



## Part 2 Drivers guide

What drivers can do to lessen the risk of fires

The Truck Fires Series is in four parts and addresses the many ways in which trucks and their trailers can catch fire.

It also provides advice on how truck and trailer fires can be prevented.



National Bulk Tanker Association



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# 1 Introduction

Truck Fires have been a long-standing issue within the heavy vehicle sector. Recognising this risk, ARTSA produced a report in 2006 on “Why Trucks Catch Fire.”<sup>1</sup> Despite highlighting the risks of truck fires, the heavy vehicle sector remains fire-prone.

NTI Insurance are the major heavy vehicle insurer in Australia.

Their report from 2020<sup>2</sup> states that:

- Over 10% of major losses were due to fire
- 32% of fires were in the engine bay and truck cabin area
- 55% of engine bay and truck cabin fires were due to electrical failure
- The balance of failures were mainly due to wheel and tyre issues

The impact of these fires can far exceed the actual loss of the truck and trailer equipment and its load. The disruption, safety risk to drivers and the public and environmental damage can be wide ranging.

Given the trend in fire claims in the last 10 years, this series of documents looks at the major causes of truck and trailer fires, and how these fires can be reduced.

The guidance material is arranged in four parts.

Part 1 – Fire risk guide	A detailed look at causes of fires in truck and trailers
Part 2 – Drivers guide	What drivers can do to lessen the risk of fires
Part 3 – Maintenance guide	What maintenance staff and fleet controllers can do to prevent fires
Part 4 – Fire investigation guide	Advice on how to conduct a fire investigation

This document is Part 2: **Drivers guide**

It includes driver check lists for pre-trip and on-road to help guard against truck fires.

All parts of this guide including the summary can be downloaded from [www.artsa.com.au/fires](http://www.artsa.com.au/fires)

<sup>1</sup> See <http://www.artsa.com.au/library/index.html>

<sup>2</sup> See <https://www.nti.com.au/news-resources/research/latest-report>

## 2 Guidance for drivers

Drivers are literally in the hot seat when it comes to truck fires. This document aims to assist truck drivers in:

- a) Minimising the risk of truck fires
- b) Understanding the tell-tale signs of an impending truck fire
- c) Responding to a truck fire when one occurs

### a) Minimising the incidence of truck fires

The best protection both for pre-trip and on the road is for the driver to inspect for possible problems that could start a fire.

Pre-trip inspection/walkaround should include the following checks:

- Leaks – coolant, oil, fuel and air.
- Electric wiring and electrical functions
- Debris build up
- Tyres are correctly inflated
- Hot spots – batteries, tyres and wheel bearings

Mid-trip/event inspection/walkaround should include the following checks:

- Leaks – coolant, oil, fuel and air
- Hot spots, smells/odours
- Damage after an animal strike
- Overall inspection after a flooded crossings

When the unit is parked, disconnect power via the battery isolation switch.

Refer to **Appendix 1** for a drivers' pre trip and mid trip check sheet

### b) Understanding the tell-tale signs of an impending truck fire

Drivers are usually very aware of the way their truck performs. Any changes in performance should not go unnoticed and can be a tell-tale sign of an impending truck fire or mechanical condition.

Typical tell-tale signs of a pending fire situation can include:

- Flickering or dimming of driving lights and/or dashboard lights or static disturbances in the UHF radio system. These can be caused by disturbances in the electrical system, such as large current draw during partial short-circuit or component failure and needs to be reported to the workshop for further investigation. Drivers should pull the vehicle over and inspect the main cables for any rubs or deformations before continuing along the journey. Electrical fires are often considered silent because they do not create any noise before the fire has started – hence the need to be aware of changes in performance of the vehicle.

- Unusual smells, particularly fuel vapour, a possible indicator of a high-pressure fuel leak
- An indicator of a possible high-pressure fuel leak
- Steering related vibrations and engine compartment noise
- An indicator of a deflated tyre on the prime-mover, or an impending bearing failure or a brake related issue, all of which could result in a wheel-end fire if left unchecked
- Wheel hubs that are very hot - See appendix 2 for advice on the use of heat guns to measure the temperature of wheel hubs
- Minor explosions from the engine compartment
- Fuel leaks, engine failure or a turbo-charge malfunction will often result in a minor explosion
- Rough running of the engine
- A fuel leak can result in rough running and under fueling of the engine

### c) Responding to a truck fire when one occurs

Drivers can have a significant impact on the outcome of the fire.

If safe to do so, driver can take the following actions:

- Pull over preferably off the roadway and away from bystanders or dwellings
- Call 000 and advise location and specifics of situation
- Call the company or owner and follow company procedures
- If carrying dangerous goods, assist in implementing the company's transport emergency response plan (TERP)
- Consider separating the truck from the trailer/s
- Shut off engine and electrical equipment and battery isolator
- Take load documentation especially if carrying dangerous goods
- Be careful exiting the truck onto the road
- Assess the fire situation and if appropriate use a fire extinguisher
- If possible, eliminate the fuel source
- In the event of a tyre fire or brake overheating, use water if available to extinguish – but be aware that burning tyres can explode
- If unable to control fire, evacuate immediate area
- Stay upwind of smoke, fumes, gas or other harmful toxins
- Render first aid if required
- Keep unauthorised personnel away
- Warn other traffic
- Wait for Fire and Rescue or Police to establish Incident Control
- If safe and able, take photographs as the fire develops
- If able, take detailed written notes and record observations and times of the event

### 3 Additional reference information

1. Truck Emergency Breakdown and Roadside Safety is available from the Australian Trucking Association's website: <http://www.truck.net.au/resource-tags/business-practices>  
It is a useful resource.

# Appendix 1 – Drivers check list

## Driver's daily pre-trip and trip checks/walkaround to mitigate non-impact HV fires

Driver's have always been expected to undertake a pre-trip inspection or check. The following is in addition to the normal requirements, but may overlap. Service managers should be able to provide further advice and optimise the following check list to the specific application and duty cycle.

The following should be available for the driver to undertake these checks

- Torch with spare batteries

- Heat gun for identification of hot spots

- Fire extinguisher - water based

JOB	AREA / DETAILS	APPLICABILITY	ACTION
CHECK for leaks and/or rub points			
<b>Before each trip, undertake a complete vehicle walkaround. Use a torch as required to inspect.</b>			
COOLANT/ WATER	Engine	Truck	Inspect and look for powdery residual between radiator and components Report, wash away with water and monitor
	Transmission, if applicable		
OIL	Engine	Truck	Inspect and look for liquid on the ground or excessive residual coating components Report, clean up suspect area and monitor
	Power steering		
	Transmission		
	Drive Axles / differentials		
	Wheel ends	All, if fitted	
FUEL	Low pressure supply and return lines from tanks to engine - typically plastic.	Truck	Inspect and look/smell for fuel on the ground or excessive residual coating components Ensure lines are secure and away from any structure fixed by 25mm or moving object by 75mm
	High pressure lines on the engine - typically steel		
AIRLINES	Plastic and steel lines from engine to air tanks through to each wheel end	All	Inspect and listen for air leaks with the cab/engine off - monitor the air gauges with park and service brakes applied
ELECTRICAL WIRING	Complete chassis wiring loom	All	Ensure lines are secure and away from any structure fixed by 25mm or moving object by 75mm
DEBRIS BUILD UP	In and around engine and exhaust system	Truck	Inspect, remove any suspect material and report any issues
	Noise and / or heat insulation material for damaged and contamination	All	
TYRES	Check for under or over inflated tyres particularly the inner tyre of a dual set	All	Inspect for inflation pressure rubbing between tyres and with the body, report any issues and appropriately adjust the tyre's inflation pressure
	Mismatch in dual tyre inflation pressures Over loaded or load sharing issues within a multi axle groups		
SUSPENSION HEIGHT	Body and trailer is level and there is clearance between tyres, guards and body	All	Inspect, report any issues and seek advice. If air-bag suspension is visible, look for cracks, damage and defects on the airbags
ELECTRICAL FUNCTIONS	Starting issues	Truck	Modern engines require little cranking time Anything more than 5 to 10 seconds is excessive and should be reported Could be a sign of flat batteries, cabling issue, poor circuits
	Low brightness or flickering of lights or crackliedng over the radio	All	Issues should be reported Could be a sign of flat batteries, cabling issue, poor circuits, shorts These can develop during a trip and should be checked
	Additional activities on a circuit	All	Issues should be reported. Could be a sign of a poor earth
<b>Walkaround during the trip. During trip, and after the trip, "flick" the battery isolation switch off. Driver's should not climb under the vehicle but use the torch to look for telltales</b>			
Walkaround HOT SPOTS with HEAT GUN	Batteries	Truck	Check for acid spills or splatter, wash with water, report and seek advice.
	Tyres	All	Check, report and seek advice
	Wheel bearings		
AFTER ANIMAL STRIKE	Check for damage to airlines, wheel ends, brake chambers and valves	All	When safe to do so, pull over, park unit, apply park brake and turn the engine off. Walk around the unit, listen for air leaks, inspect for a collapsed suspension/body sagging and mud guard damage. Return to the driver's seat with engine off, note the primary and secondary gauge air pressures with park brake applied and service brake applied at consistent pedal position for 5 minutes . Wind the down window and listen for leaks. Check for any change in system air pressure. Brakes are given preferential demand air, if seat downs or suspensions sag, stop. If nothing is evident, proceed or call for assistance
	Inspect for damage to fuel lines		Look for oil, coolant or fuel leaks highlighted by pooling on the road surface. Focus on the side/area the strike occurred Ensure lines are secure and away from any structure fixed by 25mm or moving object by 75mm look for leaks and smell for diesel odour
HOT SPOTS AND SMELLS OR ODOURS	Tyres	All	Walk around the unit with a heat gun, checking wheel bearings and tyres for excessive temperature or variations in temperatures. Note anything unusually hot or smelly. Seek help, if this is the case
	Wheel bearings		
	Batteries	Truck	
FLOOD CROSSING	Axles and wheel ends	All	If you have forded water with a depth greater than the centre line of any axle, water will be sucked into the axle or differential as the water cools the housing. When safe to do so, pull over, park unit, apply park brake and turn the engine off. Walk around the unit check - report the incident and only proceed as advised

## Service and maintenance checks to mitigate non-impact HV fires

OEM guidance takes precedence over this service guide. Seek further assistance if OEM information differs from the below.

The following should be available for the driver to undertake these checks

- Torch with spare batteries
- Heat gun for identification of hot spots
- Fire extinguisher - water based

JOB	CHECK for leaks and/or rub points	AREA / DETAILS	APPLICABILITY	ACTION	SCHEDULE	
					A	B
COOLANT/WATER		Engine Transmission	Truck	Inspect and look for powdery residual. Wash away with water, fix and monitor		ü
OIL		Engine Power steering Transmission Drive Axles / differentials Wheel ends PTOs / hydraulics	Truck    All, if fitted	Inspect and look for liquid on the ground or excessive residual coating the items Clean up, fix and monitor	ü	
FUEL		Low pressure lines supply and return lines from tanks to engine, typically plastic High pressure lines on the engine, typically steel	Truck	Ensure lines are secure and away from any structure fixed by 25mm or moving by 75mm Action as required Inspect around the engine, identify any diesel weeps, report Action as required		ü ü
AIRLINES		Plastic and steel lines from engine to air tanks through to each wheel end	All	Ensure lines are secure and away from any structure fixed by 25mm or moving object by 75mm Action as required		ü
ELECTRICAL WIRING		Complete chassis wiring loom	All	Ensure lines are secure and away from any structure fixed by 25mm or moving object by 75mm Action as required		ü
DEBRIS BUILD UP		In and around engine and exhaust system Noise and /or heat insulation material damaged, contamination	Truck All	Inspect and remove any suspect material Action as required	ü	
TYRES		Under or over inflated Mismatch in dual tyre inflation pressures. Over load, load share for multi axle groups	All	Inspect, record issues and appropriately adjust the tyre's inflation pressure Action as required	ü	
SUSPENSION HEIGHT		Body and trailer is level and there is clearance between tyres, guards and body	All	Inspect and action as required	ü	
ELECTRICAL FUNCTIONS		Starting issues  Low brightness of lights Additional activities on a circuit	Truck  All All	Modern engines require little cranking time Anything more than 5 to 10 seconds is excessive and should be investigated Could be a sign of flat batteries, cabling issue, poor circuits Action as required Inspect. Could be a sign of flat batteries, cabling issue, poor circuits or shorts Action as required Inspect. Could be a sign of cabling issue, ground problems, poor circuits or shorts Action as required	as reported	
HOT SPOTS		Batteries Tyres Wheel bearings	Truck All	Inspect Action as required Inspect Action as required Inspect Action as required	ü  ü	ü
As reported after a Trip						
After an Animal Strike		Check for damage to airlines, wheel ends, brake chambers and valves	All	Inspect unit or combination from front to back Action as required	as reported	
Hot spots and smells/odours.		Tyres Wheel bearings Batteries	All Truck	Inspect, used a wheel end shaker to check bearings Action as required		
Flood Crossing		Axles and wheel ends	All	Inspect, check lubricated and replace as required		

## Appendix 2 – Infra-red temperature reading heat guns

Infra-red temperature guns can save hours of frustrating diagnostics, with a simple point, click and read off the screen. With this device you can instantly:

- Measure coolant temperatures at the close end of the return line
- Test for blockages in a radiator
- Measure belt and pulley temperatures
- Test your HVAC system by measuring temperatures of inlets, outlets, and supply lines, output vents and condenser
- Detect excessive heat in brake components
- Detect lack of heat in brake components
- Evaluate the heat dispersal dynamics of your brake system
- Monitor tyre temperature on long trips to avoid blowouts

By far the most common and recommended practice of the use of an Infra-Red Gun is for monitoring wheel end temperature on both trucks and trailers. Without having to remove the wheels it is recommended to use the Infra-red guns from a distance of about 0.5m from the target (aiming the beam directly towards the drum or hub assembly). It is best to inspect the temperatures as soon as possible after stopping or upon return to the yard. If a wheel end is considerably, i.e. 30% hotter or colder, than the opposing wheel end on the same axle or between one axle set and another, then this could indicate that only some brakes are performing their task. Colder brakes are clearly making little or no contribution to braking if the others are hot. An overly hot wheel end as compared to the others, from +30% hotter, is overheating and over braking so is worthy of an early service inspection to avoid the risk of a fire.

Possible common causes could be wheel imbalance, wheel alignment, loose pads or linings, over tightened slack adjusters, booster stroke, seized pads or drums, mismatched friction ratings on the brake material or contamination.



30 Percent difference in temperature from one wheel to the next indicates a potential problem