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OTSI’s investigations are conducted under powers conferred by the *Transport Administration Act 1988 (NSW)* and *Passenger Transport Act 2014 (NSW)*. Additionally, all OTSI publications that are considered investigation reports are also conferred by these Acts. OTSI also conducts rail investigations on behalf of the Australian Transport Safety Bureau under the *Transport Safety Investigation Act 2003 (Cwlth)*. 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 our balanced approach to the investigation, in a manner that properly explains what happened, and why, in a fair and unbiased manner.

Once OTSI has completed an investigation, its report is provided to the NSW Minister for Transport and Infrastructure for tabling in Parliament. The Minister is required to table the report in both Houses of the NSW Parliament within seven days of receiving it. Following tabling, the report is published on OTSI’s website at [www.otsi.nsw.gov.au](http://www.otsi.nsw.gov.au).
# CONTENTS

## TABLE OF FIGURES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXECUTIVE SUMMARY</td>
<td>iii</td>
</tr>
<tr>
<td>PART 1 FACTUAL INFORMATION</td>
<td>1</td>
</tr>
<tr>
<td>Events leading up to the occurrence</td>
<td>1</td>
</tr>
<tr>
<td>The occurrence</td>
<td>3</td>
</tr>
<tr>
<td>Events following the occurrence</td>
<td>4</td>
</tr>
<tr>
<td>Incident location</td>
<td>4</td>
</tr>
<tr>
<td>Environmental conditions</td>
<td>5</td>
</tr>
<tr>
<td>Bus information</td>
<td>5</td>
</tr>
<tr>
<td>Driver information</td>
<td>7</td>
</tr>
<tr>
<td>Related occurrences</td>
<td>8</td>
</tr>
<tr>
<td>PART 2 ANALYSIS</td>
<td>10</td>
</tr>
<tr>
<td>Introduction</td>
<td>10</td>
</tr>
<tr>
<td>Initiation of fire</td>
<td>10</td>
</tr>
<tr>
<td>Actions of the driver</td>
<td>16</td>
</tr>
<tr>
<td>Controls in place to detect and prevent a fire</td>
<td>17</td>
</tr>
<tr>
<td>Remedial actions</td>
<td>18</td>
</tr>
<tr>
<td>PART 3 FINDINGS</td>
<td>19</td>
</tr>
<tr>
<td>Contributory Factors</td>
<td>19</td>
</tr>
<tr>
<td>Other Safety Factors</td>
<td>19</td>
</tr>
<tr>
<td>PART 4 RECOMMENDATIONS</td>
<td>21</td>
</tr>
<tr>
<td>Comfort Delgro Corporation</td>
<td>21</td>
</tr>
<tr>
<td>NSW bus operators</td>
<td>21</td>
</tr>
<tr>
<td>PART 5 APPENDICES</td>
<td>22</td>
</tr>
<tr>
<td>Appendix 1: Sources, References and Submissions</td>
<td>22</td>
</tr>
</tbody>
</table>
## TABLE OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Map of bus path from Morpeth to Thornton</td>
<td>2</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Map of incident location</td>
<td>5</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Bus 7818MO following the fire</td>
<td>6</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Rear interior of bus after fire</td>
<td>7</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Same model bus as bus involved in fire</td>
<td>7</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Bus fires and thermal incidents initiated in the wheel well</td>
<td>9</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Burn pattern offside rear wheel well</td>
<td>11</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Remnants of both offside rear tyres</td>
<td>12</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Tyre sensor on offside rear inner tyre</td>
<td>13</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Evolution in the processes leading to a tyre blowout or explosion</td>
<td>14</td>
</tr>
<tr>
<td>Figure 11</td>
<td>An offside rear wheel bearing</td>
<td>16</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

On Monday morning 16 October 2017, a Hunter Valley Buses\textsuperscript{1} bus, 7818 MO, caught fire at Thornton. At the time, the bus was travelling with only the driver on board. There were no injuries but the bus was destroyed by the fire.

The driver noticed an audible alarm coming from the dash-mounted tyre monitoring system (TMS)\textsuperscript{2} as he travelled along Raymond Terrace Rd, Thornton. He continued driving while the alarm was sounding and after 20 seconds the driver manually silenced the alarm.

The driver travelled for a further 5 minutes until he reached the intersection of Glenroy Street and Railway Ave, Thornton. While stationary at the intersection, the driver heard a loud explosion coming from the rear of the bus. This was most likely the offside rear inner tyre exploding. Despite efforts by a member of the public using a fire extinguisher and the response from NSW Fire and Rescue, the bus was destroyed by fire.

The fire initiated within the offside rear wheel well. It is likely the fire developed after a large amount of heat was generated by friction from either a deflated tyre or a dragging brake problem. The frictional heat generated was sufficient to initiate pyrolysis and lead to the tyre exploding when the bus was stopped at an intersection.

There was a functioning TMS fitted to the bus which alerted the driver to a problem with a tyre; however the driver silenced the alarm and continued driving.

Recommendations were made to Hunter Valley Buses to reinforce to drivers that any alarm or apparent performance problem is to be treated with urgency and investigated before continuing with the journey. It was also recommended that the initial and recurrent training of drivers incorporates the function and operation of all safety features installed on a bus as well the correct response to alarms and the evacuation of passengers.

Full details of the Findings and Recommendations of this bus safety investigation are contained in Parts 3 and 4 respectively.

\textsuperscript{1} Hunter Valley Buses is part of the Comfort DelGro Corporation.

\textsuperscript{2} This report will use the abbreviation TMS to describe the tyre monitoring system which monitors tyre pressure and as well as temperature. It is commonly referred to in industry as TPMS (tyre pressure monitoring system), by using TMS OTSI acknowledges that it is used for temperature monitoring as well.
PART 1  FACTUAL INFORMATION

Events leading up to the occurrence

1.1 On the morning of 16 October 2017 the driver commenced his shift at Hunter Valley Buses’ Thornton bus depot at 0553, completing a pre-departure inspection of his assigned bus (registration 7818MO). The driver said he found no problems with the bus. He departed the depot at 0559 and drove via the Hunter Expressway to Hanwood Estate, North Rothbury to commence route 179. The distance from Thornton to North Rothbury is approximately 43 km.

1.2 The driver said the bus operated normally during the trip and he arrived at North Rothbury at 0643. He departed North Rothbury at 0644, three minutes behind schedule. The bus made seven stops to drop off or pick up passengers during the trip to Stockland Green Hills, East Maitland, arriving on schedule at 0750. The driver said that the bus did not exhibit any sign of malfunction with the doors, brakes or acceleration.

1.3 The bus driver had a layover at Stockland Green Hills for 10 minutes and did so with the engine switched off. As the driver commenced a 184 route to Morpeth at 0800 he noticed the bus was slow to accelerate compared to the previous trip. This improved after approximately 20 metres of travel. The driver continued to Morpeth with no passengers on board.

1.4 The driver completed the 184 route at Morpeth, changed the destination board and departed at 0825 to return special to the bus depot at Thornton.

1.5 The driver said that the bus was again slow to accelerate when it moved off from the stop at Morpeth. The driver travelled along Metford Road, Raymond Terrace Road, Haussman Drive and Glenroy Street (Figure 1). He was scheduled to arrive at the Thornton Bus Depot at 0839, where he would sign off at 0844.

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3  Times in this report are in 24-hour clock form in Australian Eastern Daylight-saving Time.

4  Running Special – a term that means the bus is travelling without passengers to begin a route or at the end of a route to return to depot.
1.6 The onboard CCTV recording showed that at 0833:28 the driver noticed an audible alarm coming from the dash-mounted TMS control panel indicating either a low tyre pressure or high temperature alert. He continued driving while the alarm was sounding and after 20 seconds he manually silenced the alarm.

1.7 The driver made a right hand turn from Raymond Terrace Road into Haussman Drive at 0836:10 and continued until 0838:48 when he came to a stop at the intersection of Glenroy Street and Railway Ave, Thornton.

1.8 The TMS alarm activated again and the onboard CCTV shows the driver leaning forward to silence the TMS alarm. It had activated for three seconds.

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5 No data could be recovered from the tyre pressure and temperature monitoring system due to fire damage, however the CCTV recording included audio of the event.
The bus had travelled approximately 9.3 km since leaving Morpeth with an average speed of 46 km/h. The driver was approximately 1 km away from the Thornton bus depot when the incident occurred.

The occurrence

The bus was stationary for approximately 11 seconds at the intersection of Glenroy Street and Railway Avenue, Thornton whilst the driver waited to make a right hand turn.

At 0838:59, while stationary at the intersection, the bus driver heard a loud explosion coming from the rear of the bus. This was most likely the sound of the offside rear inner tyre exploding. CCTV footage showed smoke emanating from the offside and nearside rear wheel well areas of the bus, and seeping through the rear floor hatch above the rear axle. At 0838:11 the TMS alarm can be heard again.

The driver said he saw black smoke in the rear view mirror but was unaware of what happened. Rather than block the intersection the driver completed the right hand turn into Railway Avenue and pulled over to the side of the road. He applied the park brake and switched off the engine along with the main battery switch. He remained inside the bus for approximately 35 seconds before leaving the bus.

A member of the public then came to the front door of the bus and informed the driver that the bus was on fire. The person also informed the driver that she had called triple zero and that the fire brigade were on their way. Another member of the public approached him and asked if he had a fire extinguisher. The driver located the extinguisher and the member of the public took it from his hands and said ‘you had better get out’. This person ran to the back of the bus and attempted to extinguish the flames but to no avail.

At 0839:58, the driver left the bus as the rear of the passenger saloon was filling with smoke. The driver returned about 90 seconds later to retrieve his belongings. At 0841:45, the driver is still on the bus as the CCTV footage ends. The driver said he left the bus soon afterwards, attempted some traffic control and notified the depot of the situation using his mobile phone.
Events following the occurrence

1.15 By the time the driver had evacuated the bus, the fire was fully engaged. The flames from the rear tyres eventually penetrated the passenger saloon and spread throughout the interior of the bus.

1.16 NSW Fire and Rescue arrived on scene approximately 10 minutes after the call. They secured the area and extinguished the fire. Despite their efforts, the bus was destroyed. Later that afternoon the bus was taken by low loader back to the Thornton bus depot where it was quarantined awaiting inspection.

1.17 The following day, an OTSI investigator deployed to the Thornton bus depot, inspected the bus, interviewed the driver and visited the scene of the fire. A further inspection of the bus was carried out on 15 November 2017. In attendance at this inspection were representatives of MAN buses and the OTSI investigator. During all inspections, Hunter Valley Buses had representatives present and the mechanics from the depot also provided assistance.

Incident location

1.18 The incident occurred at the intersection of Glenroy Street and Railway Avenue, Thornton. Thornton is a suburb of Newcastle located about 21 km northwest of the Newcastle CBD. (Figure 2).
Environmental conditions

1.19 The morning of 16 October 2017 was dry and cloudy. The Bureau of Meteorology recorded a temperature of 18°C at 0900 at the Maitland weather station about 10 km northwest of the incident. At 0900, the wind was recorded from the southeast at 43 km/h. Apart from the likely effect of wind on the promotion of the fire and dispersal of smoke, it was determined that the environmental conditions played no part in the incident.

Bus information

1.20 The MAN 12.220 HOCL bus, registration 7818MO, was operated by the Hunter Valley Buses out of the Thornton Depot (Figure 3 and 4). There were 13 other buses of this model in the Hunter Valley Buses’ fleet. Hunter Valley Buses is part of the Comfort DelGro Corporation (Figure 5).

1.21 The bus was first registered on 1 March 2001 and had a MAN chassis fitted with a Custom Coaches body. It was authorised to carry 55 passengers. The
bus was powered by a six cylinder diesel engine and the odometer read 655,479 km at the time of the incident. The bus was last inspected by Roads and Maritime Services, under the Heavy Vehicle Inspection Scheme, on the 11 August 2017. It was deemed fit for service.

1.22 It was equipped with a compressed air brake system with disc brakes on the front axle and rear drum brakes. The bus is fitted with dual wheels on the rear axle. In July 2017, as part of a Transport for NSW program, the bus was fitted with an engine bay fire suppression (EBFS) system and a TMS.

1.23 There were no other reports of fire incidents on this bus, nor on this model bus in the Hunter Valley Buses’ fleet.

1.24 The fire destroyed the majority of the bus (Figures 3 and 4). Despite the intense heat from the fire the hard disk drive containing the CCTV recording was still functioning afterwards. Most of the video and audio footage of the event was able to be recovered.

![Figure 3: Bus 7818MO following the fire](source: Hunter Valley Buses)
Driver information

1.25 The driver held a HC Driver’s license and has been employed by Hunter Valley Bus for approximately 5 years. He said that he had 21 years’ experience driving heavy vehicles before driving buses.
1.26 The driver was familiar with the routes travelled on the day of the incident and was fully qualified and medically fit. The driver said that although he had received a general induction when he joined the company, he had not received practical training in the use of a fire extinguisher. The driver said he was not aware of procedures, or had received instructions, on the use of the TMS and the EBFS systems.

Related occurrences

1.27 The following OTSI bus fire investigations are instances of fires starting in the wheel well area:

- Holbrook - 8 February 2010
- Jindabyne - 7 August 2010
- Sydney Harbour Bridge - 2 November 2018

1.28 The Holbrook fire was attributed to the ignition of polymer residue from a failed right inner rear tyre due to friction. The Jindabyne fire was caused by dragging brakes, with the origin being the nearside rear wheel.

1.29 The Sydney Harbour Bridge bus fire commenced in the nearside rear wheel area. The cause of the fire was still under investigation at the time of publication of this report.

1.30 None of the above buses were fitted with a TMS.

1.31 OTSI has collated and published summaries of reported bus fire incidents in NSW since 2012. Thermal events initiating in the wheel well are a common occurrence, although it is rare that they lead to a destroyed bus.

1.32 The number of fires and thermal incidents initiating in the wheel well area for the period 2013-2017 is shown below (Figure 6).

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6 All OTSI reports are published and can be found on the OTSI website at www.otsi.nsw.gov.au in the bus investigation section.
1.33 The most recent annual summary of bus fires in NSW was published in February 2018. In 2017, 45 incidents (52%) were located around the wheel well. It should be noted that the majority of these incidents (91%) resulted in nil damage. OTSI believes that the increasing trend of wheel-well thermal incidents is due mainly to an increase in incident reporting and the increase of fitment of disc brakes as standard equipment to new buses.

1.34 The majority of incidents (43) in 2017 were a result of brake problems. Fire incidents caused by tyre problems occurred on 2 occasions, including this event.

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PART 2  ANALYSIS

Introduction

2.1 The investigation focussed principally on the factors that contributed to the initiation of the bus fire, the actions of the driver and the controls to detect and prevent a fire in place at the time of the incident.

Initiation of fire

2.2 The investigation found that the fire started in the offside rear wheel well area and was most likely caused by an event which eventually affected one of the tyres. This was confirmed by physical evidence, the testimony of witnesses and the elimination of other causes.

2.3 Physical evidence. The fire pattern was pronounced on the offside panels around the rear wheel well (Figure 7). There is a void between the rear wheels on each side of the bus. This void allowed direct transfer of heat and flames to the other side of the bus. The CCTV footage shows smoke coming from the offside rear wheel well. A tyre explosion occurred, with dust and smoke seen billowing out from the nearside rear wheel well. At the same time black smoke is rising from the offside rear wheel well.
2.4 The entry of the flames into the passenger saloon is also likely to have occurred initially by flashover from the tyre flames to the window directly above the rear wheel well. Once the flames entered the passenger saloon a large amount of combustible material in the form of seating and lining material would have promoted the progress of the fire throughout the bus.

2.5 Photographs taken during the event by witnesses show the initial fire emanating from the offside rear wheel area (Cover Photo). The offside inner tyre was completely consumed by the fire whilst the offside outer tyre was partially consumed (Figure 8). This is indicative of the inner tyre burning for a longer period. Because of the loss of the inner tyre, with only the reinforcing wire left, it was not possible to determine the precursor event.
2.6 Scenario leading to explosion. The bus was fitted with a TMS. This system monitors the pressure and temperature of the rear tyres via a sensor attached to the wheel rim valve stems (Figure 9). When the sensor detects a temperature above 80°C, the information is captured by the sensor and relayed wirelessly to the dashboard panel. If certain parameters are reached, an audible alert sounds and a visual warning is shown on the dashboard panel located to the driver’s right hand side.

2.7 The following conditions are monitored by the TMS system:

- Normal: signal detected, tyres inflated to within 12.5% of programmed baseline pressure.
- Fast leak: tyre pressure drops 31 kPa within 16 s of baseline.
- Low pressure: 12.5% drop from programmed baseline pressure.
- Extreme low pressure: 25% drop from programmed baseline pressure.
- High pressure: 25% rise from programmed baseline pressure.
- High temperature: tyre/ wheel rim at 80°C.
- Lost signal: signal interrupted, sensor missing, battery depleted.8

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8 LSM technologies HDJ/GDJ 360 Gauge Tyre Monitoring System Specifications
2.8 There are a few possible scenarios that may have caused heat to build-up in the offside rear wheel area where the fire initiated. Some of the possible scenarios include:

1. The deflation of the outer offside tyre, which increased the pressure in the adjacent inner tyre. The deformation could have caused mechanical friction in the tyre due to rolling damage and possibly abrasion against the other tyre.
2. The deflation of the inner offside tyre creating frictional heat in that tyre.
3. The offside brake shoes dragging on the brake drum transferring heat to the wheel rims and eventually the tyres.
4. The wheel bearings seizing and generating heat.

2.9 The first three scenarios are considered most likely due to the lack of physical evidence for seized wheel bearings. The examination of the offside rear brake assembly showed evidence of heat exposure which was inconclusive as to whether it was pre or post-initiation of the fire. However, the reported sluggish performance of the bus was indicative of a brake drag issue and was therefore was not ruled out.

2.10 It is likely that the development of frictional heat in the offside rear inner tyre, or the offside rear dragging brake increased the temperature in the tyre to an...
extent that a chemical reaction called pyrolysis commenced. The term pyrolysis is used to describe the process where a chemical reaction occurs which causes the tyre polymer to deteriorate and produce flammable gases inside and outside the tyre. This heat-initiated reaction can occur at temperatures as low as 185°C. Once pyrolysis starts it can continue even when the heat source is removed. It can lead to a rapid pressure increase inside the tyre, thermal weakening of the tyre structure and chemical degradation of the tyre polymer matrix. An explosion can occur when critical conditions are met. These conditions include the auto-ignition temperature and the correct mixture of flammable gases and oxygen (Figure 10).

![Figure 10: Evolution in the processes leading to a tyre blowout or explosion](source: Journal of Safety Science vol. 46)

2.11 According to research by Cresenzo (2012) on the causes of bus tyre fires, he states: ‘most tyre fires start when dual wheels disguise a low air pressure problem. The inside dual is the source of many a tyre problem and resulting coach fire. It does not take much time for a flat tyre at highway speeds to heat to a point at which a fire ignites.’

2.12 Kirk’s fire investigation textbook states that: a deflated tyre, when run against the road surface mile after mile can develop great frictional heat. This heat

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can build up sufficiently to ignite the tyre ... sometimes with disastrous results. Such a situation is most serious. The movement of the vehicle usually aids in dissipating the heat being developed, but when the driver finally stops to inspect the problem, the heat can ignite the tyres to flaming combustion. This was the case in this instance where the tyre explosion occurred after the bus was stationary for 11 seconds. The explosion of the tyre occurred once sufficient heat was generated in the tyre.

2.13 Once a tyre has ignited it is extremely difficult to extinguish. In this instance there was additional fuel from the adjacent dual tyre. The driver made no attempt to extinguish the fire. A member of the public used the onboard fire extinguisher given to him by the driver, but without success. By the time NSW Fire and Rescue had arrived the bus was well alight. The actions of the fire fighters prevented the whole bus structure being consumed by fire.

2.14 Elimination of other causes. An examination of other components on the bus was undertaken to eliminate other possible causes.

2.15 In order to closely examine the wheel components, the rear wheels, rear brake system and bearings were disassembled and examined in the workshop. When the offside rear brake drum was removed the drum showed evidence of heat exposure along with the lower brake lining. The heat exposure marks on the brake lining were likely consequential to the fire as no rotational marks were present. This was indicative of the bus being stationary when the marks were made, hence occurring after the fire initiated. Material from the brake lining was found attached to the lower brake drum inner surface. This also supported the theory that the bus was stationary when the brake linings were subjected to high temperatures. While the physical evidence for a brake problem was not inconclusive, the reported sluggish performance of the bus by the driver meant that it could not be ruled out.

2.16 After the brake system was examined, the wheel bearings on the offside rear wheel were removed from the axle. The wheel bearings were undamaged and in serviceable condition (Figure 11). The wheel bearings were excluded as initiating the fire.

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2.17 Electrical cables were examined for signs of short circuits or chafing. There was no evidence of short circuit activity or chafing in any cables. The electrical system was excluded as initiating the fire.

2.18 The engine bay and the major mechanical components were examined and found to be free from defects and excluded as having initiated the fire.

**Actions of the driver**

2.19 The driver said that the bus was slow in accelerating from 0800, about 30 minutes before the fire. The driver did not stop to inspect the bus at any time after noticing the change in bus performance.

2.20 The CCTV footage recovered after the accident came from a single ceiling mounted camera pointed towards the driver and the rear of the bus. The facial expressions and actions of the driver can be seen and audio is also recorded.

2.21 At 0833:28, as the driver is driving along a straight section of road at an estimated speed of 55 km/h, a distinct regular beeping alarm sound can be heard in the background. The driver then looked in the direction of the alarm, and then reached forward at 0833:59, and the beeping could no longer be heard. As the TMS is fitted with an alarm silencing function, it is likely that the driver activated this function. The driver continued driving along this relatively
straight section of road until 0838:48, until the intersection where the tyre exploded.

2.22 The driver was wearing non-prescription polarising sunglasses during the trip from Morpeth. LCD screens, such as fitted to the TMS display, also use polarising filters and can appear blank when seen through polarised glasses. The driver stated that he did not see any TMS display screen warnings, but reiterated that he did not know what the screen was and was not looking for any warnings.

2.23 Polarising glasses making some LCD screens appear blank is a known phenomenon. Field testing confirmed that there was a visibility issue with the use of polarising sunglasses with the TMS screen on the drivers’ dashboard. Consultation with the original equipment manufacturer of the TMS confirmed that the screen may appear blank which viewed through polarising sunglasses.

Controls in place to detect and prevent a fire

2.24 All buses in NSW contracted by Transport for NSW (TfNSW) and operating in the metropolitan and outer metropolitan regions are now fitted with an EBFS system. All new buses contracted for these regions are also fitted with EBFS and TMS systems before entering service.

2.25 The principal reason these systems were installed was to alert drivers in order to prevent fires such as one that occurred in this instance. The evidence confirms that the TMS performed as designed and provided adequate warning to the driver of a problem with the tyre.

2.26 The EBFS system fitted to the bus was installed correctly and was found to have activated. The sound of this alarm can be heard on the CCTV recording at 0841:37 as the driver is getting off the bus. The activation was the result of heat transferring from the wheel well fire to the engine bay and igniting flammable materials there. It is not the intended function of an EBFS system to suppress fires that commence in areas other than the engine bay.

2.27 This sounding of the EBFS system alarm indicated that the fire did not reach the engine bay for approximately 2 minutes after the tyre exploded. It also
showed that the system performed as designed and provided warning to the driver that the system had activated.

**Remedial actions**

2.28 TfNSW wrote to bus operators following this incident in October 2017 about driver response to alarms and warning signals. Operators were asked to ensure that bus drivers were trained to monitor these safety systems and to respond immediately to alarms and warning signals.

2.29 Hunter Valley Buses have addressed this issue by providing training to all of the drivers on what the different alarms mean, and the correct response should an alarm activate. Training was also provided on emergency evacuation procedures, and the operation of a fire extinguisher.
PART 3 FINDINGS

From the evidence available, the following findings are made with respect to the bus fire involving a MAN 12.220 bus, registration 7818 MO, which occurred in Thornton, NSW on 16 October 2017.

Contributory Factors

3.1 The fire initiated in the offside rear wheel well. It was most likely a tyre fire that developed when a large amount of heat was generated by friction from either a deflated tyre or a dragging brake issue. The frictional heat generated was sufficient to initiate pyrolysis and lead to the tyre explosion when the bus stopped at an intersection.

3.2 The fire developed further when the heat and flames from both offside rear tyres entered the passenger saloon area of the bus.

3.3 There was a functioning TMS fitted to the bus which alerted the driver to a problem with a tyre.

3.4 The driver silenced the TMS alarm and continued driving for 5 minutes before the tyre exploded. The driver did not stop to inspect the bus to ascertain the cause of the alarm.

3.5 The driver reported that the bus was performing poorly earlier in the day. Despite this, the driver did not stop to inspect the bus at any time during the trip.

3.6 The driver continued driving the bus a short distance following the tyre explosion and remained on the bus for approximately 35 seconds while smoke was entering the passenger saloon. The driver also re-entered the bus while the tyres were burning and smoke was inside the passenger saloon.

3.7 The driver did not use the onboard fire extinguisher, but instead allowed a member of the public to use it to attempt the extinguishing of the fire.

Other Safety Factors

3.8 An EBFS system was installed correctly and activated as designed.
3.9 The driver had not received training in the function of the TMS and the EBFS system.

3.10 The driver had initial training in the use of fire extinguishers, although this did not include a practical activity in using the extinguisher.

3.11 The driver’s use of polarised sunglasses may have restricted his visibility of any warnings on the TMS LCD screen.
PART 4 RECOMMENDATIONS

It is recommended that the following safety actions be undertaken by the specified responsible entity.

Comfort Delgro Corporation
4.1 Inform bus drivers and maintenance personnel of the message that fires can commence in the wheel well of a bus and that they can develop quickly into a serious fire.
4.2 Reinforce to drivers that any alarm or apparent performance problem is to be treated with urgency and investigated before continuing with the journey.
4.3 Ensure that drivers are aware that a bus is to be evacuated immediately if a fire or smoke is detected, that contact with the depot is to be made from outside the bus and that a bus should not be re-entered.
4.4 Conduct driver training at regular intervals to maintain drivers' familiarity with current emergency procedures.
4.5 Incorporate into the initial and recurrent training of drivers the function and operation of all safety features installed on a bus as well as the correct response to alarms and the evacuation of passengers.
4.6 Further develop driver training to ensure drivers receive some form of practical training in fire extinguisher techniques.

NSW bus operators
4.7 All bus companies that operate buses fitted with EBFS systems and TMS to ensure their drivers are properly trained in the operation and responses to those systems.
4.8 All bus companies to remind drivers that the use of polarising sunglasses may restrict visibility on LCD screens.
PART 5 APPENDICES

Appendix 1: Sources, References and Submissions

Sources of Information

- Comfort Delgro Corporation (Hunter Valley Buses)
- LSM Technologies
- MAN buses
- Transport for NSW

References


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:

- Comfort Delgro Corporation (Hunter Valley Buses)
- Driver of 7818MO
- LSM Technologies
- Roads and Maritime Services
- Transport for NSW

Submissions were received from the following DIPs.

- Comfort Delgro Corporation (Hunter Valley Buses)
- Driver of 7818MO
- LSM Technologies
- Roads and Maritime Services
- Transport for NSW

The Chief Investigator considered all representations made by DIPs and responded to the author of each of the submissions 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.