TECHNICAL INSPECTION FINDINGS
FIRE ON CONCORD COACHES BUS MO8644
BROOKLYN
30 OCTOBER 2013
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Released under the provisions of
Section 45C (2) of the Transport Administration Act 1988

File Reference: 04619
THE OFFICE OF TRANSPORT SAFETY INVESTIGATIONS

The Office of Transport Safety Investigations (OTSI) is an independent NSW agency whose purpose is to improve transport safety through the investigation of accidents and incidents in the rail, bus and ferry industries. OTSI investigations are independent of regulatory, operator or other external entities.

Established on 1 January 2004 by the Transport Administration Act 1988, and confirmed by amending legislation as an independent statutory office on 1 July 2005, OTSI is responsible for determining the causes and contributing factors of accidents and to make recommendations for the implementation of remedial safety action to prevent recurrence. Importantly, however, OTSI does not confine itself to the consideration of just those matters that caused or contributed to a particular accident; it also seeks to identify any transport safety matters which, if left unaddressed, might contribute to other accidents.

This OTS investigation was conducted under powers conferred by the Passenger Transport Act 1990. OTSI investigators normally seek to obtain information cooperatively when conducting an accident investigation. However, where it is necessary to do so, OTSI investigators may exercise statutory powers to interview persons, enter premises and examine and retain physical and documentary evidence.

It is not within OTSI’s jurisdiction, nor an object of its investigations, to apportion blame or determine liability. At all times, OTSI’s investigation reports strive to reflect a “Just Culture” approach to the investigative process by balancing the presentation of potentially judgemental material in a manner that properly explains what happened, and why, in a fair and unbiased manner.
Summary of the Incident

At approximately 1430 on Wednesday 30 October 2013, a Concord Coaches bus left Beresfield, north-west of Newcastle, carrying a tour group returning from a factory outlet visit. The bus, registered in NSW as MO8644, was a 2002 model Mitsubishi Rosa licensed to carry 24 including the driver, and was lightly laden with only 13 on board.

After leaving Beresfield and travelling for around 90 kilometres the bus made a fuel stop at Kariong, before continuing along the M1 towards Sydney. The bus was travelling behind a slow-moving truck in the left lane as it climbed the hill from the Hawkesbury River bridge, when passengers told the driver they could smell something. The driver assumed the odour was from the truck they were following, but after passing the truck the odour persisted and the driver saw dark smoke coming up from the front of the bus, to his left. Operation of the bus appeared otherwise to be normal.

As the driver was stopping the bus he checked his instruments and could see no indication of a problem. He was able to stop in a parking bay clear of the carriageway, and immediately evacuated the passengers before also alighting. When off the bus he looked back and could see flames coming from the front of the bus, and was unable to re-enter the bus to reach a fire extinguisher located near his seat, or to retrieve his belongings.

The driver of a following truck tried unsuccessfully to extinguish the fire using his own extinguisher, and the fire spread rapidly through the interior of the bus.

The Fire and Rescue station at Berowra received its first notification of the fire at 1512 and despatched a unit. As is the practice in rural locations, the Rural Fire Service also responded. Police arrived on the scene at 1518, and the first fire unit arrived at 1521. The fire was under control within 10 minutes, but not before the bus had suffered severe damage. A Roads and Maritime Service breakdown crew arrived on scene at 1543 and assisted in traffic management and recovery operations.

1 Times in this report are in 24-hour clock form in Australian Eastern Daylight Time, equal to Coordinated Universal Time plus 11 hours.
Incident location

The incident occurred on the M1 motorway in the vicinity of Brooklyn (see Figure 1), a township immediately south of the Hawkesbury River.

Figure 1: Key locations
The M1, a multi-lane divided highway with three traffic lanes in either direction and a speed limit in the area of the incident of 110 km/h, ascended from the river bridge to the incident location with an average grade of approximately 1 in 30.

A little over 2 kilometres from the bridge the M1 passed under the Old Pacific Highway, and approximately 150 metres further on was the parking bay, signposted “RTA VEHICLES ONLY”\(^2\), in which the bus stopped (see Figure 2).

![Figure 2: Location of the parking bay where the bus stopped](image)

**The driver**

The driver of the bus was a 75 year old male retiree who had been driving buses for over 20 years. He had known the owner of the bus for “many years” and drove for him on a part-time basis when he was short of a driver. This was one such occasion.

\(^2\) At the time of the incident the RTA (NSW Roads and Traffic Authority) no longer existed, having been subsumed into the RMS (NSW Roads and Maritime Services).
On the morning of 30 October 2013 the driver had risen early and had picked up the bus at the Concord Coaches depot at Sydney Olympic Park, a distance of some 10 kilometres from his home, shortly before 7:00 am.

The bus

The bus was a 2002 model Mitsubishi Rosa, registered as MO8644. It had been last serviced on 3 September 2013, when its odometer indicated 263,101 kilometres. The odometer reading at the time of the incident was not available.

The bus was not fitted with fire detection or suppression systems, but was equipped with a single hand-held fire extinguisher that could not be clearly identified on inspection as it was badly damaged in the fire. It was stated by Concord Coaches management to be rated at 2A:40B:E, and its appearance was consistent with this rating.

*Australian Design Rule 58/00 – Requirements for Omnibuses Designed for Hire and Reward* required the provision of fire extinguishers as specified in *Australian Standard 2444—2001, “Portable Fire Extinguishers – Selection and Location”*. In the case of buses used in urban areas and for short trips outside urban areas the requirement was for a single 2A:20B rated extinguisher. OTSI accepts that the extinguisher fitted to the bus met or exceeded this requirement.

OTSI notes that Mitsubishi Rosa buses manufactured between 25 July 2003 and 5 July 2011 were recalled by the supplier to rectify a fuel pipe defect that had the potential to result in a fire. The bus involved in this incident was manufactured prior to that time interval, and was not subject to that recall.

Examination of the bus

The degree of damage to the bus rendered it beyond economic repair. Prior to disposal it was taken to a holding yard in western Sydney. It was there that it was examined by OTSI investigators.

The front of the bus was severely damaged, as shown in *Photograph 1*. Although the rear half of the exterior of the bus showed little damage (see *Photograph 2*), the
interior of the bus showed fire and heat damage throughout (Photograph 3). The greatest degree of interior damage was forward of the underfloor engine, and around the dashboard (Photograph 4).

Photograph 1: Damage to the front of the bus
Photograph 2: Relatively undamaged exterior rear of bus

Photograph 3: Fire damage to the interior of the bus
Analysis

In order for a fire to develop and be sustained for a significant time, four elements are necessary:

- an initiator
- combustible material
- an oxidising agent, in this case oxygen in air
- a path by which the fire can spread.

The initiator

Due to the extent of damage to the bus it was not possible to determine the initiator of the fire with certainty. The most common initiators of heavy vehicle fires are electrical malfunction or short circuit, and excessive temperature of mechanical components such as turbocharger, wheel bearings, brakes or exhaust.

In this case, although the engine had been subjected to high temperatures, and flammable components and materials had been burnt, there was no identifiable location that could be differentiated from the general level of damage in order to be considered a probable point of fire initiation. Likewise, although the front tyres, and
in particular the right front, were damaged by fire, there was no evidence found to indicate an initiation point.

The driver was initially alerted by an odour, and reported that prior to bringing the bus to a stop, he “looked to the front left and saw smoke coming out”. In all other respects the bus appeared to be operating normally, and no warning lights were showing. At this stage no flames were visible to the driver, and flames were not seen by him until he was out of the bus.

As the engine in this bus was located under the floor immediately beside the driver and the movement of air under the moving bus would have carried any smoke from the engine towards the rear of the bus, it is unlikely that the smoke that was first seen was coming from the engine. It is more likely that the source of the smoke was components in the interior of the bus, or more probably in the left front underfloor area. As the driver reports that after getting out he was unable to re-enter the bus due to the fire, it is probable that the fire was already well established in an area not directly visible to the driver, before the bus came to a stop.

It is unlikely that a fire that was established solely outside the passenger compartment could have made its way into the interior of the bus through the floor in the short time taken to evacuate the bus after stopping.

Unfortunately the damage to the front left hand area of the interior of the bus, as seen in Photograph 5, was such that a likely point of initiation, if present in this area, could not be identified.
Combustible material and propagation path

As reported previously by OTSI\textsuperscript{3}, the majority of materials used in the interior fittings and linings of a bus are flammable.

As the bus driver reported seeing smoke before stopping the bus, it is probable that the fire was already established and was suppressed to some degree by the cooling effect of the airstream. When the bus slowed and came to a stop, the resulting concentration of heat around the seat of the fire resulted in flames becoming visible and the fire rapidly becoming well established and spreading through the flammable materials in the interior and underbody of the bus.

In OTSI’s experience, once a fire is established in flammable material in the interior of a bus, it will continue to spread rapidly throughout the bus and, if not countered, will destroy the bus within minutes. In this instance the interior of the bus was destroyed, but the arrival of NSW Fire and Rescue units resulted in the fire being suppressed before the exterior bodywork towards the rear of the bus was consumed.

Evacuation of the bus

The driver reported that immediately after stopping the bus he evacuated the passengers and then exited the bus himself. With only 13 on board, and the passengers all being young and able-bodied, evacuation was rapid and the driver was able to safely follow the passengers off the bus. The speed with which the fire was established in the interior of the bus prevented the driver from re-entering the bus to retrieve personal belongings or to reach the fire extinguisher that was located near his seat.

The passengers were moved to a safe location away from the bus and clear of the roadway.

Emergency response

Multiple calls to Emergency Services were made, and the source of the first notification is not known. The NSW Fire and Rescue station at Berowra received notification of the fire at 1512 and immediately despatched a unit. Police and the Rural Fire Service also responded, and the Police arrived on scene at 1518, three minutes before the first fire unit. By this time a truck driver had unsuccessfully attempted to extinguish the fire using a hand-held extinguisher.

The fire was extinguished in approximately 10 minutes from the time of arrival of the fire units, and a Roads and Maritime Services breakdown unit arrived at 1543 to assist in traffic management and recovery operations.
Conclusions

Although the cause of the fire could not be determined with certainty, it is most likely that it was caused by an electrical failure in the left hand front section of the bus. The driver was initially alerted by a burning odour, and by the time that smoke became visible to the driver the fire was already established, and flared up rapidly after the bus came to a stop.

The fact that all passengers were able-bodied and were evacuated in an efficient manner by the driver averted what may otherwise have been far more serious consequences than the loss of the bus.

On the basis of these findings OTSI has concluded its examination of the circumstances of this incident and has determined that it does not require further investigation by this Office under the provisions of Section 46BA (1) of the Passenger Transport Act 1990.

Copies of these findings have been provided to Concord Coaches and Roads and Maritime Services.