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Electric Vehicles

There are three main types of Electric Vehicles:

1. Hybrid Electric Vehicle (HEV) – A vehicle without the capacity to plug in but has an electric driver system and battery.
2. Plug-in hybrid Electric Vehicle (PHEV) – A vehicle with plug-in capability, and it can use energy for driving from either its battery or fuel.
3. All-Electric Vehicle (EV /AEV) – A vehicle that gets its energy for driving entirely from its battery and it must be plugged in to be recharged.

The Electric Vehicle market is continuing to grow rapidly, with over 164,100 AEVs on UK roads at the end of September 2020 and over 373,600 plug-in models (including PHEVs).

With increased supply of electric and plug-in hybrid cars, plus new models being launched with increasing regularity, this trend is only going to accelerate over the course of the next few months[1].

Driver Risk Management

With more individuals and organisations opting to select electric vehicles as manufacturers develop additional models, electric range increasing, and the government benefits given towards electric vehicles, it is important to consider the differences between Internal Combustion Engine (ICE) and Electric Vehicles (EV).

Thatcham Research (which carries out research and testing for car safety and supplies data that insurers use to define a car's insurance grouping) advise that for group rating purposes it has now been agreed and communicated to vehicle manufacturers that where they produce an AEV variant of a model which also has ICE variants, it will be necessary for the EV version to be separately crash tested.

This is because, although from the outside the vehicles may all appear identical, their weight and the position of the battery pack and likely re-engineering of load paths to protect the battery, may result in the vehicle performing quite differently in a crash compared to the ICE variant(s).

In order to consider some of the risk management measures that can be put in place, let's first look at some of the main differences between AEVs and ICE vehicles.

The main differences when driving an EV are the stronger acceleration and a braking system that adds power back to an EV battery known as 'Regenerative Braking'.

Stronger acceleration arises as there is no delay in output for an EV compared with an ICE, meaning that the power is immediate with no lag. To put that into perspective, many family sized vehicles have typically been able to accelerate to 60 mph in about 10 seconds. However, 5 to 6 seconds is the new normal for AEVs. Some performance models from Tesla can get there in under 3 seconds. This could pose an increased risk for injury or damage particularly if the individuals aren't familiar with the vehicle or are inexperienced drivers.

Over the past couple of decades, drivers have become accustomed to using their vehicles for hundreds of miles before even considering the need to refuel. Early PHEVs often had a range of sub-100 miles, which didn't meet the expectations and needs of many. This inconvenience was then exacerbated by charging times of up to 20 hours and a sparse, at best, charging infrastructure. We're now seeing these issues being alleviated as a result of both government policy and manufacturer investment.

Many new models have battery ranges in excess of 200 miles, fast charging times of sub-30 mins for 80% charge and there is a much more consistent supply of charging points. Driving style also has a direct impact on battery depletion. The requirement to accelerate smoothly and not 'harsh' brake which is recommended in all cars will have a noticeable effect on the EV range.

Not only does driving style effect range but so do weather conditions (cold weather can affect range by 30%) and air conditioning has a similar range-draining effect.

Insurer Considerations

As with any emerging risk, there are both expected and unexpected exposures that arise. This is no different for EVs and one aspect is inevitable; if the vehicles are more expensive then the subsequent damage claims will be more expensive, subsequently higher insurance premiums.

EV Repair costs and timing

There are several aspects that contribute to the increased cost of repairs for EVs. Unique to EVs is that when any repair work is undertaken on one it is necessary to decommission the battery to ensure that the vehicle is safe to work on and this can take up to an hour.

What isn't unique to EVs but present in all new vehicles is the increasing level of technology and assistance as well as new construction materials and methods. As new vehicles continue to incorporate more technology in the quest to become autonomous, the presence of cameras and sensors at the front and rear of the vehicle are resulting in an increased cost of damage claims, even from seemingly innocuous bumps. With new vehicles, and particularly new manufacturers, there is an increased risk of repair delays as a result of limited availability of new parts or unexpected issues being encountered with the repair. Not only could this increase the cost of labour charges but also any subsequent credit hire if a third party vehicle is involved in a road traffic accident.

“EV Noise” - AVAS

By virtue of not having a combustion engine, EVs are considerably quieter than other vehicles, which can pose an increased risk to other road users. In July 2019, European legislation made it mandatory for all manufacturers to install Acoustic Vehicle Alerting Systems (AVAS) in all new vehicles from July 2021. This system will make a continuous noise if the EV is driving at low speed (20km/h or less), significantly reducing the risk to individuals that are visually impaired.

Perceived fire risk?

It is often thought that the presence of highly flammable lithium in an EV battery means they present a greater fire risk than an ICE vehicle. This was further exacerbated by early media coverage of a handful of EVs igniting when involved in road traffic accidents. Subsequently a study was conducted in the USA which found that EVs actually present a lower fire risk than ICES[2] and subsequent statistics appear to have verified this.

EV Purchase Price

One of the most important considerations as to the viability of an EV is price. Consumers were initially finding that EV models were vastly more expensive than their ICE counterparts by virtue of the battery. However, battery costs have fallen by approximately 90% in the past decade.

Connected Vehicles and Cyber Risk

Experts predict that by 2026 100% of all new cars in UK will be connected. Obviously, the British population is seeing the benefits of EV and connected cars. But this also implies that the attack surface for cyber criminals is also rising at the same pace as we connect more and more cars to the internet.

According to Data Centre Review Magazine, a standard connected car uses 150 million lines of code – a staggering 103.5 million more lines of a code than a Boeing 787 jet. So these connected cars are basically a computer on wheels and require all the basic cyber safeguarding of an IT System. Some of the key things to consider and apply are:

1. These cars will ask for a password and PIN for identity and access management. Ensure safe and secure passwords and follow good password hygiene, i.e. not sharing with anyone or writing them down in an insecure place.
2. Like every operating system and software, always ensure you patch the car as soon as patches and updates are available.
3. Think about the amount of information you share with the car. Don’t go overboard with the amount of connections and personal data you trust your car with — sticking to essential functions means you’re less likely to lose anything valuable.
4. Also, be mindful of apps permission and don’t give permission to apps where it is not relevant.

5. These cars are connected and can be controlled by mobile applications that can be downloaded from the official Appstore or Google Play. Only use official applications and even for the mobile applications make sure they are always patched and up to date, so that cybercriminals cannot exploit any vulnerability in the application or use these applications as an entry point to access the car.
6. Finally, remember to clear all personal data from the car before selling it, in order to avoid providing personal data to the next owner.

Sir Ralf D Speth, CEO, Jaguar Land Rover, once said, "In a connected world, the cybersecurity is as fundamental to your safety as the brakes". We all know the importance of regularly checking the braking system, but with more connected cars in the market we have to also ensure equal importance is given to cyber maturity and cyber hygiene.

Conclusion

Many EVs come with a range of features and driving modes to ensure smarter and efficient driving, and drivers need to understand what these are and when to apply them. They also need to understand what they can do to preserve range, i.e. ensure tyres are inflated correctly, close windows at higher speeds (above 45mph), remove unused roof racks, boxes and/or bike racks to reduce any drag, and remove any other unnecessary weight in the vehicle. Targeted Risk Management programmes that include a focus on improving driver behaviours will lead to reduced likelihood of being involved in crashes and collisions, in turn having an overall impact on the reduction of cost of vehicle repairs and time spent with vehicles off the road.

Organisations looking to add EVs to their fleets should ensure they provide appropriate driver training to ensure range is preserved, vehicle features are understood, driving style is amended and with the lack of noise discussed above the impact this could have on vulnerable road users.

Organisations should also encourage their drivers to plan their routes, especially when driving long distances, incorporating where an appropriate charge point is and how it can be accessed, as getting lost could add unnecessary mileage and lead to an increase in breakdowns. Charging points differ in terms of types of connection so it should not be taken for granted that an appropriate charging point is available as the connection type will differ from vehicle to vehicle and the driver needs to ensure that they have a full understanding of the time taken to charge their vehicle.

References

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CONTACT

Risk Engineering
Risk Support Services
6th Floor, The Colmore Building
20 Colmore Circus, Queensway
Birmingham
B4 6AT

Phone +44 (0) 121 456 1999

For more information please visit: www.zurich.com/riskengineering

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