

# FIRE!

**A** lack of attention to basic engine bay maintenance is often likely to be the cause, contends Malcolm Dodds, head of technical services at the Road Haulage Association.

"Technicians should be looking for signs of oil and fuel leaks," he says. If they seep on to hot areas of the engine then a fire may start. Cables may have worked loose or become frayed, causing an electrical short which may be a cause of ignition. So technicians should ensure that cables are clipped into position and wires are not exposed, Dodds advises.

"There may be a case for double-insulating wiring in places, even if the truck manufacturer has not done so," he contends.

Freight Transport Association's engineering and technical manager Martin Candish agrees that leaks and chafed wires are potential causes of blazes. "Repairs should be carried out before any defect becomes a fire risk," he states.

Poor cleanliness around the engine bay is another potential flash point. An accumulation of old grease, oil and road dirt may be ignited by a small spark, with a broken wire the possible culprit. "All these are the sorts of things that should be picked up during statutory inspections," Dodds says. If they are, then appropriate action should be taken.

A truck fire is serious enough. If a bus or coach full of passengers bursts into flames, however, then the consequences can be catastrophic.

Traffic reports of delays caused by lorry fires on the motorway do not occur all that frequently. However, they are regular enough to prompt questions as to why such conflagrations break out, given that safety and compliance should be at the top of every operator's agenda. Steve Banner investigates

Fires in such vehicles are surprisingly frequent, says Jonas Brandt, project manager at RISE - the Research Institutes of Sweden - which has evaluated the performance of different onboard fire suppression systems. "In the USA, approximately six school bus fires are reported every day," he observes. "Recent statistics from Sweden show that at least 0.76% of all buses in service annually will suffer from an incident with fire or smoke," he continues. "In Germany, between 0.5% and 1% of all buses suffer a fire every year, which corresponds to at least 350 to 400 fires annually."

Nor are arson, illicit smoking or dodgy electrical items plugged in by passengers or drivers the major causes. Says Brandt: "About two-thirds of all bus fires start in the engine compartment." Luckily most fires do not lead to fatalities, he adds; but they can lead to the total loss of a vehicle and cargo. The costs associated with business interruption, the need for the emergency services to deal with the inferno, the recovery of the burnt-out vehicle and in some cases the creation of major traffic jams and reputational damage cannot be ignored either.

So why are there so many bus blazes worldwide? One possible explanation is the length of time many buses remain in service, suggests Doug Jenkins, specialist business resilience manager for motor at AXA Insurance. Older vehicles are more prone to leaks and electrical faults, and the third or possibly fourth owner may not have the funds to maintain them properly.

The UK has a comparatively healthy record, so far as vehicle fires are concerned, however, he stresses. "It is certainly better than it was in years gone by, when you used to see truck drivers lighting fires under fuel tanks by the roadside in the winter because the diesel had gone waxy," he remarks. The advent of winter-grade diesel has ended this annual spectacle.

## NEW REQUIREMENTS

Fears that a bus or coach fire may lead to serious loss of life mean that automatic engine bay fire suppression systems will soon become mandatory under UNECE (United Nations Economic Commission for Europe) regulation R107 for vehicles that can carry more than 22 passengers. The regulation will apply not just in the European Union, but also in other countries, such as Russia and Turkey; 45 states in all.

It will come into force, so far as all newly registered coaches and double-decker buses in the EU are concerned, from 11 July 2019, says fire suppression equipment specialist Fogmaker. All newly registered single-decker buses will have to comply by 1 September 2021.

Suppression equipment must meet testing protocols based on four tests extracted from RISE's SP method 4912, points out Rotarex Firetec, another specialist. Those protocols include a re-ignition test which involves dripping oil on to a surface heated to 600°C to see if the blaze re-ignites. (The test is passed, says Brandt, if re-ignition is prevented for at least 45 seconds.)

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A variety of different extinguishing agents is available, including powder, foam and liquid mist. “An alarm is normally included to warn the driver if a fire breaks out,” he says.

Weighing up to around 10kg, and UNECE R107-approved, USA-based Firetrace International’s automatic fire detection and suppression system employs a non-electric pneumatic polymer sensor which controls a powder extinguisher. When the sensor detects a blaze, it releases the powder through four nozzles to smother it. “The sensor can tell the difference between the engine’s temperature and the heat of a flame,” says marketing director Scott Starr.

The extinguisher’s contents can deal with fires involving solid combustibles, flammable liquids and gases and energised electrical equipment. This means that Firetrace’s equipment can cope with conflagrations on gas and hybrid vehicles as well as those fitted with diesel engines.

Fogmaker argues that its water-based mist is to be preferred because of the way in which it cools the heat, drives out oxygen and smothers surfaces at the same time as it fills the engine bay. UK installation agent J Lewis Auto Electrical reports that over 700 buses operated by two of the country’s largest fleets have been switched to Fogmaker, and away from powder-based equipment.

Fires on electric buses that involve their battery packs require a different approach, Starr says. “Under those circumstances we tend to favour a gaseous fire

suppression agent called Novec 1230 from 3M,” he says. A less-environmentally-damaging replacement for ozone-depleting halon, with a global warming potential of 1, it extinguishes fires by removing the heat, and is less harmful to electrics than liquid or powder extinguishing agents.

#### OTHER IGNITION SOURCES

Engine bays are not the only sources of fire. Overheated brakes – possibly the result of a disc brake calliper sticking (see also pp21-22) – and tyres that overheat and fail because of under-inflation (pp11-12) can trigger blazes too, Dodds of the RHA says. Insurer Aviva also highlights a lack of attention to the state of a vehicle’s tyres as a key cause of conflagrations. Candish of the FTA advises: “Ensure brake wear, adjustment and wheel bearings are checked regularly and any defects quickly rectified.”

One service procedure that is not a fire risk, perhaps contrary to first impressions, is regenerating a diesel particulate filter (see also pp37-8). The heat produced is unlikely to

result in a vehicle igniting, contends engine manufacturer Cummins. “The filter’s surface is heavily insulated,” a spokesman points out.

Finally, poor maintenance of truck cab night heaters could also be a possible cause of blazes, suggests Jenkins. While he does not retract his view that fire is not a huge issue so far as road transport is concerned, he suspects there may be an element of under-reporting. “If a fire breaks out in a truck parked in a yard and the fire brigade has to attend, then they may class it as a fire at a company’s premises,” he suggests. Doing so might provide a misleading picture of the circumstances that lead to the incident. **TE**

#### FURTHER INFORMATION

UNECE fire suppression systems requirements – <https://is.gd/fulisu>

HSE requirements for vehicle fire extinguishers – <https://is.gd/ahiteg>

RISE evaluation of bus engine enclosure fire suppression systems – <https://is.gd/itiref>

