Australian Government
Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY REPORT
Rail Occurrence Investigation RO-2011-002
Preliminary

Collision between suburban passenger trains G231 and 215A in Adelaide Yard, South Australia

24 February 2011

Figure 1: Leading railcar 3133 of train G231, looking towards Adelaide Station

Abstract

At 1209[1] on 24 February 2011 a suburban passenger train (215A) with 17 passengers on board was being routed from the Up South Main Line into number 5 platform at the Adelaide Railway Station. At about the same time a second passenger train (G231) with 22 passengers on board that was departing the Adelaide Railway Station passed signal 141 located at the end of number 3 platform at low speed. The signal was displaying a stop (red) indication.

A short time later the drivers of both trains realised that they would come into conflict and applied their train's brakes, too late to avoid a collision. There were no injuries as a result of the collision but both trains sustained minor damage.

The investigation is continuing.

The information contained in this preliminary report is derived from the initial investigation of the occurrence. Readers are cautioned that it is possible that new evidence may become available that alters the circumstances as depicted in the report.

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[1] The 24-hour clock is used in this report. Australian Central Daylight-saving Time (CDT), UTC + 10.5 hours. Unless shown otherwise, all times are CDT.

FACTUAL INFORMATION

Location

The Adelaide metropolitan passenger railway system is operated by 'Public Transport Services' (PTS) the trading name for the Office of the Rail Commissioner[2], the legal entity that operates and maintains Adelaide's suburban train system.

The Adelaide Railway Station is the central terminus for Adelaide's suburban passenger train network. The station is located on the north side of North Terrace and to the east of the Morphett Street road bridge.

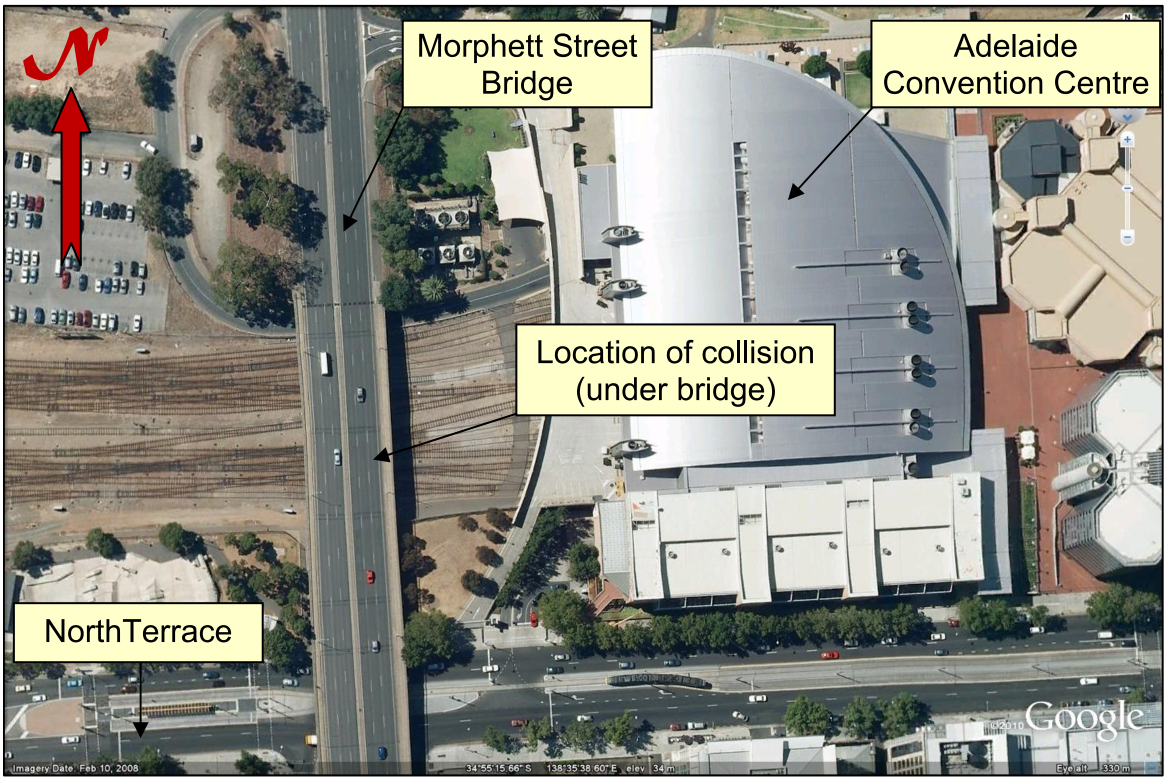
The collision occurred on the southern side of the railway yard, just outside of the Adelaide Railway Station and beneath the Morphett Street Bridge.

Train information

Train G231 was a regular passenger service that consisted of two 3100 class diesel/electric multiple units (DMU 3133 leading and 3134 trailing). The train was 52 m in length and weighed 92 t.

Train 215A was also a regular passenger service, comprised a single 3000 class diesel/electric multiple unit (DMU 3027). The train was 26 m in length and weighed 46 t.

Figure 2: Aerial view – Adelaide Railway Station, South Australia



It is a 'dead end' station with nine platforms all of which are located beneath the Adelaide Convention Centre. All trains are signalled into and out of the railway station using colour light signals that are controlled by a computerised safety system.

Public Transport Services operate their trains with only one driver. As a defence against driver error, trains are provided with a vigilance system comprising a 'dead man's system' and Automatic Warning System (AWS).

At the time of the incident the driver of train G231[3] was 'Class 4' qualified and therefore allowed to drive unsupervised over all of Adelaide's suburban passenger main lines.

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[2] The *Rail Commissioner Act 2009* came into operation on 3 December 2009. On 6 September 2010 it was announced that TransAdelaide would be abolished and its staff and functions transferred to the Office of the Rail Commissioner.

[3] Train G231 was the service reported as having passed signal 141 while displaying a stop (red) indication.

He had about 2 years experience in the rail industry having commenced employment with TransAdelaide in July 2009. After completing pre-requisite training he became a 'Class 3' driver and was allowed to perform shunting duties at the Adelaide Railcar Depot. He commenced main line driver training (under supervision) in March 2010. By late May 2010 he had qualified as a 'Class 4' driver and therefore was allowed to drive unsupervised on Adelaide's passenger main line network. He had been driving for about 8 months when the incident occurred.

The driver of train 215A had over 20 year's industry experience of which 12 years included main line driving duties on the Adelaide passenger rail network. He was appropriately qualified as a 'Class 4' driver and therefore allowed to drive unsupervised on the Adelaide passenger network.

When trains depart the Adelaide Railway Station the driver is given a 'Right of Way' (RoW)[4] hand signal by a platform coordinator (PC) or a passenger service assistant (PSA), depending on the train configuration. The PC who provided the RoW signal to the driver of train G231 had over 30 years experience in the rail industry of which 25 years included the duties of station supervisor and platform coordinator at the Adelaide Railway Station. At the time of the incident he was appropriately qualified.

An examination of PTS records established that the two drivers and the PC were assessed as medically fit as prescribed by the *National Standard for Health Assessment of Rail Safety Workers*. It was also established that the two drivers had not been involved in any previous operational safety related incidents or SPAD[5] events. The PC advised that, about two weeks earlier, he had given RoW to a train that had passed a signal at stop, this was the only known operational safety incident in which he was involved.

The occurrence

At about 0440 on the morning of the incident, the driver of train G231 signed on for duty at the Dry Creek railcar depot. The depot is located about 10.600 track kilometres north of Adelaide on the Gawler railway line. After signing on, he went out into the yard and prepared two train sets for traffic. He then departed with one of the sets for Adelaide. The first revenue service that he worked was to Oaklands followed by the 0809 service to Belair and return. He then had a rostered break of about two and a half hours before working train G231.

Early the same morning, at about 0814, the rail system experienced a major service disruption caused by the breakdown of a 2000 Class railcar, on the Noarlunga Line. This event caused significant delays throughout the morning.

The PC on duty at the time of the incident commenced work at 1030.

The driver of train 215A (involved in the collision) signed on for duty at 1100 at the Belair depot, which is located about 21.500 track kilometres south of Adelaide. Train 215A departed Belair at 1131 and the journey to Adelaide was uneventful until just before the collision.

By about 1200, the Belair train (215A) was en route to Adelaide Railway Station. At this time the driver of train G231 had just finished lunch and left the crib room to make his way to platform 3 to join train G231. As he walked along platform 3 he noticed a stationary two car set close to the buffer stop. Being unsure if this was his train he conferred with the PC who advised that his train was running late and would be alongside shortly[6].

Train G231 arrived into platform 3 about 3 minutes before its scheduled departure. The driver of train G231 had a brief conversation with the driver that he was taking over from to ascertain whether there were any issues with the train; there were none. He then spoke with the PC, joined the train, completed pre-departure checks and passenger announcements. At 1208 the PC gave the driver of train G231 a 'yellow' RoW flag

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[4] The RoW signal given to a driver indicates that passengers are either onboard or clear of the train at the scheduled departure time and also the status of the 'Starter Signal' located at the end of the platform.

[5] SPAD - Acronym for 'Signal Past at Danger', the unauthorised passing of a signal displaying a stop indication.

[6] The PTS (TransAdelaide) Operating Rules and Signalling system permit multiple trains to marshall in the Adelaide Station platforms. This was not a safety issue in relation to this incident and is a normal operating practice.

indicating that the signal ahead, 141, was at stop. The driver acknowledged the PC and also observed that signal 141 was at stop. He then made a final passenger announcement, closed the railcar doors, and accelerated slowly towards the end of the platform in notch one.

The driver's recollection thereafter was that when he next looked at signal 141 it was displaying an '*SS and a green light*'. That is, he thought the route ahead was set and clear for the Down South Suburban Main.

At this time train 215A, travelling on the Up South Main, had just entered a network of points leading into number 5 platform and would therefore cross directly in front of number 3 platform.

The driver of train G231 had become preoccupied with additional departure checks, including a review of the timetable as his train moved along number 3 platform. At 1209:10 the train passed signal 141. It was about this time that the driver noticed a railcar (215A) travelling on the South Main Line, and that it appeared to be coming towards his train.

Initially the driver was not concerned as there are many train movements occurring throughout Adelaide Yard, many of which appear to converge. In fact, both trains were now on a collision course and it was only in the last moments that both drivers realised the pathing of their trains would result in a collision. Both drivers applied their train's brakes but the two trains collided with the off-side front of train G231 clipping the off-side of train 215A. Both trains came to a stand within a short distance. The driver of G231 immediately contacted the Operations Control Centre over the radio system.

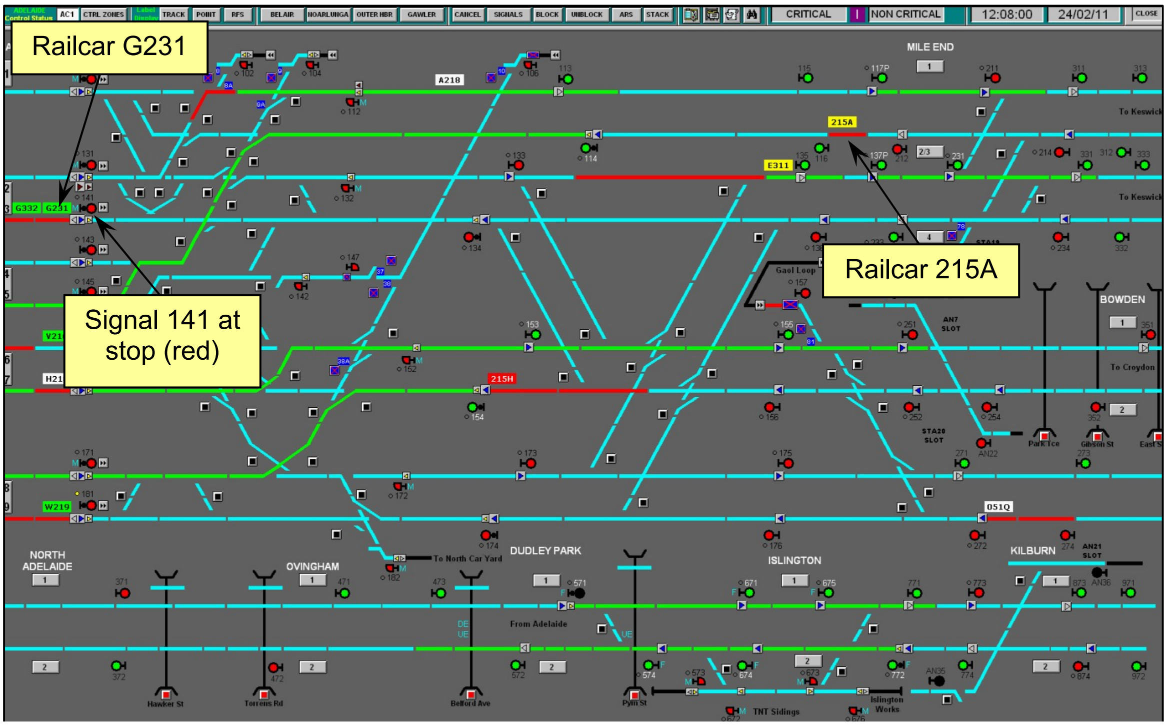
Both drivers were directed to remain with their trains.

Post occurrence

On 24 February 2011, the Australian Transport Safety Bureau (ATSB) received notification of the collision from the South Australian 'Office of the Rail Safety Regulator' (ORSR) with a request to investigate. The ATSB dispatched investigators from the Adelaide Field Office. The initial investigation concentrated on the preservation of perishable evidence including; train control data replay logs, train data logs, and site inspection information.

Immediately following the incident the two drivers and the PC were drug and alcohol tested, all returned zero readings.

Figure 3: Adelaide Yard, Operations Control Centre replay 1208:00.



Site information

In the week following the collision ATSB investigators interviewed the two train drivers and the PC who were involved in the incident. In addition, the ATSB also sourced evidence such as train consist details, train control graphs, training records, medical and roster information, rules and procedures and a history of similar events.

Based on a preliminary examination of this information including the driver's account of events, it was concluded that signal 141 was displaying a stop (red) indication when the PC correctly gave the 'yellow' RoW flag.

This was corroborated by the Train Control data replay log (Figure 3) that shows signal 141 was at stop (red) at 1208:00 which coincided with the time the PC gave the RoW.

The examination of the Train Control data replay log (Figure 4) and the computerised safety interlocking data show that signal 141 did not clear at any time as train G231 approached it and was displaying a stop (red) indication as the train went past it.

The investigation found no evidence of any mechanical defect or deficiency with train G231 or 215A that may have contributed to the initial SPAD at signal 141 or subsequent collision between the two railcars.

Further investigation

The investigation is continuing and will include an examination of the following:

- Verification of the aspect displayed by signal 141 at the time when passed by train G231.
- Signal conspicuity.
- The actions of the train driver.
- Factors that may have influenced the driver's actions.
- Driver training.
- The actions of the platform coordinator.
- Right of Way rules and procedures.
- History of similar events and action taken or considered to reduce the safety risk.
- Factors that may reduce the SPAD risk including an examination of the train vigilance system.

Figure 4: Adelaide Yard, Operations Control Centre replay 1209:10 showing train G231 having just passed signal 141, displaying a stop (red) indication, illumination of SPAD alarm and position of train 215A.