

11<sup>th</sup> Annual BULK TANKER DAY – Reducing the  
Risk of Heavy Vehicle Fires

# Reducing the Risk of Heavy Vehicle Fires

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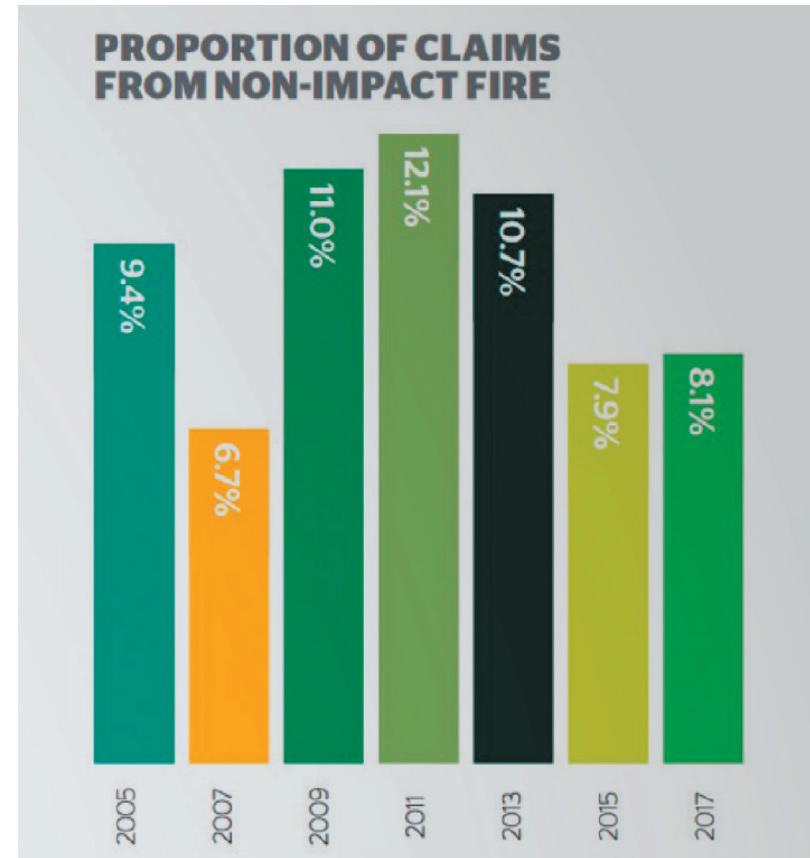


# 11<sup>th</sup> Annual BULK TANKER DAY – Reducing the Risk of Heavy Vehicle Fires

## SCOPE OF THE PROBLEM

Truck Fire numbers have held steady

Figures for 2019 are yet to be analysed



Graph retrieved from the NTI Report on series incident insurance claims – 2017

# 11<sup>th</sup> Annual BULK TANKER DAY – Reducing the Risk of Heavy Vehicle Fires

## SCOPE OF THE PROBLEM

NTI Assessment of Fire Causes – Based on 756 large-loss claims in 2017

<b>PROPORTION OF NTI LARGE-LOSS CLAIMS</b>	8%								
<b>SUB-CLASSIFICATION</b>		ENGINE / CABIN FIRES (Electrical)	ENGINE / CABIN FIRES (Mechanical)	WHEEL END FIRE (Tyre)	WHEEL END FIRE (Dragging brake)	WHEEL END FIRE (Unknown cause)	WHEEL END FIRE (Bearing Failure)	TRAILER FRIDGE MOTOR FIRE	TRAILER LOAD CAUGHT FIRE
<b>BREAKDOWN OF FIRE CAUSES</b>		32%	25%	10%	10%	8%	5%	3%	7%

Assuming NTI insures 1/3<sup>rd</sup> of trucks on Australian roads = ~180 truck fires annually resulting in a large loss. Actual fires are even higher.

## 11<sup>th</sup> Annual BULK TANKER DAY – Reducing the Risk of Heavy Vehicle Fires

### Top 10 Heavy Vehicle Fire Causes

#### Electrical

1. **Main cable rubs on the starter, alternator or positive feed cable into the cabin or trailer relay box.**
2. Overloaded minor electrical cables and hot terminals.
3. After-market fuse problems.

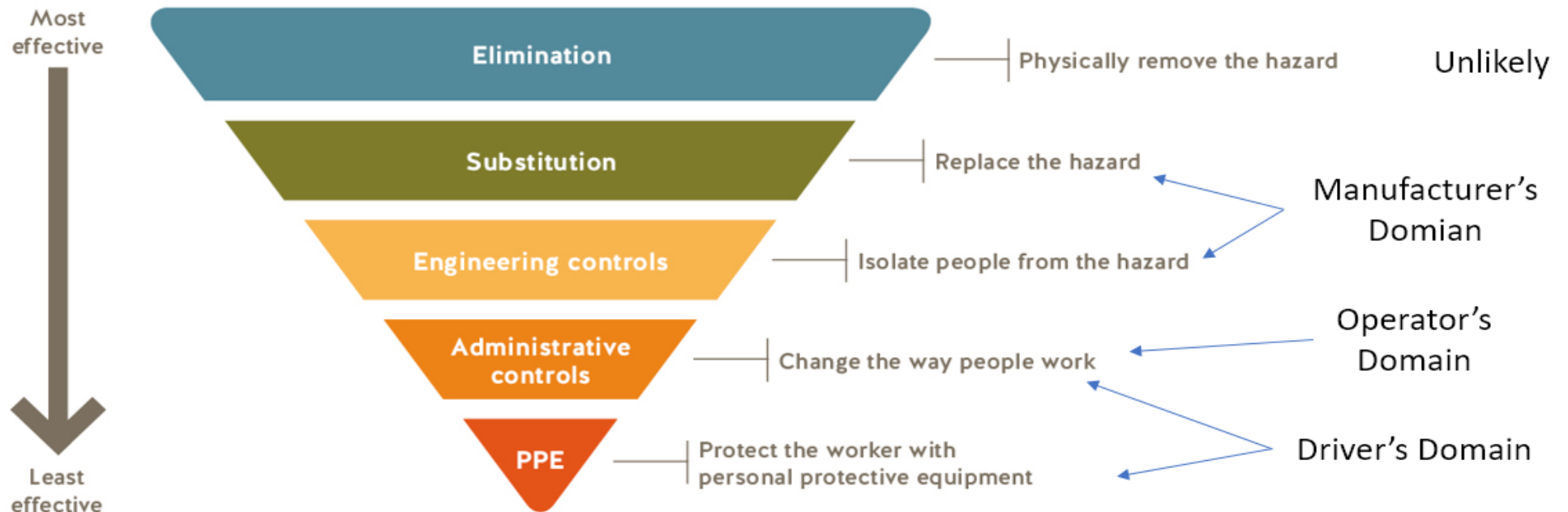
#### Mechanical

4. **Combustible material contacting exhaust pipes or turbochargers.**
5. Fuel line rubs or failures that result in leaks/spray on the exhaust.
6. Lubrication/Hydraulic oil line failure to the exhaust.
7. Turbocharger failures.
8. **Wheel bearing failure and Dragging brakes.**
9. Tyre Friction rubs.
10. Friction rubs on mezzanine support brackets.

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## How to effectively protect against the main causes

### Hierarchy of controls



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## Distribution of electrical system - Causes

Rubs occur around the starter motor because of the crowded space available for cables and hoses.

Some motor vehicle manufacturers distribute the electrical system from the starter motor terminal, so minor cables are electrically unprotected.



This air hose ran inside the rail through starter motor area and was rubbed by a main electrical cable.



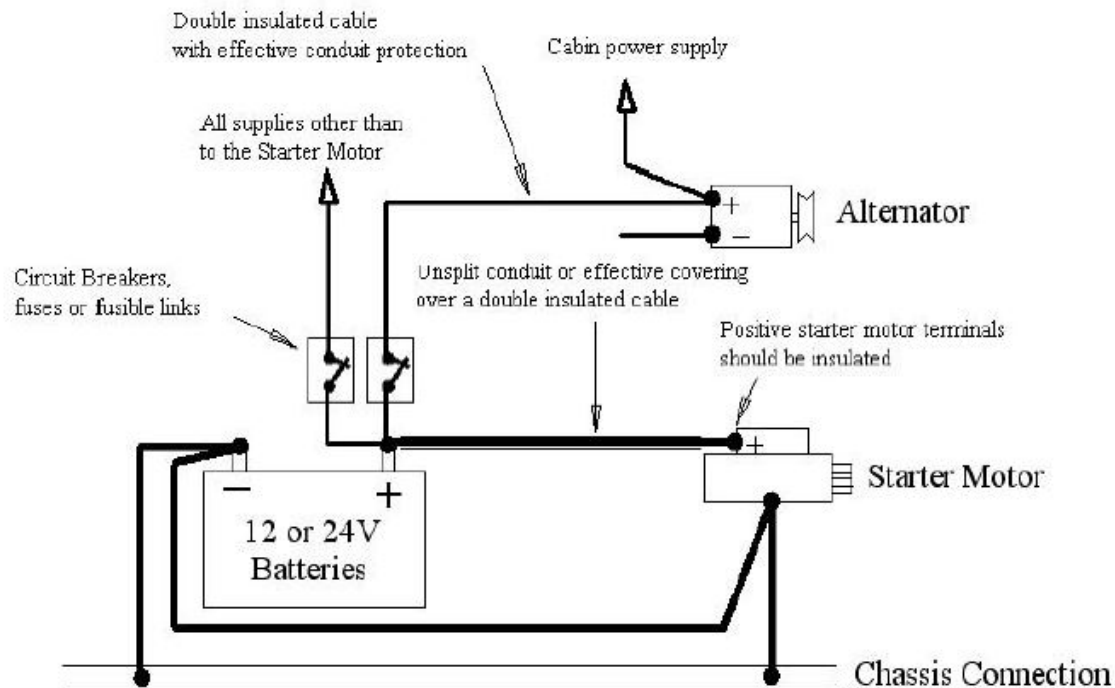
Some 12V trucks have duplicate starter motor cables, which increases the vulnerability because of crowding.



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## Circuit Breaker or Fuse Protection



A desirable circuit connection scheme is shown. The main battery-to-starter cable is never circuit breaker protected because of the large, occasional starter current. Many manufacturers distribute off the starter motor and fail to put fuses / circuit breakers into the alternator or cabin supply cables. All these cables are then vulnerable to short-circuit at rub points. The cable insulation is flame retardant but the plastic conduit is not. Fire usually spreads via burning polymer conduit.

# 11<sup>th</sup> Annual BULK TANKER DAY – Reducing the Risk of Heavy Vehicle Fires

## Suitable Conduit Protection

Acceptable conduits are taken from the 'European ADR'. There is no performance standard but these materials have durability and some flame retardancy.

A conduit flammability rating, such as UL94 V0 or ISO 11295 (15 minutes) should be mandatory in Australia on all trucks and particularly on fuel-haul trucks.

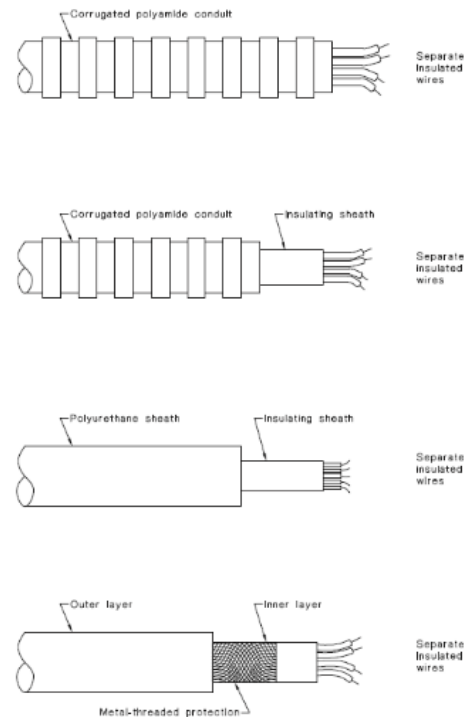


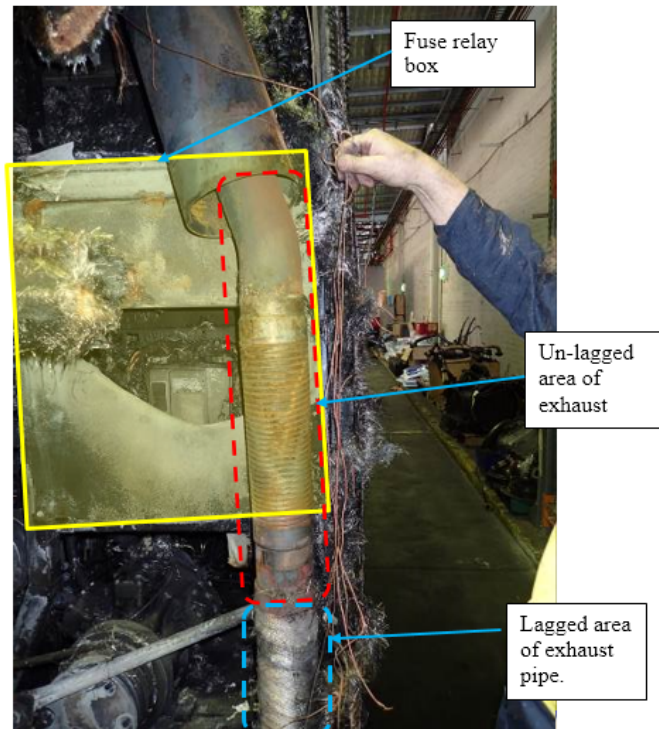
FIGURE 2.3 SOME ACCEPTABLE METHODS OF CABLE PROTECTION

**AS 2809.2 excerpt.**



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### Keep combustible material away from exhaust pipes or turbochargers



Poorly lagged exhaust.

Tail light wiring was run too close.

Electrical conduit caught fire.

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### If components still get close – Lag the exhaust



Clearance between exhausts and fuel lines should be > 250 mm.

Failure spray zones should be anticipated and directed away from the exhaust pipe.

Shielding / deflectors will often be needed.

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### Mounting of Actuators and Hoses on Trailers



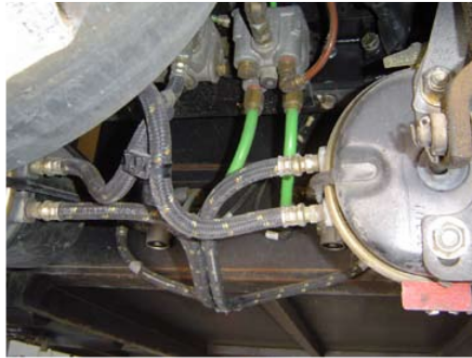
Low-slung brake actuators are a risk factor for road debris strike.

Disk brake actuators are particularly vulnerable because they stick out. Drum brake actuators tend to be protected behind the axle.

Holes in the side of the spring-brake actuator will cause the spring brake to drag causing extreme disk or drum temperature.

## 11<sup>th</sup> Annual BULK TANKER DAY – Reducing the Risk of Heavy Vehicle Fires

### Mounting of Actuators and Hoses on Trailers



Spring brake relay valve. Valves can clog with carbon particles from the compressor. Air compressors with unloader type valves or that are worn out will cause engine oil to burn and generate carbon debris in the pneumatic system.

Valves should be checked for leaks periodically.



Low hanging hose problems

Poor quality hose attachments sometime cause tubes to split leading to spring brake drag.

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### Top 10 Tips to mitigate against truck fires

#### Manufacturers:

1. Protect ALL main cables other than the battery supply to the starter motor with fuse or circuit breaker protection.
2. Protect ALL main cables with suitable flame retardant conduit.
3. Consider electrical ratings and cable routing during installation and design.
4. Shield or lag exhausts.
5. Mount brake actuators and secure air hoses higher up. If this is not practical, install a shield.

#### Operators and Mechanics:

6. Maintenance – Check and double-check wheel bearings, and introduce a scheduled replacement of wheel bearings.
7. Maintenance – Add main electrical cable inspection to A-service checklist.
8. Maintenance – Add fuel line inspection to A-service checklist.
9. Maintenance – Inspect the air hoses and spring brake actuators at every A-service.
10. Have a tyre inflation pressure policy and make someone responsible for checking the tyre pressures once a day

# 11<sup>th</sup> Annual BULK TANKER DAY – Reducing the Risk of Heavy Vehicle Fires

## Heavy Vehicle Safety Initiatives Program

### NHVR to probe recent prime mover fires

18-02-2019

The NHVR has launched an investigation into a spate of recent truck fires.

NHVR's Safety Standard and Assurance Executive Director Geoff Casey said concerns had been raised with the NHVR regarding several fires emanating in the engine bay of prime movers over the past year.

"There have been a number of high profile incidents recently, including a semi-trailer fire on the Princess Highway, near Wollongong in January," Mr Casey said.

"Several other incidents have been reported through various sources as well as from Police and state transport agencies.

"Fires are obviously dangerous to heavy vehicle drivers, operators and other motorists, and often lead to major delays on key freight routes.

"While the NHVR has a specific interest in prime mover fires, we are also looking at the issue of truck fires more generally and their increasing prevalence."

As part of the investigation and research, the NHVR has held initial discussions with operators, vehicle and component manufacturers about the current causes of truck fires.

Mr Casey said the NHVR was also working with police and state agencies to continue to identify common causes of the fires.

"This will enable the NHVR to provide guidance and information to industry as to what measures may best prevent or minimise the likelihood of such incidents," he said.

Anyone who has information about a truck fire can call the NHVR's Confidential Reporting Line on 1800 931 785 or email [vehiclestandards@nhvr.gov.au](mailto:vehiclestandards@nhvr.gov.au)

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THANK YOU!

