QUEENSLAND COURTS

OFFICE OF THE STATE CORONER

FINDINGS OF INVESTIGATION

CITATION:	**Non-inquest findings into the deaths of Michael Smithers and Richard Wetherell**
TITLE OF COURT:	Coroners Court
JURISDICTION:	CAIRNS
FILE NO(s):	2008/392 and 2008/393
FINDINGS OF:	Kevin Priestly, Coroner
CATCHWORDS:	Non-inquest findings, collision between B-double truck and Cairns tilt train, truck driver's late detection of train, Rail Safety Unit investigation, and comprehensive safety response.

Contents

Introduction

At 2.47pm on Thursday, 27 November 2008, the northbound Cairns Tilt Train ("CTT") collided with a southbound B-double truck at Rungoo level crossing on the Bruce Highway, about 19.5 km by rail north of Ingham. Mr Michael Smithers and Mr Richard Wetherell, the train drivers, were fatally injured and died at the scene.

A number of investigations were initiated.

I was informed of the collision within a couple of hours and immediately travelled from Cairns to the site to view the scene to better understand the scope of the coronial investigation. A Forensic Crash Unit investigator from Qld Police Service was already on site.

Arrangements were made for the Rail Safety Investigation Unit within Qld Transport to attend and conduct an investigation. The investigation was conducted by Queensland Transport as an independent accident investigation with an investigator from the Australian Transport Safety Bureau acting as the chair and providing resources as necessary. The investigation was conducted in accordance with the legal framework as defined in Queensland's Transport Infrastructure Act 1994.

I was provided with a copy of the Final Report of the Rail Safety Investigation from Queensland Transport published in 2009. The purpose of that investigation was to identify factors that contributed to the collision with the intent of identifying risks that may have the potential to adversely affect rail and road safety at level crossings.

A copy of the Final Report may be accessed through this hyperlink: http://www.tmr.qld.gov.au/~/media/Safety/railsafety/safetyreports/Pdf_rail_safety_qt2493_mundoo_complete.pdf

In parallel, the police investigation through the Forensic Crash Investigation Unit focussed on establishing if any individual might be criminally responsible for the incident.

My role as a coroner is to establish who died, when and where the person died, what caused the death and how that person died. Most of these matter were readily established. How Mr Smithers and Mr Wetherell died required me to identify the contributing factors and this task was more complex.

Given the expertise deployed in the Rail Safety Investigation and Forensic Crash Investigation, my approach was to await the outcomes of those investigations, review the resulting reports, and consider whether any further investigation was required from a public health and safety perspective.

My findings are substantially reliant on the Final Report of the Rail Safety Investigation. I found it comprehensive as to the scope of the matters addressed and detailed in its examination of the particular issues. There was no issue I thought warranted further investigation. Where recommendations were made, I obtained a report from the relevant organisation about implementation and can now report on progress. I am satisfied with progress on implementation of key recommendations.

Finally, I must clarify the role of the coroner in deaths resulting in criminal proceedings. It is not my role to review the conduct of or outcome of criminal proceedings. After a long and complex police investigation, the driver of the truck was charged with dangerous operation of a motor vehicle causing death. The driver pleaded not guilty and the matter went to trial in Innisfail before the District Court. On 25 February 2015 a jury returned a verdict of not guilty.

Readers who are interested to understand what complexity is associated with an investigation of this nature are encouraged to read the Rail Safety Investigation Final Report. While doing so, it should be borne in mind that the police investigation was statutorily prohibited from relying on the Rail Safety Investigation Final Report in the conduct of its prosecution. All the necessary evidence had to be gathered and analysed independently, using its own resources and expertise.

There are very good policy reasons for this statutory prohibition. A Rail Safety Investigation is focused on identifying contributing factors for the purpose of identifying opportunities to improve public health and safety, and to prevent a reoccurrence. The investigation necessarily requires individuals involved in an incident to provide high quality and reliable information, unfettered by concern about possible civil or criminal consequences. It will be evident on reading my findings that the driver did provide such information to the Rail Safety Investigation team.

Background

The location

The Rungoo level crossing is a road/rail crossing between the main north coast rail line to Cairns and the Bruce Highway. As at December 2008, the two way vehicular traffic over the crossing was 2360 per day. Weekly, there were 41 train crossings, 12 were passenger trains consisting of three return Sunlanders and three return Tilt Train services. On average, about six trains cross per day in either direction.

The movement of road traffic is controlled by signs warning about the presence of the level crossing and flashing lights activated by an approaching train. Road users are required to stop at the level crossing when the lights are activated.

The Layout

The immediate southbound approach to the crossing is level with timbered countryside up to the boundaries of the road corridor. A southbound motorist encounters a gradual right curve on approach to the crossing with limited view of a northbound train until about 100m to 150m from the crossing. The Highway remains level as the rail line is crossed and then straightens as it continues towards the Cardwell Range.

A northbound rail approach to the crossing is almost level within 500m. The surrounding countryside is heavily timbered up to the boundaries of the rail corridor and it is not until the train reaches the Bruce Highway corridor, about 40m from the crossing, a view to the north opens.

The road speed limit at the crossing was 100kph. The normal maximum rail speed limit was 80kph but a temporary speed reduction to 60kph was in place for operational reasons.

Train

QR Passenger Pty Ltd, a subsidiary of QR, was the accredited operator of the Tilt Train. The trains started in service in 2003 and operate as a push-pull configuration with a diesel power car at the front and rear of the train and seven air-conditioned cars in between. The train was 197m long, had gross weight of 448t and a passenger capacity of 173. Although capable of greater maximum speeds elsewhere, the maximum between Cairns and Townsville was 80kph.

The Drivers

Mr Smithers and Mr Wetherell operated the Tilt Train from the leading power car. Both were experienced drivers, appropriately qualified, and medically fit for duty. The Rail Safety Investigation team reported that a review of personnel records revealed that both train drivers had a good work history with no employment or safety related infringements during the four years preceding the collision.

Truck

The truck and trailer combination involved in the collision consisted of a 2002 Freightliner C620 class prime-mover hauling two Maxi-CUBE tri-axle trailers. The tare weight of the B-double combination was 28.2 t. This comprised the prime-mover at 8.6 t and the two trailers at 9.5 and 10.1 t respectively. Both trailers were certified to a maximum design gross weight of 35 t. The truck was carrying about 28 t of empty pallets, making the gross weight of the combination was about 56 tonnes.

The truck was later inspected and found in good condition.

The Truck Driver

Mr Michael Nugent was the driver and had over 40 yrs experience in that capacity. He had travelled this section of road before for several years including three return trips in the three weeks before the collision. He was appropriately licensed.

Environmental Conditions

The weather was predominantly fine with showers about the tops of the nearby hills with an overcast sky.

The Collision

There is no issue about what happened in terms of the dynamics of the actual collision. The Rail Safety Investigation reports:

> The front of the CTT impacted the leading trailer of the B-double truck about eight metres from the truck's front bull-bar. The angle of the collision and the speed and weight of the B-double truck imparted very high lateral forces on the driver's cabin of the CTT. This caused the driver's cabin to lozenge which, in turn, reduced the amount of survivable space afforded to the train's two drivers. In essence, the lead power car and, in particular, the driver's cabin of the CTT, bore the brunt of the force of the collision. This was evidenced by the fact that the power car was rotated about 135 degrees in an anti-clockwise direction and that the driver's cabin sheared to the left while the rest of the train's nine carriages remained relatively undamaged.

The focus of all investigations was how and why the collision happened. In particular, how and why did the truck enter the crossing in the path of the oncoming train?

Sequence of Events

In developing the narrative, I have focussed on the evidence about the movement of the truck. The train drivers had no opportunity to take action that might have influenced the outcome.

The truck driver gave an account of the incident to the Rail Safety Investigators and it is reported as follows:

> The truck driver said he left Cairns at about 1100 and proceeded south along the Bruce Highway as far as Innisfail (about 90 km) where he had a sandwich and a soft drink for lunch.
> The truck driver estimated that he departed Innisfail at about 1300 and then continued south along the Bruce Highway. The journey was uneventful until he encountered a level crossing south of Cardwell (Conn) where the level crossing flashing lights were operating but no trains could be seen.

> A truck and a number of other vehicles were also stopped ahead of him at the level crossing. After a short time, presumably upon realising that no trains were approaching, these vehicles moved across the rail line. The truck driver said that, after stopping and having a look each way along the rail line, he did likewise.
>
> He estimated that about seven or eight miles (about 12 km) further south, he encountered another level crossing. By this time he was the leading vehicle as the truck he had been following had pulled over at a rest area and the other vehicles were further along the highway to the south. He said that the flashing lights at this level crossing were not illuminated and, as such, he continued at an estimated 90 km/h around the sweeping right-hand bend on the approach to the level crossing. At an estimated 150 m from the level crossing, he saw a train approaching from his left at about a 45 degree angle and realised it was moving.
>
> He said he applied the brakes hard momentarily but then, realising he would not be able to stop, applied power to get as far across the level crossing as he could in order to try and get the prime-mover clear of the impact point. The truck driver said he could not turn right due to the acute angle of the rail line to the road and, if he turned left, he probably would have rolled the truck into the side of the train.
>
> Within moments the collision occurred and the truck driver felt the prime-mover being violently thrown about before coming to a rest on the side of the road in an upright position. The truck driver then alighted from the truck to assess the situation.
>
> The truck driver said that at the time of the collision the air-conditioning was on, the windows were wound up and both the radio and the CB radio were turned off. He also said that he did not notice any of the advance level crossing warning signs, he only saw the flashing light assembly at the level crossing and they (the lights) were not illuminated.

Witnesses from nearby cars were identified and interviewed. The Rail Safety Investigation team reported:

> The driver of a vehicle immediately behind the B-double truck involved in the collision, a Nissan Patrol, said that he had followed the truck for some distance and had pulled up behind it at the previous level crossing where the lights were flashing continuously. He said that when the truck continued across the level crossing he, after looking for approaching trains, did likewise. He then remained behind the B-double truck all the way to the second (collision) level crossing. He said that both vehicles were travelling between 90 and 95 km/h during this time. On the approach to the collision level crossing, as he encountered the sweeping right-hand bend, he saw that the level crossing lights were flashing. He said he then saw the brake lights of the B-double truck flash momentarily and then black smoke from the truck's exhaust. At this time he heard a horn sounding until impact; he said he was sure it was the train horn. He said the train then passed through the truck's lead trailer and the leading vehicle of the train (the power car) then 'flipped up' into the air. His sister-in-law, who was seated in the third row of seats in the Nissan Patrol, then called the emergency services via the triple-zero number on her mobile telephone.

His sister-in-law had also witnessed the events. Although seated towards the rear of the vehicle, she said that her view was not significantly impeded as this seat was 'built up' higher than the seats in front. She saw the brake lights of the B-double truck come on momentarily and heard a horn sounding before she saw the train appear from behind the line of trees to the left of the level crossing. She also said that as they came around the right-hand bend towards the level crossing she saw that the level crossing lights were flashing.

Both witnesses were asked a number of questions in regard to the flashing lights at the level crossing, both were adamant that the lights were working and clearly visible. They also said that the windows of the Nissan Patrol were wound down because the air-conditioning was not working.

Two people were travelling in a white Mercedes delivery van behind the Nissan Patrol. They were travelling from Cardwell to Townsville for work related activities. At the first level crossing south of Cardwell the level crossing lights were flashing but no train appeared to be in the vicinity. At these lights there was a B-double truck (the collision vehicle) and a four wheel drive vehicle in front of them. After a short while these two vehicles proceeded through the level crossing and, after checking for trains, they followed. Once underway, both estimated that they and the two vehicles in front were travelling at between 80 and 90 km/h.

By this time the driver of the delivery van was engaged in a conversation with a work colleague on his hands free mobile telephone. Some minutes later the person in the passenger seat also received a work related call on his mobile telephone; the delivery van driver then slowed the vehicle slightly so as to reduce road noise. Both were still engaged in their respective conversations when the collision between the B-double truck and the train occurred. The delivery van driver said that he saw a train come from his left out of the corner of his left eye and collide with the truck at the level crossing. At impact he said he saw the engine of the train (the power car) 'fly straight up into the air'. After stopping the vehicle, the driver called the emergency services and told them what had happened. He said he 'did not see the flashing lights working' but was not sure whether he looked or noted this before or after the collision.

The person in the passenger seat estimated that they were about 150 m from the level crossing when he saw a train collide with the B-double truck. By this time he said that they and the vehicles in front had slowed to somewhere between 60 and 80 km/h. The person in the passenger seat said that he did not see if the flashing lights were working, nor did he see the train before the collision.

Three persons not in the immediate vicinity when the collision occurred were also interviewed. The first were residents who lived on the hill beside the Bruce Highway south of the Rungoo level crossing. They said that on a number of occasions previously they have had to call the emergency services upon hearing the noise of crashes on the Bruce Highway below. In this instance both were in the living room of their house with all windows open; the living room faces the direction of the Bruce Highway. They said that they heard the train horn sound for about two seconds and then a very loud 'bang'. The nature of the noise seemed to indicate a very solid impact and there was no 'scraping' noise as is often heard with road crashes.

> The third person interviewed was a semi-trailer driver who had traversed the Rungoo level crossing in a southbound direction a short time before the collision. He said that he had seen a train on his right (southbound) at an estimated 300 to 350 m from the level crossing and that the flashing lights at the crossing were not working at this time. He said that before this there had been a lot of talk on the CB radio about the lights at the 'middle' level crossing south of Cardwell flashing continuously in the absence of any train. At Ingham he heard over the CB radio that there had just been a crash at the level crossing he had traversed a short time before.

The Rail Safety Investigation team reviewed the Tilt Train data logs, level crossing data logs and researched human behaviour applicable at level crossings.

Technical Information

The traffic control system at the crossing used relay control circuits to detect approaching trains and activate the warning system (flashing lights) to alert road users. There was also a Remote Monitoring System (RMS) installed at the crossing to provide offsite testing and monitoring of the traffic control system. The RMS had the capacity to capture and record data events. Some of the equipment used for date monitoring was destroyed in the collision and data was unable to be recovered by normal means (remote transmission to central storage). The data chip was recovered and in a laboratory setting, the data was uploaded to the central storage system for analysis. The data analysis indicated that the crossing lights were activated by the approaching train.

The data analysis was reported as follows:

> The data recorded as 'Level crossing lights on' is determined by the status of the flashing light control relay. This relay controls the flashing light circuits.
>
> It is important to note that an indication of 'Level crossing lights on' does not verify that the lights were flashing, but does verify that the relay controlling the lights has operated. However, in conjunction with the status of the 'Lamp alarm' indication, operation of the flashing lights can be implied. The 'Lamp alarm' indications are indirectly derived from the current flowing in the flashing light circuits. The absence of an alarm implies that the correct current was flowing in the flashing light circuits. In this case, the RMS recorded 'Level crossing lights on' at 1446:36 and the status did not change until the equipment box was damaged by the derailed train. At no time was a 'Lamp alarm' recorded.
>
> In summary, the data indicated that the flashing light circuits were active, the correct current was flowing through the circuits and, as a result, the lights were flashing for the entire time that the train was approaching the level crossing.

Interrogation of the data log from the Train Management System revealed:

a. the train had slowed to 56kph at least 125m before collision and the horn was sounded;
b. the headlight of the train was on;
c. the horn was sounded at 48m before collision; and
d. the brake was moved to emergency about 16m and 1-2 seconds before collision.

Investigators reviewed the road traffic control system for compliance with applicable standards and for effectiveness. This included the effectiveness of the flashing lights, pavement markings and signage. The investigation concluded the traffic control system was compliant, there were no impediments to the southbound road users sighting the traffic control measures, and the alignment and strength of the LED units was visible to southbound road users from 385m north of the crossing – right up to the crossing.

Rail Safety Investigation – Analysis and Conclusion

On reviewing the technical data, Investigators returned to the perplexing question: Why didn't the truck driver see the flashing lights?

> The evidence is that the flashing light signals activated 26 seconds before the collision. If the B-double truck was travelling at 90 km/h then the flashing lights activated when the truck would have been approximately 650 m from the level crossing (26 seconds × 25 m/s). The first point at which the truck driver should have been able to see the flashing lights was 385 m from the level crossing, 10.6 seconds after their activation. He then had another 15.4 seconds in which to observe the operation of the flashing light signals before entering the level crossing.
>
> Using the formula contained in AS 1742.7-2007, a B-double truck travelling at 90 km/h (25 m/s) would require approximately 203 m to stop. This distance is inclusive of 2.5 seconds response time42 and a one second brake delay time.
>
> The difference between the calculated distance required to stop and the point at which the truck driver could first possibly see the lights is 182 m (385 m – 203 m).
>
> Therefore, at 90 km/h the driver had a leeway of about seven seconds to perceive the lights and stop before entering the level crossing (182 m ÷ 25 m/s = 7.28 seconds). However, the truck driver stated that the level crossing lights were not flashing and therefore he did not attempt to stop prior to sighting the CTT.

Investigators identified a number of possible indicators to the truck driver that a train was approaching:

a. visual detection of the train;
b. audible detection – the train horn; and
c. visual detection of the warning lights;

Immediately, some were excluded. Visual detection of the approaching train in time to stop was not possible given the distance, speeds of travel and first opportunity to detect its presence due to the physical layout and setting of the crossing. The horn was unlikely to be heard given the distance apart, dense foliage, background noise and closed windows. Failure to detect the warning lights introduces its own peculiar complexities and was the subject of detailed investigation and analysis.

In the event that the lights were working, Investigators explored two possible scenarios:

a. A - The truck driver detected the flashing lights but had limited confidence that the lights indicated the presence of an approaching train; or
b. B - The truck driver did not detect the flashing lights.

Investigators note that scenario A is inconsistent with the drivers account.

In addressing scenario B, the Investigators report on the basics of human information processing then raise the concept of 'look but did not see', in particular, the possible application of inattentional blindness.

> Inattentional blindness occurs when a person does not notice an object which is fully-visible, but unexpected, because their attention is engaged on another task. It is a failure to perceive what would appear to others as an obvious visual stimulus. However, this does not necessarily mean an individual was 'not paying attention', merely that their attentional resources were occupied elsewhere. As all individuals have limited attentional resources, it is possible for an individual to simply miss vital visual stimuli if their attention is allocated on another task.
> Research on human information processing suggests that inattentional blindness can occur when attention is filtered away from information and can be affected by mental workload, expectation, conspicuity and capacity. As attentional resources are limited, if the viewer is attending to something else, it is possible that the driver may not notice the stimulus. Research by Mack and Rock (1998) has shown how a person may fail to detect an object even though they were looking directly at it.
>
> Research has shown that people overestimate their ability to detect changes or objects in their visual environment (Levin et al, 2000). When asked whether they can detect a particular type of change or object, many people say they can. However, actual detection rates are much lower than these expectations.

Therefore, although the presence of flashing lights at a level crossing may seem obvious to someone who knows they are flashing, it is not necessarily salient to someone who does not know they are flashing.

Investigators were able to exclude the following potential reasons for not detecting the warning lights:

a. Medical and physiological factors including eyesight testing;
b. Visual obstructions in the cab;
c. Distractions and workload including CB radio and phone use;
d. Time pressure;
e. Environmental conditions;
f. Effectiveness of the flashing lights; and
g. Crossing awareness.

Investigators found there was some scope for two other factors to contribute to a failure to detect the warning lights.

a. Expectancy –

"The truck driver said that he had never seen a train passing over the Rungoo level crossing and had rarely seen trains at the other level crossings that he regularly used. It follows that he may have had a low expectancy of seeing a train at a level crossing. This may have led to an increased potential of the truck driver not looking for trains or warning devices or looking but simply not seeing trains or warning devices."

b. Fatigue –

"It is possible that the driver of the truck was experiencing some fatigue and/or may have suffered a microsleep, which resulted in him being less likely to be able to detect the flashing lights at the level crossing. Given the incomplete record of the truck driver's work and sleep patterns in the days prior to the crash, there was insufficient evidence to draw any definite conclusions with respect to fatigue affecting specific events or the behaviour of the truck driver before the collision.

However, fatigue remains a possible factor in the collision."

The Investigators concluded:

"Based on the information available, a definitive reason as to why the B-double truck driver did not stop at the Rungoo level crossing could not be determined. Both scenarios are possible but, with the information available it is not possible to say one scenario is more likely than the

> other. However, it is important to note that, in this instance, the defences present at the Rungoo level crossing were not sufficient and a single point of failure has resulted in the collision."

Immediate Remedial Action

The Rail Safety Investigation reported:

> In March 2009 the Federal Government announced a $150 million rail crossing improvement program for the upgrading of over 200 level crossings nationally. Of this amount, $42.7 million was allocated for the upgrade of level crossings in Queensland. The Queensland State Government had already allocated $31 million for level crossing upgrades, meaning that a total of $73 million will now be spent on the upgrade of level crossings in Queensland.
>
> Of note is that the Bruce Highway (as part of the national Auslink road network and funded by the Federal Government) has been allocated $90 million for an upgrade at the Cardwell Range. This project involves the easing of road curvature and grade of the Bruce Highway for a distance of 4.2 km on the northern side of the Cardwell Range. Included in a broader design of this project was the elimination of the Rungoo level crossing by a road over rail overpass. Confirmation that the project would include a rail overpass at the site of the Rungoo level crossing was received from the then Queensland Government Minister for Main Roads and Local Government shortly after the collision between the CTT and the B-double truck on 27 November 2008.

It will be evident to anyone familiar with the former location of Rungoo Crossing, the work foreshadowed in the report was completed within a couple of years of the incident. The Qld Government implemented a state-wide rail crossing improvement program.

Other Rail Safety Findings and Recommendations

Crashworthiness of the Drivers' Cabin

The drivers' cabin of the Tilt Train lozenged during the collision sequence reducing the amount of survivable space. The Rail Safety Investigation found that the Tilt Train was constructed in accordance with the QR crashworthiness requirements of the applicable standard from 1999. That standard was consistent with European and American Standards for crashworthiness at the time. However, these rolling stock standards do not take into account high levels of lateral loading in their crashworthiness requirements. Further, not all of the aspirational specifications contained in the standard were fully confirmed as being incorporated in the design of the Tilt Train drivers' cabin. Even if the Tilt Train driver's cabin had been fully compliant with all the aspirational requirements, the survivable space would not have been significantly greater. Further, it is unlikely drivers' cabin built to a modern crash standard, if subjected to the forces involved in this collision, would have resulted in significantly greater survivable space.

The Rail Safety Investigation team engaged an independent consultant who found there were practical measures that could be employed to incrementally improve the structural integrity of the cab structure.

These findings resulted in recommendations that:

a. The Rail Industry Safety and Standards Board (RISSB) progress the issue of locomotive crashworthiness standards to take account of high levels of lateral loading.
b. QR Passenger Pty Ltd engage consulting engineers to examine ways in which the structure of the drivers' cabin of the Tilt Train can be practically improved.

In response to these recommendations, the RISSB provided a report on its attitude to the recommendations and progress with implementation. It responded:

a. There is one Australian Standard published by RISSB and one draft Australian Standard being developed by RISSB which are of relevance to this issue. The published standard is AS7520:2012 Rolling Stock Body Structural Requirements (specifically, Part 1: Locomotives, Section 9 Crashworthiness Performance). The draft Australian Standard is AS7521 Rolling Stock Interior Crashworthiness which is scheduled to be completed in the financial year 2016/17.
b. AS7520 directly references both the North American AAR S-580 (for all locomotives) and European Standard EN15227 (applied as an additional requirement for power car locomotives). AAR S-580 specifies collision corner posts (i.e. a rigid cage), while EN15227 specifies a CEMS (Crash Energy Management System or crumple zone).
c. Both of these standards are focused on longitudinal loads due to the fact that until recently sideways impacts onto locomotives were reasonably considered a very low risk; road vehicles historically expressed lower levels of inertia but have now become large enough to cause a hazard to locomotives.
d. Given that AS7520 directly references AAR S-580 and EN15227, RISSB is seeking advice from the respective overseas technical committees regarding their intentions to revise their standards to include high levels of lateral loading. Any change in these standards will flow through to AS7520 as part of RISSB's continuous improvement program.

e. RISSB acknowledges that rolling stock crashworthiness design issues require further investigation and this is why the AS7521 project was initiated. This standard (and all RISSB standards) focuses on new or modified rolling stock only. It will not have any bearing on the existing fleet of rolling stock which are all designed to older standards. The average lifespan of rolling stock in Australia is around 30 years.

Clearly, the lessons learnt in the context of design features relevant to crash worthiness is work in progress.

I also sought a report from QR Passenger Pty Ltd about the recommendation directed to it. QR responded:

a. "Following SKM's lateral load analysis, and in order to improve occupant protection on the CTT power cars, two modification options were evaluated by SKM with the aim of reducing the lozenging action of the cab when subjected to high lateral impact loads. While the two modifications improved the power car cabins resistance to lateral impact, one provided superior performance to the other in preserving cabin space at the load levels analysed. The improvements proposed by SKM were adopted into a new CTT power car (DTD 5405) that was being built by Downer EDI Rail.
b. A similar modification to improve lateral strength was also carried out on the remaining CTT power cars (DTD5401, DTD5402 and DTD5404). Specifically, a K-brace modification was implemented in an effort to resist lozenging of the cab. The modification was welded onto the existing underframe structures and validated by Queensland Rail's rolling-stock engineers in conjunction with advice from a senior structural engineer. These modifications were completed on 27 October 2011."

QR also reported that the Sunlander 14 project included the construction of four new power cars for the Tilt Train. The construction contract with Downer EDI required structural strength and integrity to be balanced with the crashworthiness design collision scenarios in European Standard EN 15227. The structure needed to be strong enough to deform in a controlled manner in the event of a collision with an identical train or with a tanker at a level crossing. The various design scenarios were simulated on computer to assess the crashworthiness performance. QR reports it has settled on a crash energy management system that effectively implements the recommendation to improve driver's cabin crashworthiness.

I am satisfied that all reasonable steps have been taken in pursuing implementation of the recommendations relevant to crashworthiness of the drivers' cabin.

Vehicle Monitoring and Driver Fatigue Management

The Rail Safety Investigation team reported there was considerable difference in terms of vehicle monitoring and driver fatigue management between a best practice road and rail operations and those used by many road transport companies. From the data recorders on the Tilt Train the investigation team was able to reconstruct the minutes to seconds leading up to the collision. However, the B-double truck had no such equipment fitted.

The team recommended that the Australian Transport Council continue to investigate options aimed at expanding the Intelligent Access Program (or alternate programmes) that will enable issues relating to heavy vehicle speed and driver fatigue to be better monitored and enforced.

In relation to driver fatigue, Queensland Transport reports that since 2008, progress has been made towards the development and testing of electronic monitoring systems designed to better monitor and manage a heavy vehicle driver fatigue. The Electronic Work Diary is an electronic recording system as an alternative to the paper-based written work diaries to record work and rest times for fatigue purposes. The electronic version uses Global Navigation Satellite System technology to more accurately track time and place with automatic data transfers to a service provider. An operational pilot was trialled in New South Wales from 2010 to 2012. The Electronic Working Diaries will be introduced nationally as a voluntary system in 2017.

Queensland Transport also reports it has significantly enhanced its Automatic Number Plate Recognition System to provide point in time information about the location of a heavy vehicle. Cameras are strategically located across the Queensland freight network and mobile cameras are installed in compliance vehicles.

Clearly, advances in technology will continue to enhance the capability of regulators to monitor vehicle movements including for fatigue management purposes. Coroners will continue to monitor developments in this area to encourage uptake of technology by transport operators and regulators.

Emergency Response

The emergency response from the train staff as well as external agencies such as Qld Police Service, Qld Ambulance Service and Qld Fire and Rescue Service was reported as excellent. Initial calls from the scene reached emergency services about 2.49 – 2.50pm. The agencies responded as follows:

- QPS - Between 2.49 and 3.06pm, five police units were directed to respond. At 3.10pm the first police unit (from Cardwell) arrived at the site.
- QAS – Two ambulances with three paramedics were dispatched from Ingham at 2.54 and 2.56pm, arriving at the site at 3.08 and 3.10pm respectively. From this time, resources in the

form of many more ambulances, two Queensland Rescue Helicopters and one emergency response vehicle were dispatched from Townsville, Ingham, Halifax, Northern Beaches, Cardwell, Mission Beach and Cairns bases.

- QFRS - At 2.53pm, the first of two fire and rescue vehicles departed Ingham with four QFRS personnel on board. Arrival at the crossing was recorded as 3.07pm. At 3.17pm, a second and third unit from Halifax and Ingham (respectively) arrived at the crossing. There were seven QFRS personnel aboard these vehicles. A further vehicles subsequently arrived (from the north) from Cardwell, Innisfail, Tully and Cairns from 3.23pm onwards. In total, eight QFRS fire and rescue vehicles with 30 personnel attended the scene. In addition, four QFRS officers from Ingham, Tully, Innisfail and Cairns attended.

The Rail Safety Investigation team concluded the emergency response by the onboard staff was in accordance with the QR policy and of a very high calibre. The emergency response by emergency services were effective with respect to timely attendance and the resources provided.

By the time I arrived on scene, the emergency response was in its final stages. Nonetheless, it was impressive to see what resources were deployed and how quickly. All of the emergency services later conducted a comprehensive debrief and identified opportunities to improve upon what was an impressive response.

Finalisation

The safety of motorists, particularly heavy vehicles, and trains at the Rungoo level crossing was dependent on drivers detecting the flashing warning lights. The opportunity to otherwise detect an approaching train was negligible. The defences present at the crossing were not sufficient and a single point of failure has contributed to the collision.

I have reviewed other cases of rail crossing fatalities that were investigated and reported by the Australian Transport Safety Bureau with a view to familiarising myself with the investigative techniques and methodologies used to explore how collisions like this might happen. I am satisfied that the Rail Safety Investigation fully explored and exhausted all lines of inquiry into how this collision occurred. No further investigation is required.

Findings required by s45

Identity of the deceased – Michael William Smithers and Richard Wetherell

Place of death – Rungoo level crossing on the Bruce Highway, North Queensland

Date of death– 27 November 2008

Cause of death – Multiple injuries due to a train collision (Driver)

How they died –

At 2.47pm on 27 November 2008 Michael William Smithers and Richard Wetherell were the drivers of the Cairns Tilt Train, then northbound and approaching the Rungoo level crossing of the Bruce Highway at about 60kph.

At the same time, a B-double truck was approaching the crossing, southbound on the Bruce Highway at about 90kph.

At the crossing, the train collided with the leading trailer of the B-double imparting very high lateral force, lozenging the drivers cabin and rotating the power car about 135 degrees in an anticlockwise directions.

Michael Smithers and Richard Wetherell suffered fatal injury from the collision.

Although there were a number of design features intended to control and mitigate the risk of a collision, the physical layout and alignment of the road and rail corridors resulted in heavy reliance on road users detecting flashing lights, warning of a train approaching the crossing.

The truck driver reported not seeing the warning lights flashing and when the train came into view, he momentarily applied the brakes. But realising it was too late to stop, the truck driver applied power to try and get the prime mover clear of the impact point. Investigations revealed that all technical indications were the flashing lights were activated. It is possible that the truck driver looked but did not see the lights flashing. How?

Inattentional blindness is a human information processing phenomenon that emerges in human factor analysis in crash investigation studies. It occurs when a person does not notice an object which is fully visible, but unexpected, because their attention is engaged on another task; in stark contrast to 'not paying attention'. This is a phenomenon that has arisen in other fatal rail crossing collisions.

There is also the prospect that the truck driver's attention was affected by the low expectancy of encountering a train at the crossing, and limited confidence in the significance of the lights given his experience a few kilometres earlier.

The reliability of the evidence does not enable me to come to a final conclusion about what factors existed and contributed, either alone or in combination, to the failure to stop. The convening of an inquest and hearing the evidence of witnesses is unlikely to help me in better understanding about how this happened.

However, the heavy reliance on warning lights as a defence against collision gave rise to a potential single point of failure. That defence failed with catastrophic consequences. Appropriate remedial action was swiftly taken.

Kevin Priestly

Coroner

20 May 2016