wellington, New Zealand
Phone +64 4 473 3112   Fax +64 4 499 1510
E-mail: reports@taic.org.nz   Website: www.taic.org.nz

Price $22.00   ISSN 1172-828