Australian Government
Australian Transport Safety Bureau

Office of Transport Safety Investigations

Collision between a passenger train and a motor vehicle

near West Dapto Road level crossing, Kembla Grange, New South Wales on 20 October 2021

ATSB Transport Safety Report
Rail Occurrence Investigation (Defined)
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Addendum

Page	Change	Date

Safety summary

What happened

In the early hours of 20 October 2021, NSW Trains' passenger train service (C012) collided with an abandoned motor vehicle on the rail line south of the West Dapto Road level crossing and Kembla Grange railway station.

The collision with the motor vehicle caused the first carriage of the train to derail and separate from the rest of the train. The front carriage collided with a high voltage stanchion, then tipped on its side, sliding into the adjacent land of the rail corridor.

The driver received serious injuries and two passengers in the lead carriage were also injured. They and the guard were taken to hospital for observation. The other eight passengers were assessed on site and medically cleared.

There was significant damage to the rolling stock, rail infrastructure and overhead wiring as a result of the collision.

What the ATSB found

On 27 October 2021, NSW Police charged an individual with endangering passengers on a railway and obstructing a railway. On 15 November 2022, the individual pleaded guilty to these offences and eight other separate offences. The actions of the individual directly contributed to the collision when the motor vehicle was abandoned after it was driven onto the railway tracks and became stuck.

This individual was captured on Kembla Grange railway station's closed-circuit television (CCTV). They moved the level crossing cameras away from the level crossing to face directly downwards about 45 minutes before the collision. Sydney Trains Security did not detect camera tampering at this time. A CCTV Upgrade Project was scoped to install and commission tamper alarms on high-risk CCTV cameras, but the alarms were not operating on these cameras at the time. If the tamper alarm functionality on the CCTV cameras was activated and working as intended, security may have detected the camera tampering.

A member of the public called triple zero, alerting police of the motor vehicle on the rail line about 4 minutes prior to the collision. The call was not treated as an emergency by all parties involved, and the actions taken to alert the train crew of the motor vehicle on the rail line did not allow the train crew time to act and avoid the collision.

After the incident, the guard tried to make an emergency call on the Digital Train Radio System (DTRS) located at the guard's workstation. The DTRS was not working as it had gone into standby mode as a result of the control circuit breaker tripping – which likely occurred during the separation of carriages.

The guard's training and the other available resources did not provide the guard the knowledge to reboot the DTRS. In this instance, mobile phone coverage was available and the lack of knowledge about the DTRS was not a factor in being able to communicate. The use of a work issued mobile phone allowed the guard to report the incident to Network Control in a timely manner.

The Sydney Trains' Security Control Centre Standard Operating Procedure contained conflicting instruction for incident response. It referred to the Train Services Delivery Manager (TSDM) in the Incident Response Checklist in addition to the Network Incident Manager (NIM). This potentially added an additional step in communications during incident response before the information reached someone with the ability to warn or stop train services.

The derailment brought down potentially live 1,500 V overhead wires to ground level and whilst the guard and first responders were moving around the wreckage to help passengers, this

overhead wiring had not been confirmed as isolated. While this presented a risk to the guard and first responders attending to the driver and injured passengers, the guard had identified the potential sources of electricity and informed the first responders to stay clear.

This investigation also reviewed the status of the remaining open recommendations and actions from the Special Commission of Inquiry into the Waterfall Rail Accident. This was to determine if any outstanding actions had influence and/or importance to the outcomes of this investigation. The review found there were no outstanding actions that influenced or had importance to the outcomes of this incident.

What has been done as a result

Sydney Trains conducted post-incident technical and systemic investigations and made 14 internal recommendations for their organisation to address key safety issues from this incident. Sydney Trains reported all recommendations of its internal report were completed and closed.

Key actions taken to address the safety issues raised in this report and the 14 recommendations of Sydney Trains' internal report are detailed below.

To address the safety issues raised in this investigation, the Security Control Centre Standard Operating Procedure was aligned with the Sydney Trains Network Incident Management Plan with Security Control Centre Operators required to contact NIMs rather than TSDMs.

Security Control Centre Operators' initial training in responding to emergencies was upgraded to improve communications during emergencies and a recertification module was developed to be provided as refresher training.

CCTV software was upgraded to allow use of a centralised server-based analytics engine to provide alarm functionality. At the time of publication, Sydney Trains was in the process of development, testing and trialling alarm functionality to enable detection of incidents such as the tampering at the West Dapto Level Crossing while reducing the false alarm rate.

The additional actions taken by Sydney Trains to address their internal recommendations included sharing of learnings with other key stakeholders, assessing feasibility of improving emergency lighting circuitry on Tangara Sets, reviewing actions of key personnel to ensure alignment with emergency procedures and reviewing and updating risk registers and procedures to account for learnings from this incident.

Safety message

All obstructions reported on the rail line should be treated as an emergency, and priority given to urgently stopping trains on the network to avoid collision by the most effective means available.

Rail operators should assess their risk exposure in circumstances where they have been unable to implement planned controls. They should consider implementing alternative or short-term controls to reduce the risk exposure until the agreed controls are in place.

The processes and procedures that are established by accredited rail operators are the mechanisms by which the accredited operator has provided assurance they are able to manage risks safely. Rail operators should regularly review their controls to ensure they remain effective and continue to achieve their intended purpose.

When introducing new or changing existing procedures, change control processes should consider the impact on other related procedures to ensure the integrity of risk controls is maintained. Consistency in these procedures throughout the organisation should be confirmed to ensure controls remain effective.

Contents

The occurrence

On 20 October 2021, NSW Trains' passenger service (C012) departed Kiama at 0339 en route to Central Station in Sydney. As the train approached Kembla Grange Station at approximately 0409 it collided with an abandoned motor vehicle on the rail line. This motor vehicle had been left on the rail track approximately 68 m on the south-west side of West Dapto Road level crossing at Kembla Grange.

When the first carriage of the train struck the motor vehicle, it derailed and separated from the other carriages, collided into a high voltage stanchion, tipped onto its side, and slid into the adjacent land of the rail corridor. The driver and two passengers in the first carriage were injured and required hospitalisation. The guard was also taken to hospital for further observation. The remaining eight passengers were assessed on site and medically cleared. There was no-one in the motor vehicle at the time of the collision.

Police were onsite within minutes of the incident, having received an earlier notification of a motor vehicle on track from a member of the public via triple zero. The police assisted with the injured driver and passengers who were taken to hospital.

There was significant damage to the rolling stock, rail infrastructure and high voltage overhead wiring as a result of the collision.

Motor vehicle on the rail line

At 0313 (EDT)[1] a Sydney Trains' security camera located on the Kembla Grange Station platform recorded an individual moving the security camera. The camera was moved to focus away from the West Dapto Road level crossing towards the ground. There was no mechanism to alert the Security Control Centre Operators (SCCO)[2] at the Sydney Trains Security Control Centre to this event.

At 0326 a second security camera, also located on the Kembla Grange Station platform, recorded being moved from its focus on the West Dapto Road level crossing towards the ground. This movement was also not alerted to or detected by the SCCO at the Sydney Trains Security Control Centre.

Likely between 0326 and 0405, when police received the first report of a motor vehicle on track, a vehicle was driven onto the railway tracks and abandoned after it became stuck on the rail.

Police forensics marked the location of the motor vehicle at 91.732 km, 68 metres from the West Dapto Road Level Crossing (see Marker A in Figure 3).

Train service C012

At 0339 C012, a 4-carriage Tangara passenger train service departed Kiama Station en route to Sydney Central Station. As part of the scheduled stops, the train arrived at Dapto Station to pick up passengers and departed shortly after at 0407. The driver gradually accelerated the train to the track speed limit of 100 km/h.

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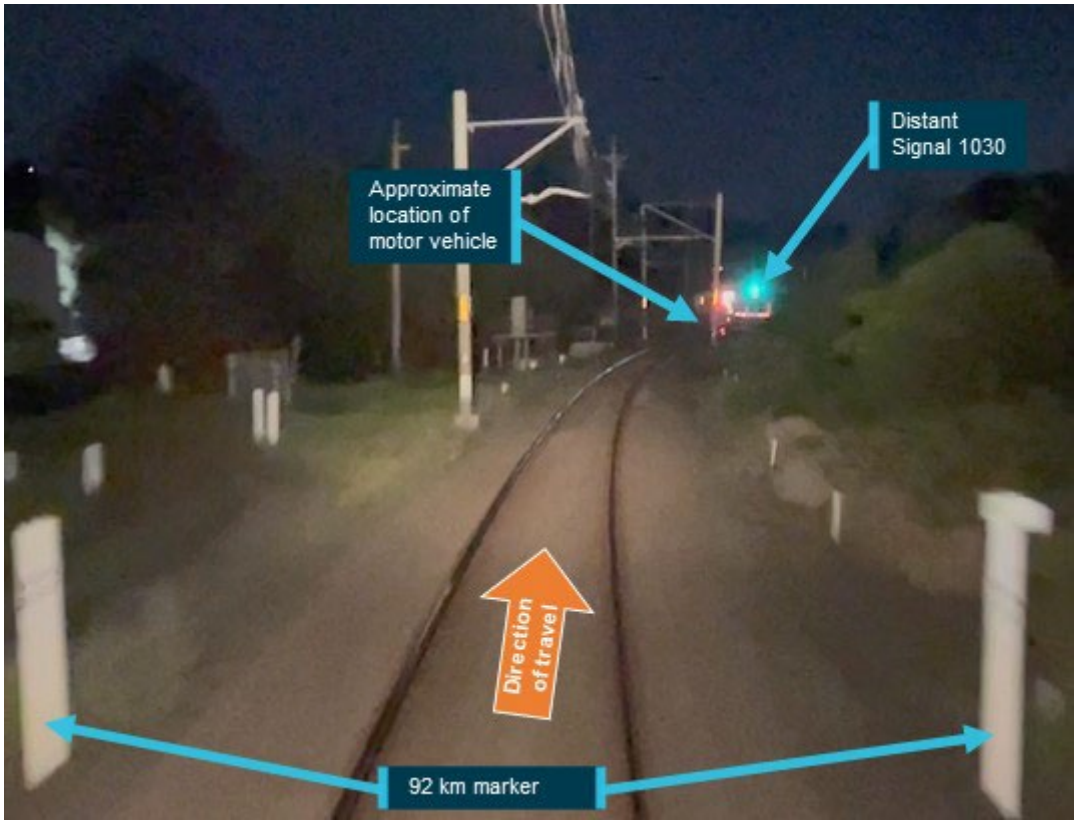
1 EDT: Coordinated Universal Time (UTC) + 11 hours.

2 The SCCO was responsible for utilising systems to provide real time responses to security incidents and other emergencies on the rail network (see The Security Control Centre Operator (SCCO) page 17).

At 0408:40, the driver moved the power notch to the off position and allowed the train to coast (from a speed of 103 km/h) as the train passed the Area 013 transponder (Wollongong South)[3] located at 93.400 km.

At 0409:06, the train passed the track circuit that activated the West Dapto Road Level Crossing warning bells and lights (92.672 km). 26 seconds later, at 0409:32, the driver made an initial brake application (91.944 km). It was estimated the train was approximately 200 m from the motor vehicle at this time. Three seconds later the driver applied full braking (91.860 km) and within the second after, applied emergency braking.

Figure 1: Approach to level crossing



Front of train footage taken from a subsequent train journey at the same time of day. The location of the motor vehicle was 268 m beyond the 92 km posts. At this time the motor vehicle was likely in relative darkness.
Source: Sydney Trains

Notification to Network Control

At 0405:52 police received a triple zero phone call and were notified of a motor vehicle on the rail line just off the Racecourse and West Dapto Road, near Kembla Grange Station.

At 0407:37, Sydney Trains Security Control Centre received a call from police.

At 0408:47, after confirming the location of the motor vehicle on track from police, the Sydney Trains SCCO called the Train Services Delivery Manager – South West (TSDM)[4].

[3] Electronic transponders are located at various locations on the Sydney Trains Network to monitor train speeds.

[4] The TSDM is responsible for the day-to-day management of train service delivery (see Train Services Delivery Manager (TSDM) page 14).

At 0409:08, the TSDM called the Wollongong Coast Panel Signaller (WCP Signaller)[5] advising them there was a report of a motor vehicle on track and to stop all services immediately.

At 0409:35, 2 minutes from when Sydney Trains received the call from police, the WCP Signaller made a point to point (direct not emergency) call to C012 using the Digital Train Radio System (DTRS), however the call was not answered.

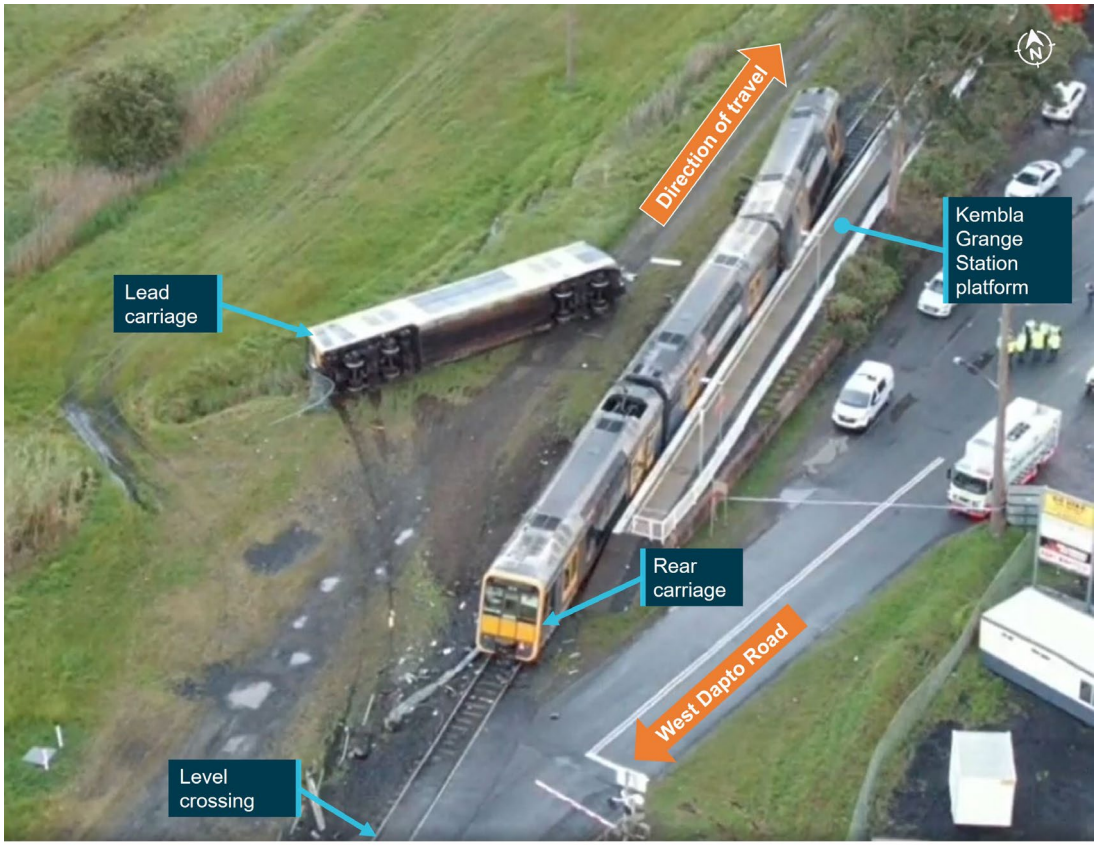
The collision and derailment

At 0409:36, the driver of C012, travelling at approximately 90 km/h, applied emergency braking on the train. Over the next 4 seconds, the train collided with the abandoned motor vehicle on track and derailed to the left of the track in the direction of travel.

The front carriage travelled approximately 125 m upright in a derailed state before the right side of the carriage impacted and flattened a stanchion supporting overhead high voltage wire.

The first carriage tipped onto its right side and jack-knifed so that the rear of the carriage separated from the second carriage, and then slid a further 25 m off to the side of the rail track. The remaining 3 carriages stayed upright with the second carriage derailing and the third and fourth carriages remaining on track and alongside Kembla Grange Station platform (Figure 2).

Figure 2: C012 after the collision and derailment



C012 alongside Kembla Grange Station after collision and subsequent derailment
Source: Sydney Trains, annoted by ATSB

[5] The WCP Signaller was responsible for signalling operations on the South Coast rail line from Berry to Kembla Grange (see Wollongong Coast Panel Signaller (WCP Signaller) page 14).

Post occurrence

Thirty seconds after the WCP Signaller had attempted to reach the driver of C012, they attempted to reach the driver with a second point-to-point call which was also unsuccessful. Shortly after, the WCP Signaller received a call from the TSDM. The WCP Signaller initially told the TSDM, C012 had gone through Kembla Grange.

When the TSDM said they could see the track was occupied, they asked if the driver had reported seeing a motor vehicle. The WCP Signaller told the TSDM that they had a few attempts to contact the driver of C012, however each attempted call kept terminating. The WCP Signaller then commented that it appeared now that C012 was not moving.

The TSDM directed the WCP Signaller to make an emergency call to the driver which differed from a point-to-point call as it would be broadcast in the cab on the radio and to all other trains in the area. The WCP Signaller made the Rail Emergency Call (REC) using the emergency function of the DTRS, but there was no response.

At 0411:56, *2 minutes and 16 seconds after the collision*, the signaller on the adjacent Wollongong panel (WP Signaller)[6] received a call from the guard of C012, from the guard's work-issued mobile phone. The guard told the WP Signaller that the train had been in an accident at the level crossing. The train radio was not working, and they were going to check on the welfare of the driver. The WP Signaller then told the guard to check on the welfare of any passengers. The guard confirmed there were passengers on board, and they would walk through the train to check on the welfare of the passengers and the driver.

As the guard checked the train, they remained on the call to the WP Signaller and confirmed that the second car had derailed and was leaning to the side with lights out and that the lead car had derailed and was lying on its side. The guard also requested an ambulance for the driver.

During this call, the guard told the WP Signaller that the police were onsite. The guard spoke with the police, which could be heard in the background. The police asked the guard about passengers and if the train was live. The guard responded, 'stay away from the overhead, and that portion of the train is still live'.

The guard then resumed conversation with the WP Signaller. The WP Signaller told the guard that they would advise the Network Incident Manager South (NIM)[7] and the TSDM so that they could arrange for a power outage.

The WP Signaller then informed the TSDM that C012 had derailed, and they had received the call from the guard on C012. The TSDM confirmed with the WP Signaller that protecting signals had been placed at STOP with blocking facilities applied[8].

At 0412:55, *3 minutes and 15 seconds* after the collision, the TSDM informed the NIM of the incident. Approximately a minute later, the Electrical Operations Centre (EOC)[9] informed the NIM of a sustained fault on the overhead wire supply from Unanderra to the countryside of Dapto Station, which included the incident site. The NIM then advised the EOC of the incident they had just been informed of by the TSDM.

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6 The WP Signaller was responsible for signalling operations from Port Kembla to Wollongong and sat adjacent to the WCP Signaller in the Wollongong signalling complex (see Wollongong Panel Signaller (WP Signaller) page 15).

7 The NIM is responsible for managing operational rail incidents that happen on the network (see Network Incident Manager (NIM) page 14).

8 Signals placed at STOP with blocking facilities applied prevents other rail traffic from entering the area.

9 The EOC is responsible for the monitoring and repair of overhead wiring systems (see *Electrical Operations Centre (EOC)* page 16).

The NIM then received a call from the WP Signaller who relayed information they had received from the guard on C012.

Next the NIM received a call from the SCCO who said they had received news of the derailment from the NSW Police Radio Operations Group (ROG)[10] and would confirm that all rescue personnel had been contacted regarding the potential for fallen overhead wires to be live. The SCCO also stated the ROG advised that passengers were injured.

At 0415 the NIM called the Incident Rail Commander (IRC) South Coast[11] and requested they attend Kembla Grange.

At 0416:23, in a three-way call between the NIM, EOC and WCP Signaller, the NIM confirmed with the EOC that power would remain off and that the power outage was from Coniston to the countryside of Dapto Station. The NIM then confirmed with the WCP Signaller that signals were at STOP with blocking facilities applied. After speaking with the NIM, the EOC requested the Work Group Leader (WGL) Traction[12] to attend Kembla Grange to verify the power outage. The WGL advised the workgroup would be there in 30 minutes.

At 0419, *9 minutes and 20 seconds* after the collision, a Level 2 incident[13] was declared by the NIM. The NIM also updated the Duty Control Manager (DCM)[14] and advised a sustained overhead wire fault from Unanderra to Dapto Station was reported at 0413. The NIM then advised the SCCO of the sustained fault and that a Rescue Power Outage (RPO)[15] was to be issued. Until the RPO was issued, wires were to be treated as live. The SCCO then called the ROG directing to inform emergency personnel onsite to treat the wires as live.

At 0435 the IRC arrived onsite at Kembla Grange and took charge as the Rail Commander under Sydney Trains' Command and Control structure. At this time a Level 3 Crisis[16] had been declared.

The RPO was issued by the EOC to the NIM at 0444, approximately half an hour after the event, which confirmed the power outage. The EOC then informed the IRC that while the RPO had been issued to the NIM, personnel onsite were still to treat all wiring as live. The EOC also stated that an Emergency Authority[17] was in process and once completed, the Emergency (electrical) Authority would be conveyed to the IRC to enable workers to sign on to it.

The NIM then informed the WCP Signaller, WP Signaller and the TSDM of the RPO details. Both signallers confirmed that blocking facilities had been applied.

At 0524 hours the incident location was declared a crime scene by police.

At 0550 hours Electrical Authority E62/21 was issued for Kembla Grange K171 to ensure power remained isolated in the incident area during incident recovery. The NIM informed the TSDM that the RPO would be overlapped with the Electrical Authority and power would be formally removed.

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10 Radio Operations Group (ROG) is NSW Police communications (see Police Radio Operations Group (ROG) page 15).

11 IRCs provide onsite incident management for significant and major rail incidents within Sydney Trains network (see Incident Rail Commander (IRC) page 15).

12 The Work Group Leader Traction was the Supervisor of the maintenance team responsible for work on Train Traction Systems.

13 A Level 2 incident is a Critical event which severely disrupts the business (see Network Incident Management Plan page 18).

14 The DCM leads the day of operations for all people on the Control Room Floor (CRF) and is also responsible for managing Level 2 – Critical incidents on the rail network.

15 A Rescue Power Outage (RPO) temporarily removes power from the overhead lines for rescue of injured persons where contact with 1500 V overhead wire is a risk.

16 A Level 3 incident is a Crisis event and considered an emergency, in line with the State Emergency and Rescue Management Act 1989 definition (see Network Incident Management Plan page 18).

17 The emergency authority was the Electrical Authority for Removal of Supply from 1500 V overhead wiring system.

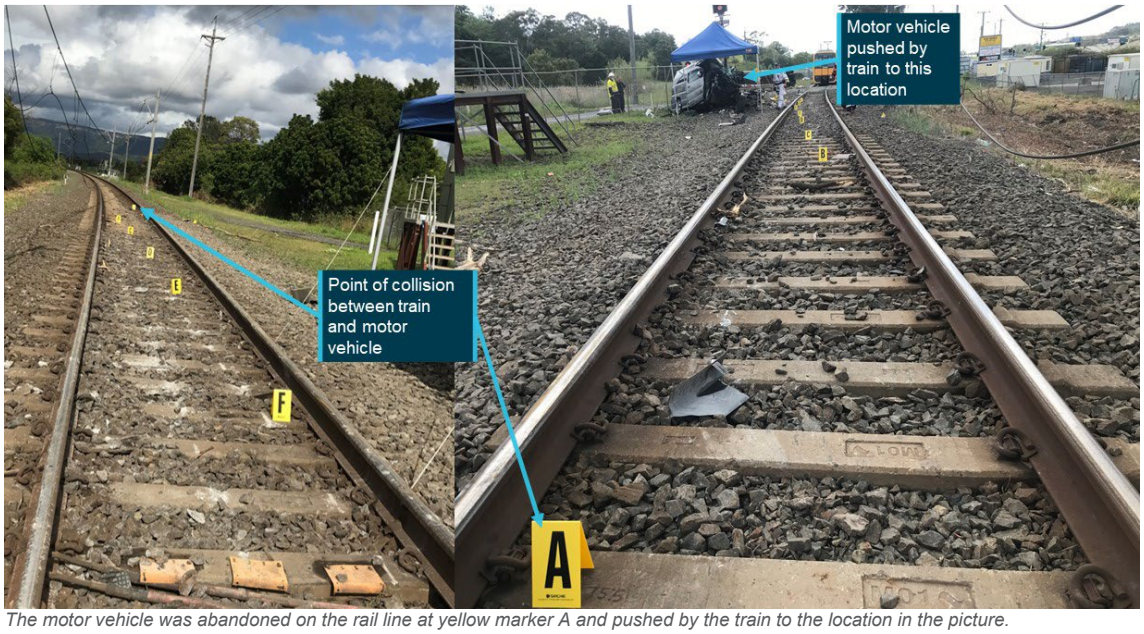
The NIM was informed by the IRC onsite there was a total of 12 people on board: 2 NSW Trains' crew, one off-duty guard travelling as a passenger and 9 other passengers. The train crew and 2 passengers with minor injuries were conveyed to hospital. A bus was arranged to transport the remaining passengers to their home.

By 0600 all uninjured passengers were on a bus and departed Kembla Grange Station.

NSW Police maintained control of the site until 11:00 at which time the site was handed to the ATSB.

By 12:00, the site was handed back to Sydney Trains to allow infrastructure repairs and train recovery to commence.

Figure 3: Point of collision and abandoned motor vehicle



The motor vehicle was abandoned on the rail line at yellow marker A and pushed by the train to the location in the picture.
Source: OTSI

Context

Criminal act

On 27 October 2021, NSW Police charged an individual with endangering passengers on a railway and obstructing a railway amongst other charges.

On 15 November 2022, the individual pleaded guilty to 8 separate offences, including endangering passengers on a railway and obstructing a railway.

The actions of this individual were key contributing factors to the collision of C012.

In the individual's attempts to steal a go-kart from the Wollongong Kart Raceway, located close to the West Dapto Road level crossing, they undertook a series of activities which led to the motor vehicle being stuck on the rail line and abandoned.

At 0313 and again at 0326 on 20 October 2021, a Sydney Trains CCTV recorded the individual moving cameras to face away from the West Dapto Road level crossing (Figure 4).

Figure 4: Level crossing cameras at Kembla Grange Station

CCTV cameras facing the ground and away from the level crossing, moved by the convicted felon as captured on CCTV.
Source: OTSI

Security cameras

CCTV Upgrade Project

Sydney Trains operated a CCTV camera network system with approximately 13,000 cameras to cover the rail network which extends over 800 km of rail track and 170 stations.

Sydney Trains highlighted in their internal investigation that the tamper alarm functionality on Sydney Trains' network of CCTV cameras was not activated on all cameras as part of the CCTV Upgrade Project contract that commenced in 2015.

The contract required tamper alarms to be installed on all cameras. However, the cameras were prone to vibration caused by passing freight trains and other anomalies resulting in high false alarm rate. Security Control Centre staff could not manage the excessive number of tamper alarms being generated causing installation to be stalled.

The requirement of the contract was subsequently amended so that the tamper alarm functionality was activated only on "high risk" cameras (including cameras that monitored level crossings) but at the time of this incident the functionality had not been activated on the West Dapto Road Level Crossing.

The Sydney Trains Network Maintenance group took charge of the project in December 2020 and a CCTV Operational Working Group was formed to continue progress from February 2021.

To make changes to the CCTVs on the network, the Sydney Trains Security Group had to submit a request to the CCTV Operational Working Group to get the tamper functionality installed.

Following this incident, Sydney Trains Security group worked with the contractor to find out what was stopping the implementation of the tamper alarm functionality. An issue raised was poor detection on outdoor cameras due to lighting conditions. At the time of authoring this report, other solutions were still under consideration such as electro-mechanical tamper alarms and/or more bespoke high-end video analytics were being trialled on cameras used to monitor level crossings.

Location

Kembla Grange Station

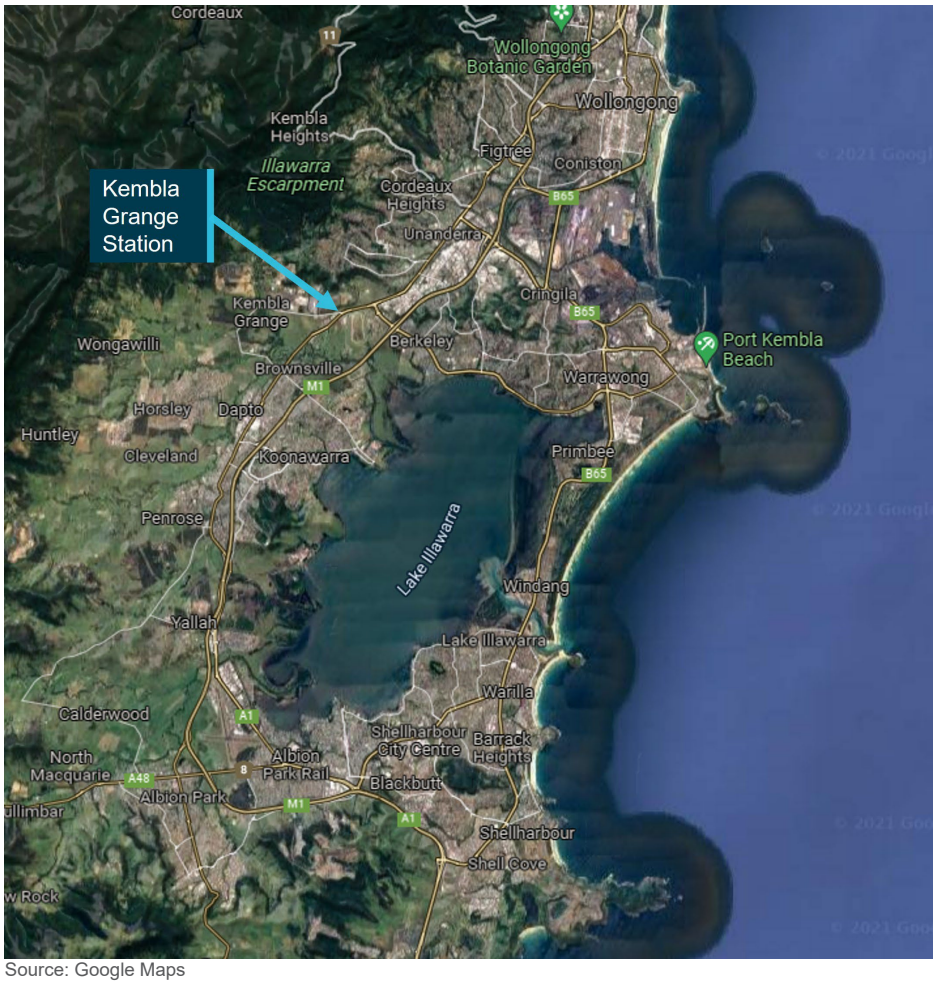
The station is located 91.586 km from Central Station on the South Coast rail line. It is within the Sydney Trains' electrified network, which extends as far south as Kiama Station. Kembla Grange is a single platform station situated on the SSE side of the bi-directional rail line.[18]

There were multiple CCTV security cameras at the station, including security cameras mounted on a pole on the western point of the platform intended to face towards the West Dapto Road Level Crossing (Figure 4). These cameras were able to be viewed by staff at Sydney Trains Security Control Centre.

Kembla Grange Station was not staffed but was fitted with a customer access point where the travelling public could reach NSW Trains' customer service attendants at any time of the day or night. The station is located along the coast between Wollongong and Shellharbour, as seen in Figure 5. The South Coast rail line skirts the west of Lake Illawarra.

[18] A bi-directional rail line allows trains to travel, at different times, in both directions on the same rail line.

Figure 5: Kembla Grange Station



Source: Google Maps

West Dapto Road Level Crossing

The West Dapto Road level crossing was located approximately 150 m west along the West Dapto Road from The Princes Highway. Approximately 20 m from the western most point of Kembla Grange Station platform.

It was a Type F level crossing with boom gates, audible warning devices and roadside flashing lights. These safety features activate automatically when a train approaches and were designed to be failsafe. The level crossing was functional and operating as required at the time of the incident.

Figure 6 shows the level crossing and how its design affords access into the rail corridor. The individual likely accessed the rail corridor in their motor vehicle from the southwest entry on the downside (left side) of the railway line.

The individual likely drove the motor vehicle along the side of the track until they reached the high voltage stanchion. They then attempted to drive the motor vehicle over the rail track onto the upside (right side). This is when the motor vehicle got stuck on the rail line.

Figure 6: West Dapto Road Level Crossing

View in both directions, Southwest is down direction away from Sydney, Northeast is up direction towards Sydney
Source: Google Maps

Rolling stock

The passenger train was a Tangara (Set T42) en route to Sydney from Kiama as service C012. There were 4 carriages in the train consist. The lead carriage was 6212, followed by 5213, 5211 and 6211.

The Tangara train set was a double-deck 4-carriage set with 2 motor carriages in the centre and 2 driving control trailer carriages at each terminal end. All carriages were built by A Goninan & Co at Broadmeadow NSW between 1987 and 1997 and were first introduced into service on 12 April 1988.

The control trailer carriage had a compartment for the driver at the front and pantographs[19] on top of the carriage at the rear. The seating capacity of the control trailer carriage was 98 and it weighed 42 tonnes. The motor carriage had a seating capacity of 112 and weighed 50 tonnes.

The Tangara trains were made in two sub classes, the "T sets" for the suburban lines and the "G sets" for the outer-suburban lines. They could run as a set of 4 carriages, or 2 sets could be coupled together to run as an 8-carriage set. On this morning, train C012 was running as a 4-carriage Tangara set and was a substitute for the usual Oscar train set (H set) that was regularly servicing the South Coast rail line.

Figure 7: Tangara four-car set

Source: Sydney Trains

Digital Train Radio System

Sydney Trains had a Digital Train Radio System (DTRS) for meeting its train radio communication requirements on its rail network. DTRS was the primary train radio system providing voice and data services to the Sydney Trains electric passenger fleet for day-to-day train operations. It enabled communications between train crews, network controllers, mechanical control and other rail staff.

The DTRS on Set T42 did not work for the guard when they attempted to call the signaller after the incident. The WCP Signaller also attempted to contact the driver on the DTRS after the incident, but was unsuccessful.

Sydney Trains investigated the functionality of the DTRS after the incident. They found the DTRS was working. However, the guard was unable to contact the signaller using the radio as the radio unit had gone into standby mode. Likely as a result of a short circuit tripping the guard's Control Circuit Breaker unit when the first carriage separated from the train.

The event recorder data revealed unexpected voltage spikes on the unpowered trainline 'Door Open' wires at the time that Car 1 (6212) was separating from Car 2 (5213). Sydney Trains concluded that the powered 'Door Close' trainline wire suffered a short circuit during the separation which tripped the guard's Control Circuit Breaker in Car 4 (6211).

For the DTRS to work again, it required the guard to reset it.

DTRS instructions

NSW Trains had a train working procedure NTTWP 182 Digital Train Radio System. This working procedure provided instruction on how to use the system including how to Start Up and conduct a Network Audio Test and how to identify cab radio and Transponder faults during start-up. The procedure did not cover how to reset the system and in which situations the DTRS would need to be reset.

[19] A pantograph is a device mounted on the roof of an electric train, tram, or electric bus. It collects power by contacting an overhead wire or line which allows the vehicle to draw electrical energy to operate.

The quick guide to the DTRS for guards 'how to' video, available on Sydney Trains Intranet provided instructions on how to use the various functions of the DTRS, including how to start up, conduct the various tests, and make emergency calls. There was no instruction on what to do if the DTRS went into standby mode.

Other procedures that provided instruction to train crew on how to respond to an incident, such as, the Operator Specific Procedure NTOSP 12 Responding to an incident and NTTWP 154 Responding to an incapacitated Driver or Guard/Passenger Service Supervisor, focus on what information to provide when reporting an incident, not how to operate the device used to report the incident.

Rail Operations Centre (ROC)

The Rail Operations Centre (ROC) was a purpose-built operations centre for running the Sydney Trains Rail Network. The goal of the ROC was to enable the network to run more efficiently, improve punctuality and achieve faster incident recovery. Teams from Sydney Trains and NSW TrainLink worked together to manage all aspects of the network.

The ROC Control Room Floor (CRF) was established in March 2019, and Security, Operations, Customer Information and NSW TrainLink all began operating from the site. Signal Box Operations later joined the CRF from July 2019. While most signal operations were managed from the ROC, a few signal operations still operated from external signalling control complexes. For instance, Wollongong Signalling Complex controlled the signals on the south coast rail line.

The CRF at the ROC comprised of the following directorates and agencies: Engineering and Maintenance (ICON), Operations Delivery (Service Delivery and Security), Customer Service (Customer Information Unit and Customer Operations), Train Crewing and Support (TCO), and NSW TrainLink.

Network Operations Reform

Prior to the ROC, Sydney Trains' rail network operations was primarily managed from the Rail Management Centre (RMC). Commencing in late 2018, Sydney Trains changed its operating model to prepare for the future move into the ROC.

A key objective of the new operating model was to improve the way incidents and service disruptions were managed. The operating model previously used by Sydney Trains had been the same for almost a century, with the role of the Train Controller historically managing both 'Train Service Delivery' and 'Incidents' across the rail network.

During this reform, Sydney Trains broke up the key functions of the Train Controller and introduced two new roles:

- Train Service Delivery Manager (TSDM), whose role would be to focus on managing train services across the network.
- Network Incident Manager (NIM), whose focus would be to manage incidents on the rail network and any unplanned possessions and work on track authorities.

During this transition, several communications were released to ensure staff understood the scope of the changes. A summary of the changes was provided in the document 'Network Operations Changes' and specific information on the Network Operation Reform was provided to stakeholders, such as Security and Train Crewing, so they could understand how the changes affected them.

A key change included defining where responsibilities lay with the new roles. A table comparing responsibilities from the old Train Controller to the new TSDM and NIM was provided to all\\stakeholders.

The table of responsibilities below was provided to Security:

Table 1 – NOR Stakeholder Information – Security

Train Controller, TSDM and NIM responsibilities		
Today	As of 2 December 2018	
Train Controller	TSDM	NIM
Receives all calls from Security Manage incidents	Receives all initial calls from Security, if Security not already dealing with an incident TSDM will escalate the call to the NIM if required	Receives follow up calls from Security or escalated from the TSDM regarding incident Manage incidents

The stakeholder communication stated all initial calls needed to go to the TSDM which contradicted Sydney Trains' overarching Command and Control structure.

The stakeholder information also clarified the new network control boundaries and who was responsible for the area.

The previous Train Controller boundaries had broken the rail network into 6 train control areas.

New boundaries for the TSDM were broken into 5 train control areas, with 2 NIM areas to cover the entire rail network, a North and South, which overlaid the TSDM boundaries (Table 2).

Table 2 – NIM and TSDM area boundaries

NIM North			NIM South	
TSDM Main	TSDM North	TSDM Central Coast	TSDM Illawarra	TSDM South-West

Involved parties in the ROC

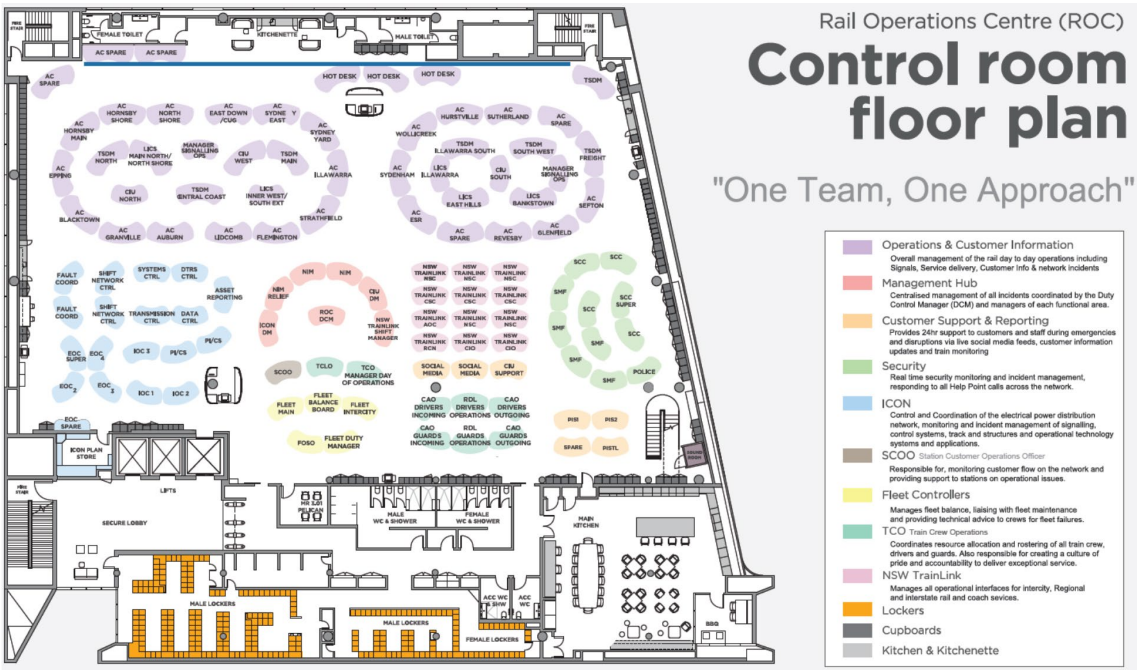
Key roles located in the ROC who were involved in this incident included the Duty Control Manager (DCM), Network Incident Manager (NIM), Train Services Delivery Manager (TSDM), and the Security Control Centre Operator (SCCO).

Duty Control Manager (DCM)

The DCM oversees the daily operations for everyone on the CRF. As the lead for Service Delivery and Customer Operations on the CRF, their role was described in the Sydney Trains document *Control Room Floor Roles,* as responsible for creating a collaborative work environment to support and empower others to make informed decisions promptly. They drive continuous improvement, encourage technology adoption including systems and procedures, and aimed to achieve improved operational efficiencies while building customer advocacy, amongst other responsibilities.

The DCM was also responsible for managing Level 2 – Critical incidents on the rail network. This is further explained below in *Network Incident Management Plan.*

Figure 8: ROC Control Room Floor



Source: Sydney Trains

Network Incident Manager (NIM)

The NIM was responsible for end-to-end management of operational rail incidents that happen on the network. They played a key role in communicating with operational employees and updating internal and external stakeholders about incidents. The decisions they made were focused on providing a safe process for people on and about the track and safe transportation of customers.

The NIM was responsible for managing Level 1 – Routine incidents on the rail network. This is further explained below in *Network Incident Management Plan.*

As their primary role was managing routine rail incidents, the NIM was provided access to the DTRS which enabled them to communicate directly with train services on the rail network.

Train Services Delivery Manager (TSDM)

The TSDM was responsible for the day-to-day management of train service delivery and ensuring smooth running of services on the Sydney Trains network.

They provided thorough communication of real-time information of service status updates and changes to train plans to other business areas.

TSDMs did not have direct access to the DTRS. To pass information to train crew, the TSDM would need to go through the NIM or a Signaller.

The Security Control Centre Operator (SCCO)

The SCCO is part of *Rail Network Security* and is discussed later in the report.

Other involved parties

Signallers

Signallers are responsible for the control and supervision of rail traffic movements, the operation of signalling equipment and coordinating train movements within their area of control in accordance with safeworking regulations.

Train operations at Kembla Grange were controlled by a signaller located at the Wollongong Signalling Complex who operated points[20] and signals[21] to permit rail traffic movements. The complex was located approximately 12km from Kembla Grange Station and the location of the incident.

Signallers used a push button panel which allowed the control and interaction with signalling infrastructure from a remote location. The signallers used the panel to set start and stop points for the intended routes. As the train enters the controlled area, lights illuminate on a large visual display board indicating the location of the train. This allowed the signaller visibility of trains within their designated area.

They could communicate with trains in their area using the DTRS. This communication could occur through either point-to-point calls to specific trains, or emergency broadcasts to all trains on the local network.

Wollongong Coast Panel Signaller (WCP Signaller)

The WCP Signaller involved in this incident was located at the Wollongong Signalling Complex. They were responsible for operation of the track circuited territory on the South Coast rail line from Berry to Kembla Grange (Figure 9).

In this incident, the TSDM made a call to the WCP Signaller to request all trains be stopped once they learned there was a motor vehicle on track.

Wollongong Panel Signaller (WP Signaller)

The WP Signaller was also located at the Wollongong Signalling Complex and seated alongside the WCP Signaller. As both signallers were in the same room, it was easier for them to communicate about the incident.

The WP Signaller was responsible for operation of the track circuited territory from Port Kembla to Wollongong, including Port Kembla Yards and Inner Harbour (Figure 9).

The WP Signaller received the emergency call from the Guard at 0411:56 from the guard's work-issued mobile phone. At this time, the TSDM and the WCP Signaller were also on a call, which was when the TSDM requested the WCP Signaller to make an emergency call to stop all services.

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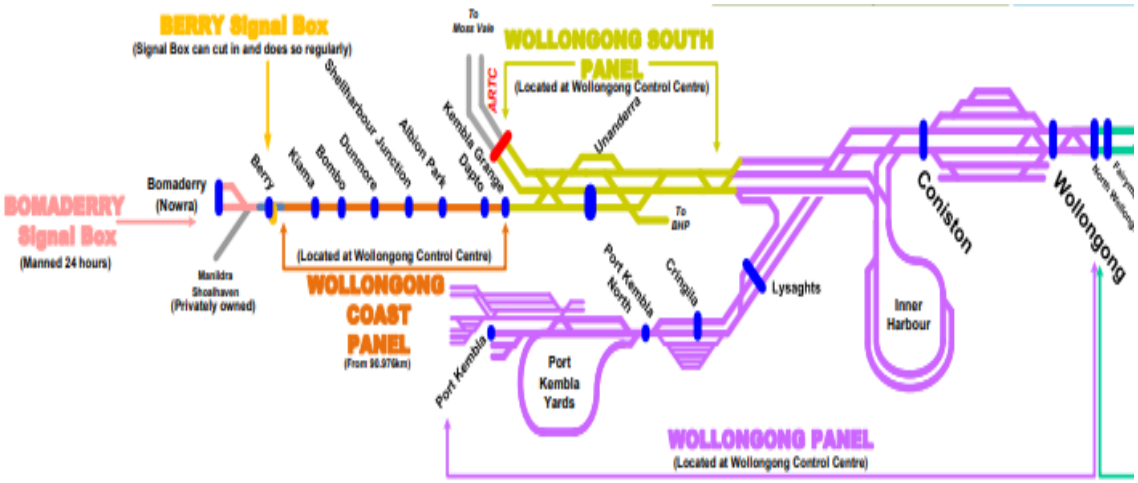
[20] A track component consisting of paired pieces of tapered rail that can be moved and set to allow tracks to diverge or converge.

[21] A fixed signal placed near a running line to authorise and control running movements.

Figure 9: Signalling Panel Boundaries



The boundary of responsibility for the Wollongong Coast Panel Signaller in Orange, Wollongong Panel Signaller in Purple.
Source: Sydney Trains

Incident Rail Commander (IRC)

IRCs provided 24/7 operational response coverage for all major rail incidents on the Sydney Trains network (area bounded by Newcastle, Lithgow, Macarthur, Nowra).

The role of the IRC was to provide onsite incident management for rail incidents within Sydney Trains' network to ensure effective and timely resolution of operational problems, and safety of all staff, contractors, commuters, and emergency services personnel.

Electrical Operations Centre (EOC)

The EOC was one of 6 maintenance operations centres that combined to form the Infrastructure Control Centre (ICON). The EOC was responsible for high voltage supply control, 1,500 V traction supply control, emergency repair coordination and electrical incidents.

A call from the EOC was made to the NIM when they detected a sustained fault of the high voltage supply between Unanderra and Dapto Stations.

Police Radio Operations Group (ROG)

The ROG was the radio dispatch and contact centre providing 24/7 assistance and service to the NSW Police Force and members of the community.

The ROG had Communications Officers who were responsible for processing incoming calls from police and the community, including emergency triple zero calls.

The ROG also had Radio Dispatch Channel (RDC) Operators who were responsible for tasking and coordinating activities of police resources responding to incidents, using both the police radio network and the Computer Aided Dispatch (CAD) system. They provided timely information to operational police to enable appropriate action to be taken.

The Communications Officers and RDC Operators were required to complete training in telephony and police dispatch business systems. They and other general duties police officers did not receive specific training in managing emergencies and other risks on the rail network.

In this incident, communication about the motor vehicle on the rail line between the ROG and Sydney Trains occurred between an Assistant RDC Operator and the SCCO. The sequence of

communication from the emergency triple zero call is described in Incident Communication and Timelines.

Driver

The driver commenced working on the New South Wales railways in 2011. They worked in the south and west region, South Coast area as part of the Wollongong crew. Review of the driver's training records indicated they were appropriately qualified, with the most recent competence assurance assessment conducted in November 2020.

The driver was on their third shift after 4 days off. The 3 shifts were all early starts, with the earliest start of 0200 on the morning of this incident.

At interview the driver stated they felt alert while driving, the early start was a regular starting time and they had adjusted to the early starts. The investigation did not find fatigue to be a contributing factor to the collision.

Guard

The guard had worked on the rail since 2006. They also worked in the south and west region and South Coast area as part of the Wollongong crew. Review of the guard's training records indicated they were appropriately qualified with the most recent competence assurance assessment conducted in December 2020. The guard completed Digital Train Radio System Cab User training in July 2016. They had not received any refresher training or additional training in the use of the DTRS.

The guard was on their third shift after 2 days off. The 3 shifts were all early starts, with the earliest start of 0154 on the morning of this incident. The investigation did not find fatigue to be a contributing factor to the collision.

Security

Since the opening of the ROC in 2019, Security merged its two functions of the Security Control Centre and the Security Monitoring Facility and both share a location on the CRF (Figure 8).

Security Control Centre

The Security Control Centre (SCC) provided the security incident command and control function and liaised with the NSW Police and emergency services to manage real-time response to incidents on the rail network. The SCC acted as a communication bridge between external stakeholders and internal stakeholders within the ROC as well as Sydney Trains and NSW Trains employees.

The Security Control Centre was tasked with real-time monitoring of security cameras on the network.

Security Monitoring Facility

The Security Monitoring Facility (SMF) was a security support operation. The SMF provided CCTV footage when requested from authorised GIPA staff from NSW Police, Media Unit, Workplace Conduct Unit, and NSW TrainLink. They were the only approved provider of CCTV for Sydney Trains.

The two functions, the SCC & SMF, were led by one supervisor at the ROC.[22]

[22] The Security section in the ROC is referred to as the 'Security Control Centre' by Sydney Trains and this report will use the term SCC to refer to the entirety of the Security section at the ROC.

SCC Supervisor

The Supervisor of the Security section at the ROC was called the Security Control Centre Supervisor (or SCC Supervisor). This supervisor was responsible for managing and directing the activities of the Security section during the course of a shift whilst managing a team of security operators as the first line of supervision.

In emergency or crisis situations, the SCC Supervisor assisted the Rail Operations Centre and external Security Services in coordinating appropriate emergency responses. This was done in accordance with Sydney Trains' procedures and response frameworks.

Security Control Centre Operator (SCCO)

The SCCO was responsible for utilising systems deployed within Sydney Trains Security Control Centre, to provide real time responses to security incidents and other emergencies on the rail network.

They assisted the SCC Supervisor to achieve the functions of the Security Control Centre, such as ensuring passenger safety, preventing equipment damage and theft to assist in improving the customer experience and the overall operations of Sydney Trains.

Amongst the stated responsibilities and operational duties in the Security Control Centre standard operating procedures, the SCCO had a duty to proactively monitor live CCTV cameras across the rail network. This was over 13,000 station-based CCTV cameras and 12,000 train-based cameras. They were also required to monitor over 800 Help Points, the Alarm Management System and the Injury Hotline.

Emergency response

At the time of this incident, the Sydney Trains emergency response processes had changed from the Incident Management Framework Parts 1, 2 and 3 to the Emergency Preparedness Framework and the Network Incident Management Plan. These documents were developed and implemented in April 2021 to accommodate the Command and Control System that Sydney Trains was adopting for management of emergencies.

Emergency Preparedness Framework

This document described the process for developing and implementing both strategic and local incident management plans to ensure Sydney Trains responded effectively and safely to critical and other emergency situations.

The framework provided the need for the development of an Incident Response Guide and Network Incident Management Plan.

Incident Response Guide

This document contained instructions for first actions to be taken when responding to an incident. It covered a number of scenarios, including train collision/derailment and security threat amongst 15 other scenarios.

On the opening page it clearly defined contact points for rail and non-rail incidents. For rail incidents the 2 key contact points were the local area controller (signaller) and/or Security Control Centre.

Network Incident Management Plan

The Sydney Trains' Network Incident Management Plan (NIMP) established the appropriate response measures, command and control structure, roles, responsibilities, and functions to be implemented in case of an incident within the Sydney Trains Network.

The NIMP recognised incidents range in severity and must be continually monitored and assessed. They were categorised based on impact and severity before being escalated accordingly through the hierarchy of management/command in the ROC.

As stated in the NIMP, Sydney Trains used a Command and Control System that established strategic, tactical and operational hierarchy to manage rail operations. The ROC Control Room Floor (CRF) created an environment of central coordination, led by the Duty Control Manager (DCM), drawing on the knowledge and experience of key Subject Matter Expert (SME) teams.

The NIMP divided incidents into 2 categories: rail incidents and non-rail incidents.

For managing rail incidents, Sydney Trains has a 3-tier incident management process, categorised into:

- Routine Incident – Level 1
- Critical Incident – Level 2
- Crisis Event – Level 3.

As per the NIMP, a Critical Incident (Level 2) was defined as the following;

> …any threat, act, event or incident, the acute impact of which severely disrupts business or causes a sustained disruption to Sydney Trains business efforts or reputation. This category includes situations where Sydney Trains may be supporting a State response to a wider disaster or emergency.

The NIMP also stated that incidents that escalate to the Critical level must be raised with the DCM for awareness and monitoring. During a Critical Incident the NIM would maintain their primary functions as indicated in the Routine incidents category, supporting the incident tactically in collaboration with the DCM. The NIM must deploy an IRC to the incident site to assume the role of Rail Commander.

This incident was escalated to a Level 2 incident at 0419, at which point the NIM informed the DCM as required. The NIM had deployed an IRC to the incident at 0415.

Section 4 of the NIMP detailed Incident Response. In the Initial Incident Response, Sydney Trains stated:

> Once an incident is imminent or occurs, the alarm should be raised as soon as reasonably practicable so that assistance can be given to protect life, property and the environment. Often this means that first contact needs to be made to workers controlling train movements on the affected track section, the contact points are:
> • Local Area Controller (Signaller); or
> • Security Control Centre (SCC)

It also states the SCC can contact the police ROG and triple zero directly and is an efficient and timely reporting strategy. In other situations, a member of the public or an emergency service communication centre could raise the alarm.

In this incident, an alarm was raised by a member of the public calling triple zero which started a chain of communications commencing with the police ROG, to the SCCO, the TSDM, then to a Signaller and NIM and eventually through to the DCM.

Security Control Centre Standard Operating Procedures

The Security Control Centre (SCC)'s standard operating procedures (SOP) was a single document of 119 pages. Version 1.3 dated June 2021 consisted of 10 different sections. The tenth section contained 16 separate miscellaneous procedures.

The first 9 sections contained information that was duplicated from other Sydney Trains documentation.

Duplications included Section 5 Chain of Command and Key Relationships, Section 6 The Rail Operations Centre, Section 7.1 General Control Room procedures, 7.2 Emergency communications, 7.3 Network Rules and Procedures, and Section 8 Command and Control Incident Management System. These sections covered parts of the Sydney Trains documentation that were most relevant to Security.

In Section 8, the SCC SOP recognised the command and control responsibilities with section 8.1 specifically highlighting the NIM managing incident response for Level 1 – Routine Incidents, the DCM responsible for managing Level 2 – Critical Incidents and the Crisis Event Chair (CEC) managing Level 3 – Crisis Events.

Section 9 of the SOP covered Dispatching and Coordinating Incident Response. It stated that, 'for ALL incidents managed by the SCC, the 'Incident Response Checklist should be used…'

In section 9.2 the Incident Response Checklist for incidents that have an effect/impact on the rail network, the procedure prompted the SCCO to inform relevant TSDM/ NIM – MAKE SAFE. There was no reference to the Incident Response Guide developed as part of the overarching emergency management framework.

Communications

NTOSP12 – Responding to an Incident

This NSW Trains document provided the instructions for workers who became aware of or were involved in an incident. The worker was required to report the incident immediately to the relevant Network Control Officer and provide sufficient detail for the NCO to assess the severity of the incident and decide on a response.

The guard reported the incident to the Wollongong Panel Signaller at 0411:56, which they did with a work-issued mobile phone. The guard said the train had derailed at the level crossing after colliding with a car on the tracks. The guard confirmed that there were passengers on the service and that they would walk through the train to check the welfare of passengers and the driver. The guard confirmed that the second car had derailed and was leaning to the side with lights out and that the lead carriage had derailed and was lying on its side. The guard also requested an ambulance for the driver.

NGE 206 Reporting and responding to a Condition Affecting the Network

This Sydney Trains document prescribed the rules for reporting and responding to unsafe conditions affecting or potentially affecting the network.

The rule stated conditions that can or do affect the safety of operations in the network must be reported promptly to the Signaller responsible for the affected portions of line. The rule further stated the signaller must promptly report the details of the Condition Affecting the Network (CAN) to the Network Controller and tell other affected Signallers.

Network Controllers are defined as qualified workers who on a day-to-day basis manage the safe and efficient operation of the Network. This includes the TSDM and the NIM.

The Signaller in this incident responsible for the affected portion of line was the WCP Signaller.

The report of the motor vehicle on track, which was the CAN, started from a triple zero call, which passed to the Police, the SCCO, the TSDM and then the WCP Signaller. It was highlighted in the Sydney Trains Investigation that all parties involved in the initial report of the motor vehicle on the rail line treated the incident as a routine Condition Affecting the Network (CAN) instead of an emergency.

Incident Communication and Timelines

When the emergency triple zero call was made by a member of the public, the call was initially received by a telecommunications officer who diverted the call to the Police as requested by the triple zero caller.

This happened at 0405:52, 3 minutes and 43 seconds before the WCP Signaller made the call to the driver of C012.

The call was then received by an ROG Communications Officer who recorded relevant information and started a CAD incident which was then sent onto the relevant Radio Dispatch Channel (RDC) Operator. The RDC Operator reviewed the CAD incident and broadcast over the radio channel for in field police units to respond. The RDC Operator also arranged for an assistant RDC Operator to call the Sydney Trains SCCO.

This call happened at 0407:37, 1 minute and 58 seconds before the WCP Signaller made the call to the driver of C012.

As per the SCC SOP, the SCCO called the TSDM at 0408:47, 48 seconds before the WCP Signaller made a call to the driver of C012.

The TSDM called the WCP Signaller at 0409:08, 27 seconds before the WCP Signaller made the call to the driver of C012.

By the time the WCP Signaller was told to stop all train services, then acted to call C012 directly to tell them to stop, it was 0409:35. Only 1 second before the driver of C012 applied emergency brakes.

Waterfall recommendations

The train set involved in this incident was the same type and configuration of the train that was involved in the 2003 Waterfall Rail Accident. As some recommendations from the Special Commission of Inquiry (SCOI) had actions against them that had not yet been completed and/or closed, they were reviewed as part of this investigation.

The review was to determine any influence and/or importance to the outcomes of this incident. While each recommendation and the associated actions are discussed below, the investigation concluded that the outcomes from this incident were not directly influenced by the status of the actions to address the Waterfall SCOI recommendations.

The Special Commission of Inquiry (SCOI) into the Waterfall rail accident released its final report on 17 January 2005. The report, titled the Final Report of the Special Commission of Inquiry into the Waterfall Rail Accident, made 177 recommendations (127 recommendations and 50 sub-elements).

The implementation of these recommendations from this significant SCOI have been monitored by the Rail Regulator since 2005.

As specified in the Waterfall SCOI Annual Status Reports published on the Office of the National Rail Safety Regulator (ONRSR) website, ONRSR will continue to provide the Minister with annual reports for tabling in the NSW Parliament, in relation to the SCOI Final Report. ONRSR's public reporting will continue until all recommendations are implemented, with reports being published on ONRSR's website. At the time of authoring this report, 3 documents on ONRSR's website provided the status of the recommendations. These were:

1. Waterfall Report No 39 2019
2. Waterfall Annual Status Report – All open and closed recommendations – April 2018 to March 2019

3. Waterfall Rail Accident Recommendations – Closed Subject to Implementation of an Approved Program or Plan – April 2018 to March 2019

These documents reported that all recommendations from the SCOI report were considered closed except for two. These recommendations had an acceptable response or acceptable alternative response. Six other recommendations were closed subject to implementation of an approved program or plan. That is, the Rail Regulator had agreed that the planned action or alternative action, when completed would meet the recommendation or satisfy the objective of the recommendation.

Open recommendations

> *No.32 – RailCorp should progressively implement, within a reasonable time. Level 2 automatic train protection (ATP), and*
>
> *No.38 – There must be compatibility of communications systems throughout the rail network. It is essential that all train drivers, train controllers, signallers, train guards and supervisors of trackside work gangs in New South Wales be able to communicate using the same technology.*

Recommendation No.32 – Automatic Train Protection

At the time of authoring this report, Transport for NSW (TfNSW) had implemented ATP (European Train Control System Level 1 Limited Supervision) on the Sydney Trains Network (excluding Erskineville to Bondi Junction and the Sydenham-Bankstown Line).

TfNSW was in process of implementing the 'Digital Systems Program' (DSP) which upgrades the technology to European Train Control System Level 2 (ETCS L2).

This program introduces the ETCS L2 and Traffic Management System (TMS) to parts of the T4 Line from Sutherland to Cronulla and from Redfern to Bondi Junction (Tranche 1). It will then be rolled out on North Shore, City Circle, City Area and Sydney Terminal (Tranche 2), as indicated in Figure 10.

System integration testing commenced in December 2023 and would be run in 3 phases and is planned for completion by end 2024.

ETCS L2 and TMS will replace current signalling and train control technology and allows trackside equipment to communicate with trains constantly. This provides better location and train information, to better manage train movements across the network.

The relationship to Recommendation No.4 – Precise Location is discussed below.

DSP rollout was planned in stages (tranches) and will cover the entire network including the South Coast rail line. The future tranches will be aligned with asset replacement (conventional signalling) and network needs and is subject to funding approval.

Figure 10: ETCS Level 2 rollout

Source: Transport for NSW

Recommendation No.38 – Digital Train Radio System

It was noted, the action to address Recommendation 38 became the focus of implementing a Digital Train Radio System (DTRS). A DTRS was installed in the incident train and serving as the main means of communications between the train crew and network control.

When the guard attempted to contact Network Control after the collision and derailment, the DTRS did not work. However, post-incident testing of the DTRS established the DTRS had become inoperable due to a short-circuit tripping the guard's Control Circuit Breaker likely because of the collision and derailment. The DTRS returned to "stand-by mode" which required the system to be reset to be operable again. This could have been done by the guard, however the guard called Network Control using a work-issued mobile phone.

In Sydney Trains' investigation, a safety action was taken to communicate to train crew that the DTRS can be made operable by resetting the guard's Control Circuit Breaker switch. However, in this incident, the decision by the guard to use the secondary mechanism of communication (the mobile phone) was likely a quicker and just as effective method of contacting Network Control due to the time required to restart the system.

Had the incident occurred on a part of the network with poor mobile reception, then the guard would need to rely on the DTRS being operable. So, the safety action to remind train crew the DTRS can be reset was relevant. Additionally, the same reset function applied to the public announcement (PA) system, which had also been tripped and rendered inoperable.

The focus of recommendation 38 was to ensure compatibility of communication systems throughout the rail network. While the DTRS was not used by the guard to contact Network Control, it was not due to incompatibility of communication systems.

To ensure the intent of this recommendation is met, the Regulator will continue to ensure functionality and compatibility requirements are met across the rail networks in New South Wales.

Closed recommendations subject to implementation of an approved program or plan

> *No. 4 The Rail Management Centre should be equipped by RailCorp with a transcriber system, or mimic board, or such other system as is necessary to enable identification of the precise location at any time of any train on the RailCorp network.*
>
> *No.88 The RailCorp passenger containment policy must be abandoned. (RailCorp: Implemented – containment policy abandoned). Note: This recommendation will be finalised once Sydney Trains completes the rollout of its Internal Emergency Door Release (IEDR) retrofit program.*
>
> *No.89 There must be a minimum of two independent methods of self-initiated emergency escape for passengers from all trains at all times.*
>
> *No. 90 All passenger trains must be fitted with an internal passenger emergency door release.*
>
> *No. 92 The internal passenger emergency door release should be fitted with a facility which prevents it from operating unless the train is stationary.*
>
> *No. 93 The operation of train doors should have an override facility whereby the driver or the guard can override an internal passenger emergency door release system if the door release is interfered with when there is no emergency. There should be an alarm, together with an intercom, in the guard's compartment so that, if a passenger attempts to initiate an emergency door release, there is an appropriate delay during which time an alarm sounds in the guard's compartment and the guard can then, after first attempting to speak via the intercom to the individual concerned, if necessary, override the door release, and make an appropriate announcement over the intercom system in the train.*

Recommendation No.4 – Precise Location

At the time of this incident, the South Coast Branch Line, where Kembla Grange Station is located, was in a track circuited territory where the system of safe working relied on track circuits to detect the presence of rail traffic.

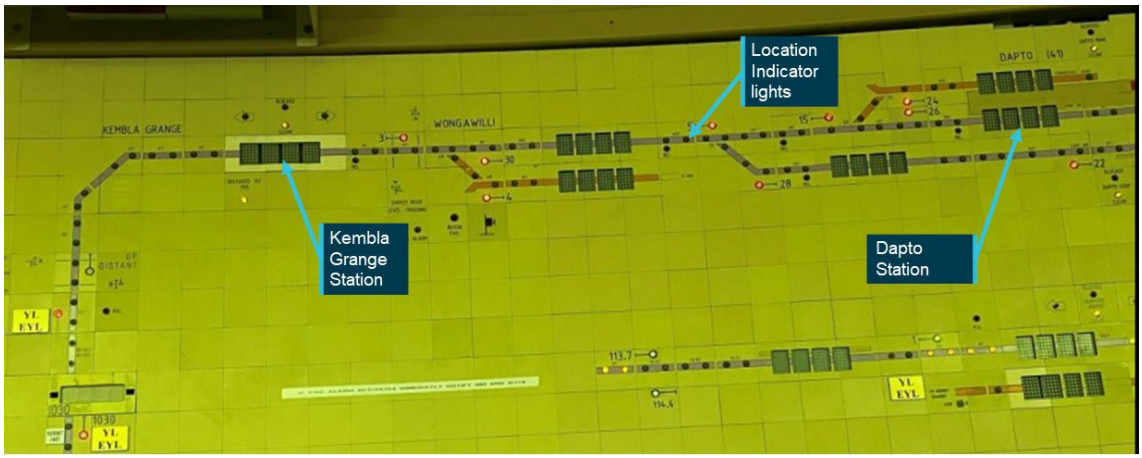
As a train traverses a track circuited area, it disrupts the electrical currents flowing through the rails which can then be used to indicate the position of the train. Lights are illuminated on a train location board (see Figure 11) to allow the network controller to get an indication of the location of the train.

The distance between Dapto Train Station and Kembla Grange Train Station is 3.4 km and the network controller has several location indicator lights between these 2 stations to provide an indication of where the train is located.

While this by no means provides a precise location of a train, it could be argued that this is a reasonable indicator for the network controller to know where a train is at a given time.

This was evidenced in this incident when the WCP signaller was aware C012 was in the track section between Dapto and Kembla Grange and was able to respond to the TSDM by saying they would make direct contact with C012, when the TSDM said to stop all services.

Figure 11: Train location board – Wollongong Signalling Complex



Source: Sydney Trains. Kembla Grange located top left, Dapto located top right. C012 was travelling from Dapto towards Kembla Grange at the time of the incident.

The ability for network controllers to identify the precise location of a train on the rail network has been further enhanced as Sydney Trains continues to improve train position reporting.

The implementation of ETCS involves the installation of balises (electronic transponders) that are placed along the rail line and communicate with the train's onboard system to provide location information.

The ETCS onboard system continuously estimates the current location of the train based on the distance travelled since the last balise was read using onboard odometry information and sends this position information to the ETCS trackside. A Network Controller can review an ETCS fitted trains' reported location; however, this information is not presented on the Traffic Management System (TMS) screen in real time. The reported location information is limited by odometry accuracy.

The ETCS L2 system will enhance the train location information available to network controllers by

• Enabling smaller sections

• Providing more granular estimated train location information

Note – Track circuits are replaced by axle counters in ETCS L2 areas.

Recommendation No.88 – Containment

The train in this incident had not been retrofitted with the Internal Emergency Door Release (IEDR). At the time of this incident, a project aimed at enhancing the existing Tangara Fleet of trains in Sydney had commenced. The Tangara Technology Upgrade (TTU) Project was a collaborative endeavour, with TfNSW, Sydney Trains, contractors, and industry experts working together to enhance the Tangara trains. It was scheduled to be completed by 2025.

At the time of authoring, the current TTU project scope did not include internal emergency release mechanisms. However, internal emergency door release mechanisms would be installed as part of another project being managed and delivered by Sydney Trains, the Tangara Fleet Life Extension (TFLE) project. In the upgraded Tangara trains, passengers would have the ability to manually release doors from the inside, allowing for swift evacuation if needed. This enhancement aligned with modern safety standards and provided an additional layer of security for commuters.

It was however, noted that extraction of the passengers from the first carriage, that had tipped over, was completed by entry and exit through the rear of the carriage where there remained an opening from the first and second carriages separating. This opening provided a more accessible means of entering and exiting the carriage, compared to opening a side door and having to climb up and out.

The driver was also able to be rescued from the front cab of the carriage as the front emergency door could be opened (Figure 12).

Recommendation No.89 – Emergency escape

On the Tangara the 2 independent methods were the external sliding doors and the intercar doors into the next carriage. In the Kembla Grange incident as there was a separation between the first and second carriages as a result of the derailment, the intercar doors served as the means of entry and exit for the passengers from these carriages.

As the IEDR had not been installed on these carriages at the time of the incident, the second independent method of self-initiated emergency escape for passengers was not available.

The driver was extricated from the emergency door at the front of the train.

Figure 12: Emergency door at front of train

Source: OTSI

The other 3 closed recommendations (90, 92, and 93) all relate to the installation and functionality of an internal emergency door release. As mentioned above, this train set had not yet had the IEDR retro fitted.

Similar related incident

Collision of NSW Trains Intercity train N169 with abandoned motor vehicle Woy Woy, NSW 19 April 2024

At approximately 1756 hours on Friday 19 April 2024 at Rawson Road level crossing Woy Woy, New South Wales, an eastbound motorist turned left at the level crossing and accidentally drove their motor vehicle into the railway corridor. The driver exited the motor vehicle after it became stuck on the railway tracks.

Two witnesses arrived at the scene at approximately 1757 and reported they observed the motorist exiting the vehicle and a bystander getting into the vehicle to assist the driver to move it.

At around this time Witness 1 called a tow truck driver.

Witness 2 tried to confirm with bystanders onsite whether triple zero had been called. When they did not receive a response, they called triple zero, confirmed from phone records to have been at 1759.

Witness 2 reported experiencing delays through the triple zero triage process as the operator appeared to have difficulty comprehending the situation and the location. When eventually dispatched through to the police the witness reported the car stranded on the tracks.

After the phone call to the tow truck driver was completed, Witness 1 contacted the Network Incident Manager (NIM) by dialling the phone number displayed on the lineside signage and level crossing identification number for fault reporting. This call was received by the NIM at 1802:04.

An approaching train activated the Rawson Road level crossing at 1802:30, which was heard in the background of the phone call between the NIM and the witness. This call was terminated and the NIM placed a priority call to both the Central Coast and Hornsby North Signalling panel operators, to initiate an emergency “All Stop” message through the Digital Train Radio System (DTRS).

Central Coast issued an emergency all stop at 1802:55. The train driver reported hearing the broadcast just prior to the vehicle being struck.

At 1803:22 approximately 4 minutes after the triple zero call was made, and after the vehicle had been struck, the Police Radio Operations Group (ROG) Operator contacted Sydney Trains SCCO with the first notification of the motor vehicle on the tracks at Rawson Road level crossing. The ROG Operator conveyed police patrols had reached the site and the train had just collided with the car and that the car was unoccupied.

In social media footage of the collision police sirens can be heard in the background indicating police had been despatched to the incident prior to the ROG Operator reporting the obstruction to the SCCO. It is possible that had Sydney Trains received a call advising of the track obstruction from:

- Witness 1 before they rang the tow truck driver
- the ROG Operator immediately after the triple zero call from Witness 2,

the train driver of N169 may have received advice of the vehicle on the rail line in time to slow or stop short and prevent the collision.

Sydney Trains investigated this incident. During their investigation they found the NIM was unable to make Rail Emergency Calls (RECs) using their DTRS as the function was not switched on. This decision was made at the time the ROC commenced operations. It was noted that the NIM DTRS could still make point to point calls to trains.

Sydney Trains commented, given the NIM's span of management over the network, point to point calls may not be practical in an emergency situation, hence the decision made by the NIM, in the Woy Woy incident, to bring in the Area Controllers was the best method of stopping trains at that time.

Rail Operations Management in Sydney Trains were not aware of the REC facility not being available to NIM terminals and this was not detected in their investigation of the Kembla Grange incident.

Safety analysis

Trespassing in the rail corridor and abandoning a motor vehicle on the rail line led to the collision and derailment of train C012 just south of the West Dapto Road Level Crossing at Kembla Grange.

The incident presented some opportunities which may have led to mitigation of the incident, and these have been discussed below.

Opportunities to mitigate risk

There were 2 opportunities which may have led to train C012 being stopped before it collided with the abandoned motor vehicle.

The first was when the individual who abandoned the motor vehicle tampered with the security CCTV cameras. The cameras were located on the Kembla Grange Station platform and positioned at the West Dapto Road Level Crossing. The individual tampered with the CCTV cameras approximately 45 minutes before the collision occurred.

The second opportunity to mitigate the event arose when a member of the public called triple zero to notify the police of the abandoned motor vehicle on the rail line approximately 4 minutes before the collision occurred.

Both opportunities are discussed further below.

After the collision and derailment occurred, there was a risk of further escalation of the incident. The Digital Train Radio System was not available for the guard to report the incident and there was potentially live 1,500 V overhead wires at ground level post-incident on the accident site.

These issues are also discussed further below.

Security Control Centre operators unaware of camera tampering

On the morning of the incident at 0313 a Sydney Trains' security camera located on the Kembla Grange Station platform recorded an individual moving the security camera. CCTV then captured images of the same individual moving the level crossing cameras away from the level crossing to face directly downwards at 0326, approximately 45 minutes before the collision.

Sydney Trains Security Control Centre was not aware the camera had been moved until 0412:57, 3 minutes 17 seconds after the collision. The SCCO identified the camera movement during the phone conversation with the ROG, which occurred after the collision and derailment.

There was an opportunity for Sydney Trains to detect a security risk at 0313 and 0326, and perhaps stop the sequence of events which led to the vehicle on the track.

Had the camera movements been detected there may have been an opportunity for the Security Control Centre to deploy rail security or police to the scene. These responders may have stopped the individual from attempting to cross the track or detected the presence of a vehicle on the tracks.

While it cannot be said with certainty that events after the detection of a camera being tampered with would have prevented the motor vehicle being stuck, early detection of, and proactive response to camera tampering may provide the opportunity to intervene when security risks such as this occur.

CCTV monitoring

The Security Control Centre's Standard Operating Procedures (SCC SOP) suggested the Security Control Centre provides proactive monitoring of the entire Sydney Trains rail network. Page 10

states that operators proactively monitor over 13,000 station-based CCTV cameras and 12,000 train-based cameras, over 25,000 cameras in total.

The SCC SOP detailed the floor plan and desk set-up for the Security Control Centre operators and provided the minimum staffing levels for given shifts. While much of the time 4 Security Control Centre operators were rostered to live monitor the rail network, there could be up to 5 Security Control Centre operators on some shifts or during night shifts as few as 3 operators.

The task of monitoring some 25,000 station and train-based cameras was, therefore, as detailed in the SCC SOP, expected to be effectively managed by 3 to 5 individual operators depending on the numbers on shift.

The Security Control Centre operators were each assigned a particular area to monitor e.g. Console 4 live monitors the Illawarra and Bankstown Lines. This operator was responsible for live monitoring over 3,000 cameras.

This monitoring involves an individual overseeing many cameras on monitors at a desk. As a result, it is not possible to effectively monitor all assigned cameras at the same time, or reliably monitor camera changes, as in this incident where camera tampering was not detected.

Tamper alarms

Installation of tamper alarms on cameras was identified and agreed to by Sydney Trains as a reasonable measure to improve the security of the rail network. Tamper alarms provide an opportunity to improve proactive live monitoring as Security Control Centre operators in principle should be immediately alerted to a tampering event. This would then enable the Security Control Centre operator to act expeditiously.

A CCTV Upgrade Project to install tamper alarms on all cameras across the rail network was started in 2015. The scope of the CCTV Upgrade Project was amended during implementation, when excessive false alarms were encountered. The scope was amended to place tamper alarms on all cameras that were under 2.4m in height or were covering specific assets, such as level crossings, or any camera with a history of vandalism. Sydney Trains identified in their investigation of this incident that the revised tamper alarm functionality had not yet been fully implemented. Including activation of the tamper alarms on the West Dapto Road Level Crossing, even though it was identified for activation.

The Sydney Trains Network Maintenance group took charge of the project in December 2020 and a CCTV Operational Working Group was formed to continue progress from February 2021. Progress on installing these tamper alarms was continuing at the time of publishing this report.

The opportunity for detecting these types of events remains significantly lower while the installation of tamper alarms or alternative solutions remained outstanding.

No alert to train crew

In this incident, the train crew was not alerted to the abandoned motor vehicle on the track in time for them to slow or stop the train to avoid a collision or mitigate the outcomes. The recorded radio call from the WCP Controller to C012, highlighted the WCP Controller attempting to call C012 at 0409:35 and there was no response.

There was an opportunity for the collision and derailment to be avoided when a report of a motor vehicle on track came from a triple zero call from a member of the public at 0405:52. Sydney Trains was not alerted to this until 0407:37, which meant there remained approximately 2 minutes for a message to be provided to C012 to stop prior to the collision at approximately 0409:35.

This time was taken up with the passing of information from the SCCO to the TSDM and then to the WCP Signaller, who then made the call to C012 via the DTRS at about the same time the driver of C012 applied emergency brakes on the train.

The audio recording of these calls highlighted emergency awareness as an area for improvement. If the message had reached the driver of C012 in time, they could have slowed or stopped the train which could have prevented the collision from occurring or lessened the outcome.

Rail emergencies

The definition of an emergency in the railways is essentially any incident requiring urgent action which might involve death or serious injury, health and safety effects and/or significant damage to property or infrastructure[23].

A vehicle obstructing the rail line presents an immediate threat to the safety of train crew and the travelling public and therefore requires immediate action to stop all train services in the vicinity to prevent collision and escalation.

There is a level of understanding about rail operations that the ROG would glean over time through the interactions they have with the Sydney Trains Security Control Centre, however a firm understanding of what constituted an emergency on the rail line would not be expected to be known by the ROG without clear instruction or rail emergency training. As the ROG is the first contact point from a triple zero call about a rail emergency, it would be reasonable to review whether rail emergency awareness training should be provided to ROG Communications Officers and RDC Operators.

The SCCO is the first point of call into Sydney Trains from the ROG for these types of emergencies.

As a rail employee, the SCCO receives relevant training to identify rail emergencies. However, Sydney Trains stated in its internal investigation that the SCCO had not received any training in responding to emergencies since 2017.

Emergency situations are times when people are required to make fast and deliberate decisions and take actions to mitigate further escalation of consequences. As the SCCO had not received regular emergency refresher training in the preceding 4 years, their appreciation and understanding of how to react in an emergency was likely not at a competency level required for an effective response.

The SCCO's response reflects this as they took considerable time to verify and confirm with the Assistant RDC Operator that there was a motor vehicle stuck on the rail line before they made the call to the TSDM. The Assistant RDC Operator stated there was a report of a car stuck on the rail line 19 seconds into the conversation with the SCCO. Valuable time was used up and at 47 seconds into the conversation the SCCO asked if it is confirmed a motor vehicle is on the train tracks? Then at 58 seconds asks, are "they" inside the corridor? To which the Assistant RDC Operator needs to confirm if the SCCO means the deployed NSW Police. All taking up critical time to potentially stop a collision and further escalation.

It took 1 minute and 10 seconds before the SCCO made a call to the TSDM.

Without suitable training and practice exercises in emergency situations, the SCCO was possibly slower to respond to the information given to them by the Assistant RDC Operator. In a role that is required to understand and act expeditiously when emergencies arise, the level of training and exercising of the appropriate response for SCCOs is important.

[23] See https://www.rissb.com.au/glossary

Performing well in a situation that arises on rare occasions is not guaranteed when that individual has not been provided training in emergency response for many years.

A report of a motor vehicle stuck or any significant object on the rail line poses an immediate threat to life and the safety of train services and should be treated as an emergency. With appropriate training and/or instruction the reaction to this information should be to take immediate action to stop train services to avoid collision and prevent escalation.

Management of rail emergencies

As discussed previously, there was inconsistency between the SCC SOP and NIMP.

The NIMP required all incidents to be reported to the NIM or the DCM to be managed, however the report from the SCCO of the incident was directed to the TSDM.

An explanation for this was presented in Sydney Trains' internal investigation, that being, the SCCO perceived the situation as a routine Condition Affecting the Network (CAN), rather than as an Emergency (which is a type of CAN requiring a more urgent response).

This incident was an emergency as defined by the NIMP and therefore needed to be treated in accordance with the NIMP. The NIMP required that once the incident is imminent or occurs, first contact needs to be made with workers controlling train movements on the affected track section.

This is the accepted and accredited process for Sydney Trains Network Incident Management.

When the SCCO called the TSDM after they were informed of a motor vehicle on the track, the incident was not managed in accordance with the requirements of the NIMP. This incident required a call to the NIM or the DCM to manage. That said, the TSDM in this instance acted quickly to advise the signaller to stop all trains.

Procedure with conflicting instructions

The Sydney Trains Security Control Centre Standard Operating Procedure (SCC SOP) contained conflicting instructions for incident response. While referencing the Command and Control System as the new Incident Management System that is detailed in the Network Incident Management Plan (NIMP), the SCC SOP also introduced the TSDM to the incident response process.

Page 59 of the SCC SOP contained the 'Incident response checklist'. This checklist is to be used for all incidents managed by the Security Control Centre.

Its purpose, to provide prompts for the SCCO in the event of an incident that may have an effect or impact on the rail network. The SCCO is instructed to "Inform relevant TSDM/NIM - MAKE SAFE."

The SCC SOP introduced the TSDM as a point of contact in an incident, however, the Sydney Trains NIMP only states the NIM and DCM, as the points of contact, for Level 1 and 2 incidents.

The NIMP provides a clear statement of roles and their responsibilities for managing network incidents. There is no mention in the NIMP of a role for the TSDM in the command and control system.

Sydney Trains also identified in their internal investigation an issue with inclusion of the TSDM in the Security Control Centre procedures.

Page 30 of the Sydney Trains Investigation report stated:

> The current SCC Standard Operating Procedure v1.3 and informal procedure allowed for the TSDM to be informed of the motor vehicle on the running line to determine the response, instead of specifying only the NIM, introducing an additional line of communication with no access to the DTRS.'

This highlighted that inclusion of the TSDM in the lines of communication slows response to an individual that has access to the DTRS (and hence an ability to STOP train services). Sydney Trains also highlighted in their investigation that an alternative solution to getting the SCC SOP and Sydney Trains NIMP processes consistent, would be to consider the processes that are occurring already as embedded and instead provide the TSDM with the ability to stop all train services when an incident such as this one occurs.

Given the competence displayed by the TSDM in this incident, the alternative solution proposed by Sydney Trains, to give the TSDM access to the DTRS and the ability to stop all train services when required is worthy of assessing for feasibility of implementation.

In the related Woy Woy incident, the NIM still opted to call the signaller to place an emergency broadcast, rather than placing a point to point call themselves, as they determined that this was the most effective means to stop the train. This was required as the REC functionality on the NIM's DTRS had been turned off. NIMs could still make point to point calls to trains but not emergency broadcasts. This was the status of the NIM DTRS functionality at the time of the Kembla Grange incident, and this status was unknown to Sydney Trains Rail Operations Management.

However, awareness of the issue has led to further technical advice being sought regarding the practicality of switching on the REC facility on NIM DTRS terminals, with a view to determining the best method/ shortest practical communication chain to stop trains in emergency situations.

Digital Train Radio System

The DTRS on Set T42 did not work when the guard attempted to call the Signaller after the train had collided with the motor vehicle, derailed, and separated. After the derailment and separation, the Signaller made attempts to contact the driver on the DTRS but was unsuccessful.

Sydney Trains investigated the functionality of the DTRS after the incident. They found the DTRS was working as required. The radio unit on the train had gone into stand-by mode likely because of a short circuit in the guard's control circuit breaker unit, which occurred when the train collided, and the first carriage separated.

For the guard to be able to use the DTRS again, it required the guard to reset it.

In post-incident testing of the DTRS, a reset of the unit was conducted, and it took approximately 30 seconds for the radio to restart after the guard key in and another 50 seconds to get through the service menu to make an emergency call.

In this emergency where the guard was in a heightened state of arousal, 80 seconds is a considerable time to wait for the radio to be usable again. Had there been no other option, then the DTRS would have been available for the guard to use after a reset, provided they had appropriate instruction on how to reset it.

In this instance the guard had a second option available which was to use a mobile phone to contact the network controller. This option was a quick and effective way of reporting the situation.

High voltage risk

As a consequence of the collision and derailment, the front carriage collided with a high voltage stanchion, bringing it to the ground along with 1,500 V overhead wires.

The Electrical Operations Centre (EOC) was alerted to a sustained fault between Unanderra and Dapto and notified the NIM approximately 4 minutes after the collision. It is highly probable the sustained fault was caused by the front carriage bringing down the high voltage stanchion. This sustained fault meant the power through the overhead wires in this section had been cut off however, verification of power being cut from the overhead had not been conducted.

Instruction from the NIM was for everyone to treat the overhead wires as live until the Rescue Power Outage (RPO) was issued.

At 0411:56, *2 minutes 16 seconds after the collision*, the guard was reporting the incident to the WP Signaller. During this call the guard tells the WP Signaller that the police are onsite.

At this point, the Incident Rail Commander (IRC) had not made it to site to take control and there had been no verification of high voltage power being cut out. With no other qualified person onsite, the guard had assumed the role of Site Controller.

It is important to highlight the competence of the guard, and their training, as it enabled them to inform the police and other first responders to watch out for the high voltage danger of the overhead wires and live portion of the train.

Additionally, a secondary avenue of mitigating risk exposure to the police was in action through the communication chain between the SCCO and Assistant RDC Operator informing emergency personnel on site to treat the wires as live.

Findings

ATSB investigation report findings focus on safety factors (that is, events and conditions that increase risk). Safety factors include 'contributing factors' and 'other factors that increased risk' (that is, factors that did not meet the definition of a contributing factor for this occurrence but were still considered important to include in the report for the purpose of increasing awareness and enhancing safety). In addition 'other findings' may be included to provide important information about topics other than safety factors.

Safety issues are highlighted in bold to emphasise their importance. A safety issue is a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operating environment at a specific point in time.

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

From the evidence available, the following findings are made with respect to the collision between passenger train C012 and a motor vehicle on track near West Dapto Road level crossing, Kembla Grange, New South Wales, on 20 October 2021.

Contributing factors

- An individual abandoned a motor vehicle on the rail line south of West Dapto Road Level Crossing, Kembla Grange.
- Train C012 collided with the abandoned motor vehicle south of West Dapto Road Level Crossing and derailed.
- The driver of C012 was not alerted to the abandoned motor vehicle on the rail line in time to stop the train prior to colliding with the vehicle and derailing.

Other factors that increased risk

- An Individual tampered with CCTV cameras monitoring the West Dapto Road level crossing at Kembla Grange Station without being detected.
- **Sydney Trains Security Control Centre Operator was not alerted to tampering of the cameras at Kembla Grange Station that monitored the West Dapto Road level crossing.**
- **Sydney Trains Security Control Centre Standard Operating Procedure contained conflicting instructions on incident response, which were not aligned with the Sydney Trains Network Incident Management Plan (NIMP).**
- Report of a motor vehicle stuck on the rail line was not treated as an emergency.
- There was a risk to the guard and first responders who attended to the driver and injured passengers, when the potentially live 1,500 V overhead wires came down to ground level.
- When the guard tried to make an emergency call on the Digital Train Radio System, they could not use it to contact Network Control in a timely manner.

Safety issues and actions

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues. The ATSB expects relevant organisations will address all safety issues an investigation identifies.

Depending on the level of risk of a safety issue, the extent of corrective action taken by the relevant organisation(s), or the desirability of directing a broad safety message to the [aviation, marine, rail] industry, the ATSB may issue a formal safety recommendation or safety advisory notice as part of the final report.

All of the directly involved parties are invited to provide submissions to this draft report. As part of that process, each organisation is asked to communicate what safety actions, if any, they have carried out or are planning to carry out in relation to each safety issue relevant to their organisation.

The initial public version of these safety issues and actions will be provided separately on the ATSB website on release of the final investigation report, to facilitate monitoring by interested parties. Where relevant, the safety issues and actions will be updated on the ATSB website after the release of the final report as further information about safety action comes to hand.

Sydney Trains Security Control Centre Operator unaware CCTV cameras tampered with at Kembla Grange Station

Safety issue description

Sydney Trains Security Control Centre Operator was not alerted to tampering of the cameras at Kembla Grange Station that monitored the West Dapto Road Level crossing.

Issue Number:	RO-2021-012-SI-01
Issue Owner:	Sydney Trains
Transport function:	Rail: Operations control
Current issue status:	Open-Safety action pending
Issue status justification:	Sydney Trains identified in their investigation that tamper alarms on level crossing cameras were meant to be installed as part of a program that commenced in 2015. In the process of installing these, it was identified the cameras were being triggered too frequently, causing too many false alarms so the project team was instructed to disable the functionality. An alternative solution was not progressed so the tamper alarms were not installed on any of the level crossing cameras.

Response by Sydney Trains

CCTV software has been recently upgraded to allow use of a centralised server-based analytics engine to provide alarm functionality. Additionally, Sydney Trains has purchased software licenses to allow development / testing / trialling of this software. It is believed that the more sophisticated analytics available will allow detection of incidents such as the tampering at the West Dapto Level Crossing while reducing the false alarm rate.

ATSB comment

This action is appropriate to ensure a risk control for trespassers on the rail line being detected is in place. In the interim period, while the control is being developed, tested and trialled, without any other control for tamper detection, the trespasser risk remains untreated.

Sydney Trains Security Control Centre Operator procedure contains conflicting instructions on incident response

Safety issue description

Sydney Trains Security Control Centre Standard Operating Procedure contained conflicting instructions on incident response, which were not aligned with the Sydney Trains Network Incident Management Plan (NIMP).

Issue Number:	RO-2021-012-SI-03
Issue Owner:	Sydney Trains
Transport function:	Rail: Passenger - metropolitan
Current issue status:	Closed-Adequately addressed
Issue status justification:	Sydney Trains identified in their investigation (Finding 142) that there were inconsistencies between the Security Control Centre Standard Operating Procedure and the Sydney Trains Network Incident Management Plan. Sydney Trains made a recommendation which stated: If procedures are not/cannot be amended to route all priority calls to the NIM, explore the feasibility of installing the DTRS in TSDM workstations. This recommendation leaves Sydney Trains with a decision to either make procedures consistent and ensure Security staff operate in line with the procedures, or to have DTRS installed on the work stations of the TSDM. When either of these solutions has been implemented, the safety issue will be considered closed adequately addressed.

Response by Sydney Trains

The Security Control Centre Standard Operating Procedure has now been aligned with the Sydney Trains Network Incident Management Plan with Security Control Centre Operators required to contact NIMs rather than TSDMs, and, Security Control Centre Operators' initial training in responding to emergencies has been upgraded (initial training module - STSCC02C - Knowledge & Skills) so that initial training around communicating during emergencies is improved and a recertification module (STSCC07A - SCC - Competency Assurance Assessment) is currently under development and will be provided as refresher training.

It is expected that the refresher training will be provided to operators every 12 months.

ATSB comment

The actions taken by Sydney Trains as described above addresses the inconsistencies previously in the safety management system. The safety issue is considered closed adequately addressed.

General details

Occurrence details

Date and time:	20 October 2021 – 0409 EST	
Occurrence class:	Collision	
Occurrence categories:	Accident	
Location:	Kembla Grange, New South Wales	
	Latitude: 34º 28' 12.601" S	Longitude: 150º 49' 3.073" E

Train details

Track operator:	Sydney Trains	
Train operator:	NSW Trains	
Train number:	C012	
Type of operation:	Passenger	
Consist:	6212, 5213, 5211, 6211	
Departure:	Kiama Station	
Destination:	Central Station	
Individuals on board:	Crew – 2	Passengers – 10
Injuries:	Crew – 2	Passengers – 2
Damage:	1 carriage destroyed, 1 significant damage, 2 minor damage	

Glossary

CAD	Computer Aided Dispatch
CCTV	Closed Circuit Television
CRF	Control Room Floor
DCM	Duty Control Manager
DTRS	Digital Train Radio System
EOC	Electrical Operations Centre
ETCS	European Train Control System
IEDR	Internal Emergency Door Release
IRC	Incident Rail Commander
NIM	Network Incident Manager
NIMP	Network Incident Management Plan
ONRSR	The Office of the National Rail Safety Regulator. Administered and enforced compliance with the Rail Safety National Law and Regulations.
RDC	Radio Dispatch Channel
REC	Rail Emergency Call
ROC	Rail Operations Centre
ROG	Radio Operations Group
RPO	Rescue Power Outage
RISSB	Rail Industry Safety and Standards Board. Responsible for the provision of standards, codes of practice, guidelines, rules, safety data and analysis for the Australian rail industry.
SCCO	Security Control Centre Operator
SOP	Standard Operating Procedure
TSDM	Train Services Delivery Manager
WCP	Wollongong Coast Panel
WP	Wollongong Panel

Sources and submissions

Sources of information

The sources of information during the investigation included:

- the Driver of C012
- the Guard of C012
- Train data logger from D6212 and D6211
- Sydney Trains CCTV cameras
- Sydney Trains audio communication systems
- Sydney Trains documented management systems
- NSW Trains documented management systems
- Transport for NSW
- NSW Police Investigation

References

ONRSR annual implementation reports on the NSW Government response.

Submissions

Under section 26 of the *Transport Safety Investigation Act 2003*, the ATSB may provide a draft report, on a confidential basis, to any individual whom the ATSB considers appropriate. That section allows an individual receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the following directly involved parties:

- Driver of C012
- Guard of C012
- NSW Trains
- Sydney Trains
- Transport for NSW
- ONRSR
- NSW Police

Australian Transport Safety Bureau

About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. It is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

The ATSB's purpose is to improve the safety of, and public confidence in, aviation, rail and marine transport through:

- independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis and research
- fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia, as well as participating in overseas investigations involving Australian-registered aircraft and ships. It prioritises investigations that have the potential to deliver the greatest public benefit through improvements to transport safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, international agreements.

Rail safety investigations in New South Wales

Most transport safety investigations into rail accidents and incidents in New South Wales (NSW) are conducted in accordance with the Collaboration Agreement for Rail Safety Investigations and Other Matters between the Commonwealth Government of Australia and the State Government of NSW. Under the Collaboration Agreement, rail safety investigations are conducted and resourced in NSW by the Office of Transport Safety Investigations (OTSI), on behalf of the ATSB, under the provisions of the *Transport Safety Investigation Act 2003*.

The Office of Transport Safety Investigations (OTSI) is an independent statutory body which contributes to improvements in the safety of bus, ferry and rail passenger and rail freight services in NSW by investigating safety incidents and accidents, identifying system-wide safety issues and sharing lessons with transport operators, regulators and other key stakeholders. Visit www.otsi.nsw.gov.au for more information.

Purpose of safety investigations

The objective of a safety investigation is to enhance transport safety. This is done through:

- identifying safety issues and facilitating safety action to address those issues
- providing information about occurrences and their associated safety factors to facilitate learning within the transport industry.

It is not a function of the ATSB to apportion blame or provide a means for determining liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner. The ATSB does not investigate for the purpose of taking administrative, regulatory or criminal action.

Terminology

An explanation of terminology used in ATSB investigation reports is available on the ATSB website. This includes terms such as occurrence, contributing factor, other factor that increased risk, and safety issue.