

Understanding EV fire risks

A lithium-ion fire is a potent chemical reaction, according to Paul Trew, former deputy assistant commissioner and head of fire safety delivery and enforcement at the London Fire Brigade. He is now technical support manager at the IFE (Institution of Fire Engineers) and was recently appointed as its alternative fuels coordinator.

Trew says: "If you get a fire in a petrol car, you will be concerned about the fuel and its flammable properties. The difference with lithium-ion is that it goes into thermal runaway. Once started, it's very volatile, and comes from within the [battery] cell."

Another problem is access. EV manufacturers install batteries in a sealed, waterproof unit. He adds: "To get extinguishing media to a battery, you have to get in there to really be effective, and the reality is that you can't."

A suppressed fire event in a lithium-ion fire can look like it's out, but can start again hours later in some cases. "At the moment, we have firefighters tied up for days in some cases, allocating resources to a fire that is basically out but could start at any time; you can't just leave it and walk away. That is a major

How the emergency services extinguish an electric vehicle (EV) battery fire and what happens afterwards is still being developed. Firefighter Paul Trew explains the situation to Will Dalrymple

resourcing issue," states the technical support manager.

Trew is at pains to point out that battery fires are less common in electric vehicles than their standard combustion counterparts. Exactly how much less frequent is hard to tell, partly because there are far fewer EVs than standard ICE vehicles. Also, the fire data collected by the emergency services doesn't separate out fires in EVs from any other vehicles. "It is very difficult to get good, solid information and data."

Trew says that a prevailing theory is that older batteries are more likely to combust than younger ones. And thermal runaway is more likely in the case of high-energy impact. Battery condition also matters. He cautions: "It is not straightforward. There are lots of different angles and issues that are coming to light in terms of li-ion batteries and how people use them." A further concern is that there are no standards among batteries, and a proliferation

of different systems and different technologies.

So perhaps it is no surprise that there is no standard approach in fighting EV fires. Trew, who has set up an IFE interest group and is coordinating access to research, information and connecting people on the subject, reports: "We are working with partners including the fire services to determine what is the best way. There are a number of examples from other countries. Some might submerge a vehicle entirely in water. Other systems might include putting a blanket over a car. A number of methods are being developed."

In addition, fellow trade association the National Fire Chiefs Council (NFCC) is developing firefighting guidance, Trew reports.

EV fire risks can easily affect buildings as well, such as for example an EV located in the underground car park of a low-rise block of flats where the landlord installs EV chargers. "There is a whole load of work in fire engineering around that: spacing, ventilation, suppression systems." And what about the case of industrious people who are repurposing batteries for the storage of power in buildings? "People are installing these units (batteries) under the stairs or in a loft space, but there's no regulation around that as far as we can tell." 