

Short investigation

Bus Safety Investigation Report

Bus rollaway and collision

Wilsons Valley

5 September 2022

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Bus rollaway and collision, Wilsons Valley

5 September 2022

This report details the results of a short investigation which had a limited scope because the circumstances of the incident were such that it was unlikely to result in the identification of systemic safety issues. Short investigations are not designed to be comprehensive but aim to disseminate valuable information in a timelier way to benefit stakeholders in improving safety.

Incident overview

On Monday 5 September 2022, two coaches owned and operated by Alley's Coaches were contracted to transport children and teachers from Gunnedah South Public School on the first day of a multi-day excursion to the snowfields and surrounding areas in Kosciuszko National Park, NSW.

Under the Transport for NSW (TfNSW) Bus Operators Accreditation Scheme (BOAS), only trained and skilled drivers could drive vehicles used to provide bus or coach services carrying passengers in the NSW snowfields between 1 June and 11 October each year.¹

Alley's Coaches was a TfNSW accredited operator at the time of the incident. One of the two drivers assigned to operate the school charter had completed the required approved Snow Driver Training course. To allow the second coach to operate in the snowfields, the company contracted a second trained driver (the snow driver).

The snow driver had been employed by Snowliner Coaches on a casual basis since 2015 and had significant previous experience working with heavy vehicles in the designated snowfields. This driver had not seen or driven the assigned Alley's Coaches vehicle (registration TV5251) before the day of the incident.

Pick up of snow driver

The snow driver met the two Alley's Coaches vehicles at Berridale, which was outside of the designated snowfields area, and boarded coach TV5251 with the driver who had not completed snow driver training (the primary driver).

The coach operator reported that at Berridale, while the children were fitted with snow gear, that period was utilised to familiarise the snow driver with coach TV5251.

The snow driver observed the primary driver operate the coach up to the Kosciuszko Park Entry, which was a distance of about 63.5 km. At that point, the snow driver assumed the driving role, with the primary driver seated across the aisle in the foldup tour guide seat.

¹ TfNSW BOAS Accreditation Bulletin update 1.3, May 2020
<https://www.transport.nsw.gov.au/sites/default/files/media/documents/rww/business-industry/buses/operators/boas-accreditation-bulletin-update.pdf>

Transfer of school group to Smiggin Holes in incident coach

After a visit to the Kosciuszko Education Centre, the school group was scheduled for a ski lesson at 1330² at Smiggin Holes, Perisher Valley.

The snow driver drove one load of passengers in TV5251 to Smiggin Holes, before returning to pick up a second load. The other coach had experienced an issue with the kneeling system and had to remain at the Education Centre until it was fixed.

The snow driver drove the second load of passengers to Smiggin Holes, arriving after 1330. After unloading the passengers, the snow driver returned to the Education Centre with the primary driver.

Return to Smiggin Holes to pick up school group

A mechanic repaired the kneeling system on the other coach and both coaches returned to Smiggin Holes to wait for the school group which was scheduled to finish a ski lesson at 1630.

After the ski lesson, the school group boarded the two coaches to travel back down Kosciuszko Road towards Jindabyne, which was about 32 km away.

Front door unsecure

The incident coach, TV5251, departed Smiggin Holes snowfields at approximately 1700, with the snow driver and 41 passengers on board (36 students, 4 teachers and the primary driver). The other coach followed behind.

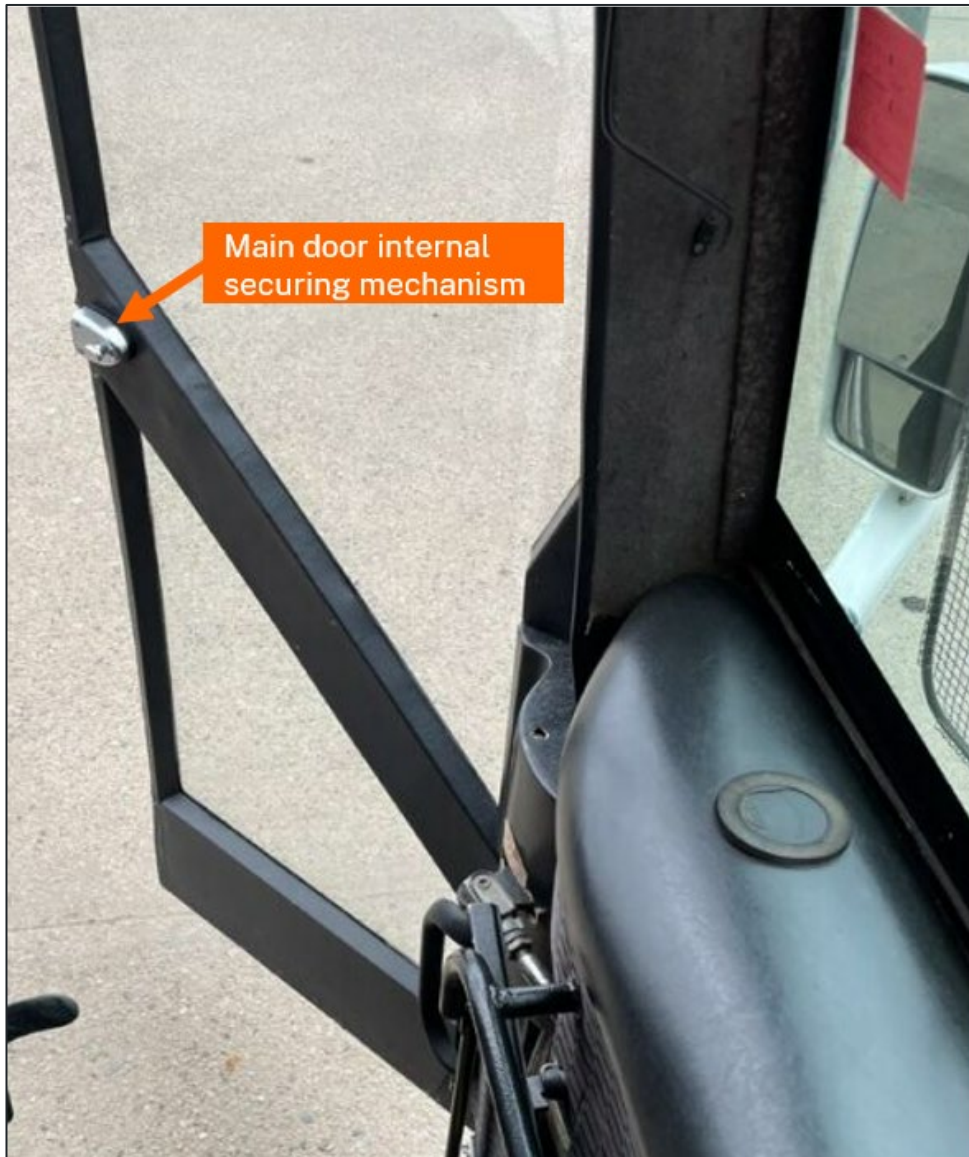
Shortly after, the primary driver noticed that the single front door on TV5251 was not closed properly and alerted the snow driver who pulled the coach over into a snow chain bay at Prussian Creek.

Once stopped, the primary driver directed the snow driver to open and close the coach door by operating the switch on the driver's console.

The primary driver then secured the door with the internal locking mechanism (Figure 1). The primary driver later reported that this action was to stop wind noise created when the door was not properly closed while the coach was in motion. The primary driver was seated in the tour guide seat at this time.

² Times in this report are in 24-hour clock form in Australian Eastern Standard Time

Figure 1: Coach TV5251 main door showing internal securing mechanism



Source: OTSI

Descent at Dainers Gap

The snow driver then proceeded down Kosciuszko Road towards Jindabyne, reaching the start of the descent at Dainers Gap, after driving a few kilometres. This was a descent from an altitude of 1600 m to 1500 m, with a 1 in 20 gradient (5%), across a driving distance of approximately two kilometres.

On the descent, the snow driver had trouble changing gears and then told the primary driver they had lost brakes. The primary driver got up from the tour guide seat to help the snow driver put the coach into gear.

It was later reported that the primary driver gripped the gear stick (Figure 2) and tried to force it into a gear, then hold it in position, as they considered that the transmission had neutralised.

Figure 2: Coach TV5251 driver's position



Source: OTSI. Note: image taken post-incident during investigation examination with some alarm coverings removed. Switch blocks were dislodged from the dash panel as a result of the collision impact.

While descending the mountain, the coach reached a speed of approximately 105 km/hr, with the snow driver forced to overtake a vehicle ahead, to avoid a collision.

Due to the nature of Kosciuszko Road, the downhill momentum enabled the coach to coast up the next incline for approximately 800 m. The coach eventually slowed and came to a brief stop where the snow driver applied the parking brake. The parking brake application had no effect, and the coach began to roll backwards, down the incline of the road.

At this time, the primary driver moved from the tour guide seat to a front passenger seat but did not secure their seatbelt.

Coach rollaway

As the coach rolled backwards down the hill, the vehicle passed the other Alley's coach which had been following behind. The snow driver swerved to try and slow the vehicle's speed as it rolled backwards down the road. This manoeuvre was ineffective, and the coach continued to gain speed.

The snow driver made the decision to veer the coach off the road, where it travelled down an embankment and struck a rock outcrop, coming to a sudden stop in an upright position. The coach had travelled approximately 250 m, and reached an estimated speed of about 50 km/hr.

The snow driver, primary driver and passengers were able to exit the coach through the single passenger door, after the internal door locking mechanism was deactivated from inside.

As a result of the incident, multiple children and adults were transferred to hospital for observation, with some passengers and the primary driver sustaining minor injuries.

The coach sustained damage mainly limited to the rear of the vehicle (Figure 3).

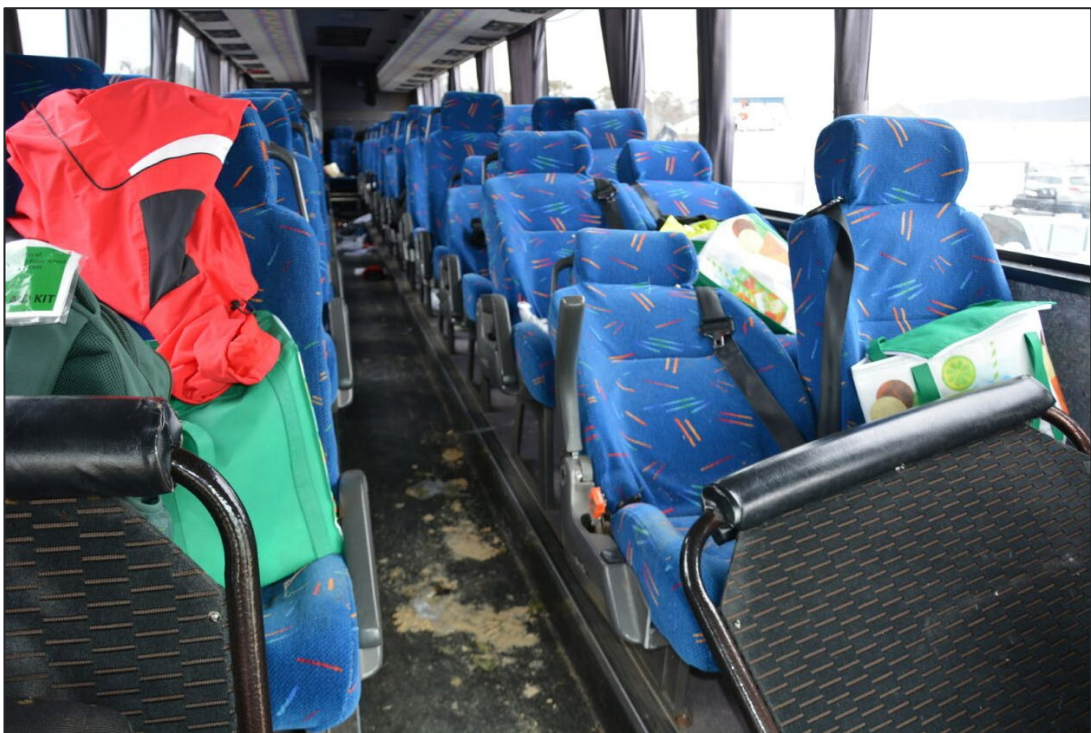
Figure 3: Coach TV5251 in final resting position after the rollaway



Source: OTSI

Damage to the coach seating indicated the impact forces that the passengers were subjected to when the vehicle collided with the rock outcrop (Figure 4).

Figure 4: Interior of Coach TV5251 showing damage to internal seating



Source: OTSI

Coach information

The involved vehicle was a MAN 24.420 three-axle chassis, fitted with a North Coast high deck coach body, built in 2000. It was registered in NSW as TV5251. The coach was 13.5m long, with a single passenger door at the front and a seating capacity of 53. The coach had an 8-speed manual transmission, and air operated brakes, with an air assisted clutch slave cylinder. The odometer recorded 217,758 km at the time of incident.

The coach's last roadworthy inspection was conducted by an authorised inspection station, in Tamworth on 14 June 2022, about 12 weeks before the incident, with no defects identified. The inspection was recorded on a Roads and Maritime Services NSW form.³

Prior to the incident, the coach owner and company drivers had identified that the vehicle was slow to build air in the braking system. The coach operator reported that they owned TV5251 for a number of years, prior to the incident, and the vehicle's braking system was always slow to build up air.

The coach operator reported that in early 2022, the flexible air discharge line from the compressor was replaced, as it had developed a leak. Not long after, one of the valves in the compressor head failed, resulting in the braking system being unable to build up enough air for the vehicle to proceed on the road. The compressor head was replaced, and the vehicle's braking system returned to its normal slow build up of air.

The owner, who was not a Licensed Mechanic, reported that they replaced the head on the compressor, with their mechanic providing instructions over the phone. Upon returning to the depot, the operator's Licensed Mechanic inspected the 'compressor head and air lines'.

OTSI observations

OTSI's evidence collection and analysis identified several safety factors.

Coach air brake system faults

The coach owner stated that the air compressor flexible discharge line was not changed, as the line was relatively new and completely clear of any buildup.

It is important that the compressor discharge line, and associated components fitted in the discharge circuit, are inspected and changed if required. Carbon build-up from worn air compressor rings can cause a restriction of the air compressor outlet ports, discharge line and associated components, resulting in a reduction of output and increased time to build air pressure in the braking system.

The coach owner reported that the involved coach was still slow to build air following replacement of the compressor head.

OTSI's post incident inspection of the involved coach identified separation of the vehicle's offside⁴ front brake line at the chassis connection point (Figure 5). It is likely that this failure initiated a significant loss in air pressure for which the air braking system was unable to compensate.

³ Roads and Maritime Services NSW was dissolved on 1 December 2019. However, some legacy forms were still in use

⁴ The left side when looking forward from the driver's seat in the bus is the near side. The right side is the offside.

Figure 5: Separation of TV5251's offside front brake line



Source: OTSI

Disabled driver alerts for coach operating systems

On post incident inspection of the coach, in conjunction with the National Heavy Vehicle Regulator (NHVR) Inspectors, pieces of adhesive plaster bandage were found covering the master alarm light and low coolant warning light on the driver's dash panel (Figure 6).

Figure 6: TV5251 dash alerting panel showing alarm lights covered at time of incident



Source: OTSI

The coach operator reported that the low coolant warning system was faulty, and there were several attempts to rectify the false activation of the low coolant level dash indicator. The system was identified as faulty as the coolant level in the tank was correct.

Due to the faulty low coolant warning system, the master alarm and low coolant warning lights remained constantly illuminated. This presented a false visual indication to the driver while operating the vehicle.

The coach operator advised that even though the lights on the dash were covered, they were still visible through and around the covering. The operator reported that the lights were covered to reduce brightness at night, and the low air warning light and low air warning buzzer were still operational.

However, the master alarm light also provided several other indications, including low air system pressure. Covering this visual alarm disabled it as a system alert and removed a safety critical indication to the snow driver that there was a brake system fault.

Driver unfamiliarity with the involved coach

While the snow driver was appropriately licensed and qualified, and had completed an approved Snow Driver Training course, they were unfamiliar with the coach that they were assigned to drive, and the associated system alerts specific to that vehicle. They were also unaware of the coach's recent maintenance and operational history, including that the air brake system was slow to build pressure. The snow driver relied on the operator, Alley's Coaches, to provide a serviceable coach with active alerting systems, and on the primary driver's familiarity with the vehicle.

Human factors influence on situation awareness and decision making

Reliance on the presence of the primary driver may have adversely impacted the snow driver's situation awareness of the dash panel visual alerting system, and decision making in addressing the passenger door issue, which was a potential indication of an air pressure system fault.

The primary driver's familiarity with the involved coach may have adversely impacted their situation awareness and decision making, with an unconscious bias that the coach had known issues which could be easily rectified (such as the front door closure issue being solved by securing the door with the internal locking mechanism) and an acceptance that visual driver alerts on the dash were covered/removed from display, without a full understanding of the potential safety consequences.

Passenger door closure issue

Low air system pressure likely contributed to the inadequate closing force of the passenger door, at the time the coach left Smiggin Holes, which was a potential missed opportunity to identify insufficient pressure in the air system before the vehicle was operated further.

Due to the reduced closing force of the passenger door, which was the only exit door, the coach was then operated from the snow chain bay to the incident site with the interior door lock enabled. Locking the door from the interior disabled the exterior emergency exit device, with the passenger door unable to be opened from the exterior (Figure 7).

Figure 7: TV5251 main door



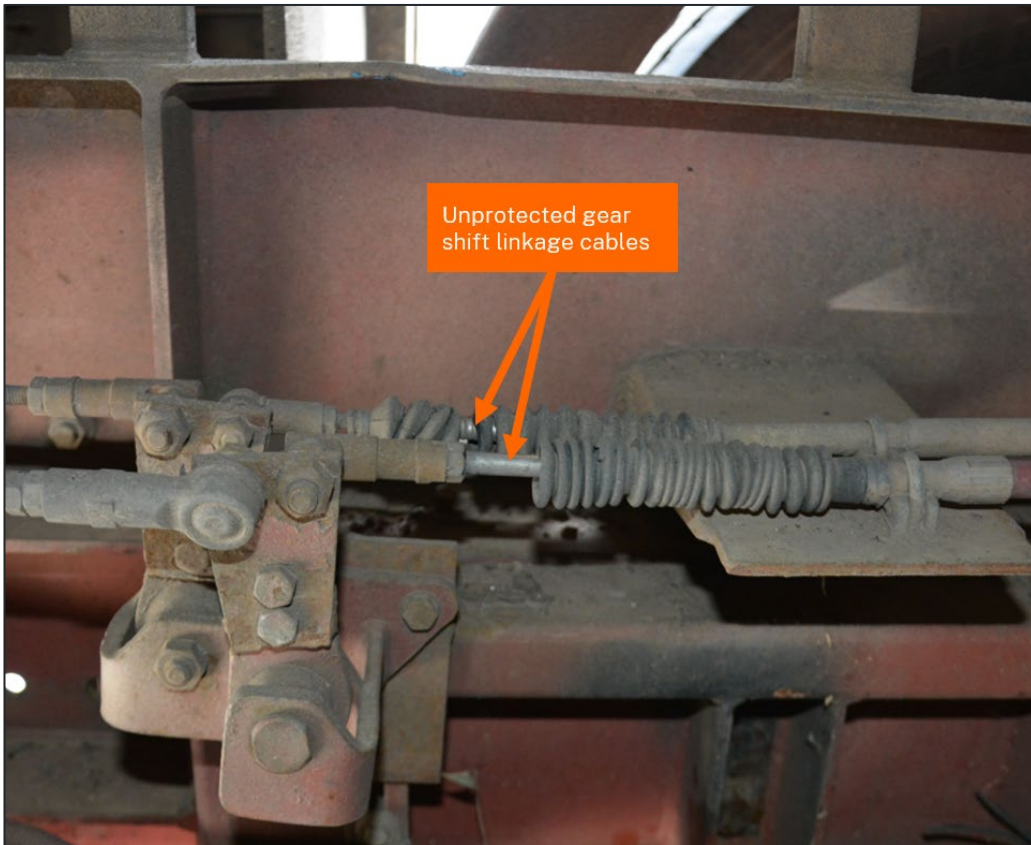
Source: OTSI

Vehicle defects

During examination of TV5251, OTSI identified several pre-existing defects and non-compliances with the National Heavy Vehicle Inspection Manual (NHVIM) current at the time of the investigation. The NHVIM detailed practical information about wear, damage or change to important systems from in-service use. It also documented the reasons for a vehicle rejection, referring to a heavy vehicle standard of the Heavy Vehicle National Law (HVNL).

Post incident, OTSI identified that TV5251's gear shift linkage cables were exposed where the protective rubber boots had separated (Figure 8), allowing road environment contamination of the cables. It is highly likely that this contamination resulted in the gear shift requiring additional force to operate.

Figure 8: TV5251 unprotected gear shift linkage cables



Source: OTSI

The condition of the drive axle brakes directly contributed to the failure of the brake system. OTSI identified that the brake linings on the drive axle were below the minimum thickness required by the chassis Original Equipment Manufacturer (OEM) and NHVIM. In addition, the drive axle brake chamber push rods exceeded the maximum stroke limits, resulting in a loss of braking efficiency.

The investigation also identified several non-compliances with NHVIM for vehicle signage, including:

- no external signage of emergency exits
- no external operating instructions for emergency exits and emergency door release; and
- no external signage showing the seating capacity of the coach.

Post incident stakeholder actions

It is noted that in 2023, TfNSW undertook a joint operation with the NHVR and NSW Police to conduct assurance activities in the NSW snowfield regions. The operation was an initiative to reduce deaths and serious injuries on NSW roads.

During the operation, TfNSW staff inspected 71 buses and coaches, ensuring bus operators were accredited, drivers authorised under the TfNSW Bus Operators Accreditation Scheme (BOAS) and had undertaken snow driver training. The NHVR assisted with bus defects, driver fatigue and work diary matters. The operation also provided an opportunity for TfNSW to assist and educate bus operators and drivers on their requirements under BOAS and the NHVR requirements. A number of issues were identified during the inspections (Table 1).

Table 1: 2023 snow fields bus and coach inspection results

Bus and coach inspections undertaken	71
Driver Authority not current	3
Snow Driver Training not completed	9
Operator not accredited	7
Bus defects	19
Penalty infringement notices issued	5
Bus Operator Accreditation Scheme deficiencies	162

Source: TfNSW

Investigation outcomes

OTSI has identified that a main contributing factor, in the failure of the coach's braking system, was the result of unlicensed, non-compliant maintenance activity of a safety critical operating system on a passenger transport vehicle.

The vehicle also had several defects that did not comply with the requirements of the heavy vehicle standard of the HVNL.

Key considerations

Bus and coach operating systems can be complex, with inadequate maintenance and repairs, by persons without the appropriate skills, knowledge, and equipment, resulting in the potential for significant adverse safety outcomes. Operators must ensure that Licenced Mechanics maintain their vehicles, in accordance with OEM and NHVIM requirements.

Additionally, in this incident, safety critical driver alerting systems were covered from display. This adversely affected driver situation awareness, potential identification of low pressure in the brake air system and a missed opportunity to cease vehicle operation before the incident.

While operators must ensure that assets are serviceable and maintained compliantly, this incident also highlights the importance of alarm displays, for bus and coach drivers, as cues to indicate that there is an issue with a safety critical system. Pre-departure checks and driver handover procedures provide opportunities to identify system faults, to then be reported to the operator for rectification.

Appendices

Appendix 1: Sources, submissions and acknowledgements

Sources of information

- National Heavy Vehicle Inspection Manual

Submissions

The Chief Investigator forwarded a copy of the Draft Report to the Directly Involved Parties (DIPs) to provide them with the opportunity to contribute to the compilation of the Final Report by verifying the factual information, scrutinising the analysis, findings and recommendations, and to submit recommendations for amendments to the Draft Report that they believed would enhance the accuracy, logic, integrity and resilience of the Investigation Report. The following DIPs were invited to make submissions on the Draft Report:

- Alley's Coaches
- National Heavy Vehicle Regulator
- Transport for NSW

Submissions were received from the following DIPs:

- Alley's Coaches

The Chief Investigator considered all representations made by DIPs and responded to the author of the submission, advising which of their recommended amendments would be incorporated in the final report, and those that would not. Where any recommended amendment was excluded, the reasons for doing so were explained.

About the Office of Transport Safety Investigations

The Office of Transport Safety Investigations (OTSI) is the independent transport safety investigator for NSW.

The role of OTSI is to improve safety and enhance public confidence in the safety of the NSW transport network through:

- independent investigation of transport incidents and accidents
- identifying system-wide safety issues and their contributing factors
- sharing safety lessons and making recommendations or highlighting actions that transport operators, regulators and other stakeholders can take to improve the safety of bus, ferry and rail passenger and rail freight services.

OTSI is empowered under the *Transport Administration Act 1988* to investigate rail, bus, and ferry accidents and incidents in accordance with the provisions of the *Passenger Transport Act 1990* and *Marine Safety Act 1998*. It also conducts rail investigations under the provisions of the *Transport Safety Investigation Act 2003* (Cth) and a Collaboration Agreement with the Australian Transport Safety Bureau (ATSB).

The aim of an OTSI investigation is to enhance transport safety by sharing safety lessons and insights with those organisations that can implement actions to improve safety. OTSI uses a 'no-blame' approach to identify and understand contributing safety factors and underlying issues. It does not assign fault or determine liability in relation to the matters it investigates.

An OTSI investigation is independent of any investigation or inquiry that a regulator, NSW Police or the Coroner may undertake. Evidence obtained through an OTSI investigation cannot be used in any criminal or civil proceedings. While information gathered by OTSI in the conduct of its work is protected, the Chief Investigator, under the *Transport Administration Act 1988*, may disclose information if they think it is necessary for the safe operation of a transport service.

OTSI is not able to investigate all transport safety incidents and accidents or matters that are reported. The Chief Investigator focuses the agency's resources on those investigations considered most likely to enhance bus, ferry or rail safety by providing new safety lessons and insights that may be shared.

Many accidents result from individual human or technical errors which do not involve safety systems so investigating these in detail may not be justified. In such cases, OTSI will not generally attend the scene, conduct an in-depth investigation, or produce an extensive report.

OTSI may request additional information from operators or review their investigation reports which may lead to several activities, such as the release of a Safety Advisory or Alert to raise industry awareness of safety issues for action.

OTSI investigators normally seek to obtain information cooperatively when conducting an investigation. However, where it is necessary to do so, OTSI investigators may exercise statutory powers to conduct interviews, enter premises and examine and retain physical and documentary evidence.

Publication of the investigation report

OTSI produces a written report on every investigation for the Minister for Transport, as required under section 46BBA of the *Passenger Transport Act 1990*.

Investigation reports strive to reflect OTSI's balanced approach to the investigation, explaining what happened and why in a fair and unbiased manner. All Directly Involved Parties in the investigation are given the opportunity to comment on the draft investigation report.

The final investigation report will be provided to the Minister for tabling in both Houses of the NSW Parliament in accordance with section 46D of the *Passenger Transport Act 1990*. The Minister is required to table the report within seven days of receiving it.

Following tabling, the report is published on the OTSI website – www.otsi.nsw.gov.au – and information on the safety lessons promoted to relevant stakeholders.