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Bus & Coach Association NSW

MEMBER
INFORMATION

Bus Thermal Ignition Mitigation

Introduction

On 14 March 2019, TfNSW sent a letter to bus operators outlining a number of key bus thermal ignition mitigation recommendations and requiring each operator to "*provide advice by 1 April 2019 on how it has or will develop and implement a plan to address these*" recommendations.

Background

There are up to 70 bus fires each year in Australia. The most common cause of bus fires is thermal ignition in the engine compartment area, relating to electrical or fuel related issues. As a result, TfNSW has introduced broad fire mitigation strategies, including:

- Bus Fire Suppression and Tyre Monitoring Systems installed on all new contract buses;
- Retrofitting of Bus Fire Suppression and Tyre Monitoring Systems on existing Sydney Metropolitan and Outer Metropolitan contact buses.

While these strategies are important, bus operators also have a responsibility to take steps to mitigate the risk of thermal ignition causes in buses in their operation.

Operators need to include the risk of bus fires in their Risk Registers and include training and instruction for their drivers, operational and maintenance staff and third-party repairers, to minimise the risk of thermal ignition and bus fires.

A sample **Risk Register** relating to the risk of bus fires is included in *Appendix A*. Please note this is a sample only and operators should consider hazards and controls based on their own circumstances and operating environment.

Drivers

Many bus fires start in the engine compartment at the rear of the bus. As a result, the driver may not be aware that there is a problem until the fire is well advanced. Since a fire can progress from the engine to the passenger compartment very quickly, it is vital that drivers receive regular training in emergency procedures including emergency door operations, the use of fire extinguishers and the driver's response to the activation of Bus Fire Suppression or Tyre Monitoring Systems (if fitted). Operators should ensure that driver training for the respective procedures is included in their *Training Register*.

TfNSW, in conjunction with BusNSW, has recently developed resources to assist operators in the preparation of emergency response plans. These materials can be accessed from www.stayinformed.com.au/RR-lets-talk-emergencies-hub and provide a resource for bus operators when training their drivers on emergency response procedures. A link to the hub is also available via the BusNSW website under Member Services / TfNSW Bus Contracts / Rural & Regional.

A sample **Driver Emergency Procedure** developed by BusNSW and RMS is included in *Appendix B* which should also be incorporated into driver training and manuals.

Vehicle Maintenance Staff and Third-Party Repairers

Accredited bus operators in NSW are required to have a Maintenance Management System. The vehicles used by accredited operators to provide public passenger services must at all times meet the requirements of the law as to registration and vehicle safety and roadworthiness.

Bus fire mitigation strategies need to be built into regular maintenance undertaken by workshop staff and third-party repairers. These strategies should include; the addition of fire mitigation checks within a service program, consideration of refresher training for maintenance staff to increase their awareness of likely ignition points and the use of techniques and procedures to identify fire initiators. Also, as the new Bus Fire Suppression Systems and Tyre Monitoring Systems are rolled out, operators should ensure that maintenance staff and third-party repairers are aware of any specific maintenance requirements associated with this equipment.

A list of **Procedures for Bus Fire Mitigation Maintenance Checklist** has been included as *Appendix C*. These procedures should be incorporated into an operator's Maintenance Management System and service sheets.

In addition, a sample **Training Bulletin for Workshop Staff and/or Third-Party Repairer** has been included as *Appendix D* to assist workshop staff and third-party repairers to understand recent recommendations to mitigate the risk of a bus fire.

Operators should ensure that all training for workshop staff is included in their *Training Register*. Operators should also keep records of any information provided to third-party repairers, including a Training Bulletin.

RMS Inspections for Heavy Vehicles

Bus operators are required to present public passenger vehicles for two RMS Heavy Vehicle Inspection Scheme (HVIS) inspections per year. RMS inspections include the vehicle's structure and body condition (including electrical equipment), as well as the Engine, Driveline and Exhaust (including oil leaks). The maintenance of vehicles and regular inspection by RMS forms part of an operator's risk management plan for bus thermal ignition causes.

Responding to TfNSW's Request

A sample **Response to TfNSW** on bus fire mitigation strategies is included as *Appendix E*.

THIS SAMPLE RESPONSE SHOULD BE TAILORED TO THE OPERATOR'S SPECIFIC OPERATION AND THEIR OWN BUS FIRE MITIGATION STRATEGIES.

For further information contact BusNSW on (02) 8839 9500.

Appendix A

Sample Risk Register – Bus Fires

Hazard	Likelihood	Severity	Risk Rating	Recommended Controls	Responsible Officer	Revised Risk Rating with Additional Controls
Bus Fires	*Unlikely*	*Death or permanent disability*	*2*	*Drivers trained in Emergency Procedures, the use of Fire Extinguishers and their response to the activation of bus fire suppression system and tyre monitoring system (if fitted).* *Fire Mitigation Maintenance Checklist developed, and workshop staff (and/or third-party repairer) instructed to use the Checklist in regular maintenance checks.* *Maintenance procedures used by workshop staff (and/or third-party repairer) include techniques to identify possible fire initiators, including the examination of electrical cabling.* *Workshop staff (and/or third-party repairer) trained in identifying potential fire ignition points.* *Workshop staff (and/or third-party repairer) is trained in the maintenance of Bus Fire Suppression System and Tyre Pressure Monitoring Devices, when fitted to a vehicle.* *Two RMS Heavy Vehicle Inspection Scheme (HVIS) inspections per year. Inspections include structure and body condition including electrical equipment, and Engine, Driveline and Exhaust including oil leaks. If a bus fails an RMS inspection a Defect Notice is issued.*	*Operations/Training Manager* *Workshop Supervisor* *Workshop Supervisor* *Workshop Supervisor* *Workshop Supervisor* *Workshop Supervisor*	*2*

Date Last Reviewed: _____

Reviewed By: _____

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Appendix B

Sample Driver Emergency Procedure

In the event of an emergency such as a Bus Fire, drivers should follow the instructions below:

1. REMAIN CALM

- Remember that in an emergency, passengers will look to you for instruction.

2. SECURE THE VEHICLE

- Pull the bus over where it is safe to do so.
- Turn off the engine, shut down emergency switches if applicable (CNG gas emergency shut off, master switch for batteries). Apply park brake and hazard lights.
- Check that no passengers are injured
- Activate duress / emergency button if fitted.

3. CONTACT HELP

- **PHONE 000 EMERGENCY SERVICES IF REQUIRED.**
- CONTACT THE DEPOT. Provide description of incident, exact location, nature of injuries (if any) and details of what you need.
- If the emergency is a BOMB threat, DO NOT USE mobile phone or two-way within 150 metres.

4. ASSESS THE SCENE

- Is the scene safe? Are there any other road hazards?
- If gas/fumes/smoke are involved, consider wind direction before evacuating.

5. EVACUATE PASSENGERS

- **IF THERE ARE CONCERNS WITH PASSENGERS REMAINING ON BUS** (e.g. fire, toxic fumes, suspicious item, bus in a dangerous place, etc)
- Instruct passengers to stay calm, leave personal items on bus and follow your directions.
- Open all doors if safe to do so and ensure everybody evacuates the bus.
- Consider a buddy system for disabled or young passengers.
- Dependent on the risk, you may have to assist injured passengers. Enlist help to do this.
- Marshall passengers to safe area away from the roadside and at a safe distance from the bus.

6. ASSIST AND LIAISE

- ONLY IF SAFE TO DO SO, extinguish fire using fire extinguisher.
- Assist injured passengers until help arrives.
- Advise passengers not to return to vehicle until instructed to do so.
- Liaise with Emergency Services and follow their instructions.
- Keep depot informed and advise of any changes until site manager arrives.
- Enlist help of someone to get names and contact details of all passengers.

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Appendix C

Procedures for Bus Fire Mitigation Maintenance Checklist

Operators should ensure that their checklist to mitigate bus fires, which forms part of a Maintenance Management System and service sheets includes the following procedures.

- ☐ Ensure engine bays clean and free of any oil, fuel or other liquids or deposits which could burn.
- ☐ Check wires, cables, conduits, plugs, hoses and pipes for fretting, wear, cracks and other deterioration.
- ☐ Where wires and cables are connected to items that move a substantial distance, check that they do not fret or rub or become trapped when an item is returned to its original position (e.g. swing out battery carrier).
- ☐ Ensure that wherever cables or hoses pass through panels, rubber grommets or other protection is provided to reduce the chance of damage.
- ☐ Where appropriate, ensure unused wires have their ends covered and protected.
- ☐ Ensure test plugs and connectors are not able to collect water or become able to earth.
- ☐ Provide additional studs to remove instances where more than four lugs are connected at one stud terminal.
- ☐ Check that any new equipment that is installed has appropriate security and support of cables and that they are clear of any swinging doors, covers or other equipment.

Appendix D

Sample Training Bulletin

Training Bulletin for Workshop Staff and/or Third-Party Repairer

Background

There are up to 70 bus fires each year in Australia. The most common cause of bus fires is thermal ignition in the engine compartment area, relating to electrical or fuel related issues. A number of recommendations were derived from a bus safety investigation report carried out by the Office of Transport and Safety Investigations (OTSI) for a specific thermal incident that occurred in March 2017.

Key Recommendations

The information below is provided to assist workshop staff and/or third-party repairers to mitigate the risk of a bus fire when undertaking bus maintenance. The company's Maintenance Management System and service sheets have been updated following consideration of these recommendations.

- Ensure engine bays clean and free of any oil, fuel or other liquids or deposits which could burn.
- Check wires, cables, conduits, plugs, hoses and pipes for fretting, wear, cracks and other deterioration.
- Where wires and cables are connected to items that move a substantial distance, check that they do not fret or rub or become trapped when an item is returned to its original position (e.g. swing out battery carrier).
- Ensure that wherever cables or hoses pass through panels, rubber grommets or other protection is provided to reduce the chance of damage.
- Where appropriate, ensure unused wires have their ends covered and protected.
- Ensure test plugs and connectors are not able to collect water or become able to earth.
- Provide additional studs to remove instances where more than four lugs are connected at one stud terminal.
- Check that any new equipment that is installed has appropriate security and support of cables and that they are clear of any swinging doors, covers or other equipment.
- Review procedures and document best practice to ensure that the company is providing consistent maintenance practices and continual improvement.
- Check the way the older buses are built to identify any deficiencies that may develop into issues.

If you require and further information or clarification, please contact me on <<insert phone number>>

<<Insert Name>>

<<Insert Position>>

Issued: <<Insert Date>>

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Appendix E

Sample Response to Transport for NSW

<<Insert Date>>

Operator Name: <<Insert Name>>

Contract Number: <<Insert Contract Number>>

Dear <<Insert TfNSW Contract Manager Name>>,

I refer to your letter of 14 March 2019 regarding bus thermal ignition causes and requiring advice from bus operators on their plan to address the key recommendations identified.

<<Insert Operator Name>> takes the risk of bus fires extremely seriously and as part of our Safety Management System have included the risk of bus fires on the company's Risk Register. Following is our plan regarding the key recommendations from the OTSI bus safety investigation report.

1. **Examine electrical cabling during routine maintenance on all buses to reduce the likelihood of short circuit events occurring.**

   A specific *Bus Fire Mitigation Maintenance Checklist* which includes the examination of electrical cabling has been updated for workshop staff and/or third-party repairers. This checklist is incorporated into the company's Maintenance Management System and service sheets. In addition to this, the company vehicles have two RMS Heavy Vehicle Inspection Scheme (HVIS) inspections per year which includes body condition and electrical equipment.

2. **Conduct driver training at regular intervals to maintain drivers' familiarity with current emergency procedures, emergency door operation and use of fire extinguishers.**

   All bus drivers are trained in emergency evacuation and the use of a fire extinguisher in the event of a bus fire, with refresher training undertaken where required. Training has also been provided for appropriate responses to the activation of the bus fire suppression and tyre monitoring systems where fitted to any bus. A *Driver Emergency Procedure* has been issued to bus drivers as part of the training.

3. **Review training for maintenance personnel to increase their awareness of likely fire initiation points.**

   The Company has reviewed its maintenance procedures, techniques and training of staff to assist in preventing fire events. Our maintenance staff and/or third-party repairers are required to undertake specific fire mitigation and thermal ignition inspections as part of the company's maintenance management system. In addition to this, the company has issued a *Training Bulletin* to alert workshop staff and/or third-party repairers to procedures for mitigating bus fires when undertaking bus maintenance.

4. **Ensure maintenance procedures encapsulate techniques to identify fire initiators and recommended practices to prevent fire events.**

   A bus fire mitigation maintenance checklist has been developed for workshop staff and/or third-party repairers and includes procedures to identify potential fire initiators. Maintenance procedures also includes the checking of bus fire suppression and tyre monitoring systems where fitted. In addition to this, company vehicles have two RMS Heavy Vehicle Inspection Scheme (HVIS) inspections per year which include Engine, Driveline and Exhaust, and the identification of any oil leaks.

I trust that this provides you with the information you need. Should you require further information, please do not hesitate to contact me on <<Insert Phone Number>>.

Yours sincerely,

<<Insert Name>>

<<Insert Position>>