

Subject

Reducing the risk of vehicle fires in the heavy vehicle industry.

Issue

Heavy vehicle fire incidents have the potential to pose serious and imminent safety risks to heavy vehicle drivers, other road users and the broader community. They also have the potential to cause damage to valuable road infrastructure, disturb the flow of freight on the network and cause traffic congestion.

To improve the safety of the heavy vehicle industry, the National Heavy Vehicle Regulator (NHVR) and industry experts have been working to review previous fire incidents to identify common causes and contributing factors. The intent of this Safety Bulletin is to raise awareness of the common heavy vehicle fire risks that have been identified and outline some actions that can help mitigate these risks.

Common fire risks in heavy motor vehicles

Shorting of electrical cables and connections

Heavy motor vehicles include a number of electrical circuits that are either unfused or carry high currents, including starter motor, battery and alternator cables. The positive feed cable in the vehicle cabin or the trailer relay box are also common components identified as having the potential to cause heavy vehicle fires.

Damage to, or faulty connections in, these cables or connections can lead to shorting, which can be the ignition source of a vehicle fire.

Inappropriately rated electrical components

Electrical components used in heavy vehicles, such as cables, terminals, fuses or fuse holders, are rated to ensure they are suitable for their intended use. In addition, the conduit that is used to protect electrical components in heavy vehicles should be made from fire retardant materials.

Use of components, either during servicing or modification, that are inappropriately rated can lead to failure due to overloading. This situation often leads to shorting on nearby exposed components (chassis, wiring, etc.) resulting in an ignition source for a vehicle fire. Once a fire starts, non-fire retardant conduit can quickly spread the fire away from the original ignition source.

Fluid line failures

Damage can occur to fuel lines when they are not properly supported, when they rub on other components or their connections are not secure. Lines that carry lubricant or hydraulic oils can also be subject to deterioration, damage or poor connections.

Leaking fuel, lubricant, oil or other flammable liquids which comes into contact with hot engine bay components, such as turbocharger or exhaust components is highly likely to result in a vehicle fire.

Turbocharger

Turbochargers generate significant heat and it is important to ensure that combustible materials are placed a safe distance away from the turbochargers (approx. 200mm). Alternatively, if it is not possible to provide this space, a shroud made of a suitable non-combustible material (i.e. metal) should be used to deflect the heat away from the combustible material.

In cases where a turbocharger oil seal fails and feeds oil directly into the exhaust system, the oil can ignite resulting in excessively high temperatures. These higher temperatures increase the risk of nearby components igniting.

Lines that carry lubricant to turbochargers can also be subject to deterioration, damage or poor connections. The proximity of these lines to the turbocharger significantly increases the risk of ignition.

Engine bay maintenance

Maintaining a clean engine bay can reduce fire risk and help to ensure contaminants that could act as a fuel for a fire are removed. Routine cleaning also ensures other components within the engine bay, such as insulation, do not deteriorate and fall onto hot engine bay components. A clean engine and surrounds allows maintenance personnel to conduct thorough inspections of high risk components where deterioration and damage may not have been evident otherwise.

Common fire risks in heavy trailers

Mezzanine support brackets

The design of some brackets that support mezzanine floors in certain semitrailers can allow for metal on metal rubbing between the floor and the bracket.

This rubbing may result in hot metal shards falling onto the load and starting a fire.

Common fire risks in all heavy vehicles

Wheel bearings

There are multiple reasons why a wheel bearing can fail, including:

- poor maintenance regimes
- water submersion
- incorrect pre-loading.

When a wheel bearing fails, its temperature increases significantly, which can result in the bearing lubricant or tyres (via heat transfer from the wheel rim) catching fire.

Brakes

Brakes generate extremely high temperatures that can increase further in certain situations, including:

- brakes not adjusted correctly resulting in dragging of the brake linings
- reduced air supply at the rear trailer(s) in longer vehicle combinations resulting in slow brake disengagement
- poor brake imbalance.

Increased temperatures from defective brakes are transferred to the wheel bearings and tyres (via wheel rims), which can lead to a vehicle fire.

Tyres

In general operation, tyres do not generate high temperatures. However, in some situations tyre temperatures can increase significantly to a point that can lead to a vehicle fire. Common situations where this temperature increase occurs include:

- tyres rubbing on vehicle components (suspension, guards, adjacent tyres, etc.)
- partially deflated tyres
- fully deflated tyres.

Loading

The type of loads a vehicle carries can also increase the risk and/or severity of a vehicle fire. For example, mixed commodity loading where one part of the load contains a potential ignition source (batteries) while another part of the load is a potential fire fuel source/accelerant (cardboard).

Action required

1. Heavy vehicle operators should:
 - review the common causes of fires and identify those that may be most present in their fleet
 - review their maintenance management systems to remove or reduce any risk factors, and improve the safety of their transport activities
 - ensure those who carry out servicing or modification on higher-risk components or systems on their vehicles, such as electrical systems, have measures in place to verify that fire risks are not introduced (i.e. persons appropriately qualified, work performed to relevant standards, work procedures or checklists completed etc).
2. Where an operator experiences a heavy vehicle fire incident, or a near-miss event, they should report the incident to the NHVR to improve our understanding of this safety-critical issue.

Reports can be made to the Heavy Vehicle Confidential Reporting Line or to the NHVR's Vehicle Standards team. For operators accredited in the National Heavy Vehicle Accreditation Scheme (NHVAS), reports can also be submitted to the NHVR's Accreditation team.

Heavy Vehicle Confidential Reporting Line – 1800 931 785

NHVR's Vehicle Standards team – vehiclestandards@nhvr.gov.au

NHVR's Accreditation team – accreditation@nhvr.gov.au



WARNING: Lack of preventative maintenance is one of the biggest risk of vehicle fires.

Industry information

A number of peak industry bodies have undertaken research into the area of heavy vehicle fires. Their findings, along with advice to help reduce fire risks have been published in various documents. These include:

- The Bus Industry Confederation "*Fire Mitigation Advisory*" document
http://bic.asn.au/_literature_176984/Fire_Mitigation_Advisory
- The Australian Road Transport Suppliers Association "*Why Trucks Catch Fire*" document
http://www.artsa.com.au/assets/library/ARTSA_Truck_Fires_Nov06.pdf

Further information

For more information about this safety bulletin, please contact NHVR's Vehicle Standards team on 1300 MYNHVR (1300 696 487) or vehiclestandards@nhvr.gov.au.

Contact

Visit: www.nhvr.gov.au

Email: info@nhvr.gov.au

Telephone: 1300 MYNHVR* (1300 696 487)

*Standard 1300 call charges apply. Please check with your phone provider.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing. However, because of advances in knowledge, users are reminded of the need to ensure that information on which they rely is up to date and to check the currency of the information with the appropriate NHVR officer.