CASE STUDY

ELECTRICAL VEHICLES RESCUE: PREPARING FOR NEW TECHNOLOGIES

A5, Austria

PROJECTS: A5 OSTREGION, PORT OF MIAMI TUNNEL

TYPE OF INCIDENTS: FIRES

EV CONSIDERATION: RE-IGNITION

KNOWLEDGE SHARING: THROUGH THE MERIDIAM TUNNEL CLUB

meridiam
INVESTING FOR THE COMMUNITY

MAINTAINING VIGILANCE IN READINESS FOR ELECTRIC VEHICLES

Numbers of hybrid and electric vehicles on the roads are rising and bringing with them new and different safety risks for highway asset operators to consider. Meridiam road and tunnel projects have taken notice and are getting ready for EVs and hybrid vehicles.

A gradual, but accelerating and seemingly inevitable change from petrol and diesel engines, to hybrid and electric vehicles (EV), means more than initially meets the eye. Service stations and both private and public car parks are certainly evolving, with EV charging points being installed to cater for rapid growth in vehicles needing to be plugged in mid-journey.

What many may not be aware of, is the inherent safety risks and necessary precautions associated with EVs and hybrid vehicles. **For instance, electric vehicles have certain unique characteristics in the event of a fire.** Storage of an EV after an accident, or after a fire has been extinguished, can be a very important consideration, due to the risk of the vehicle reigniting later on.

Meridiam project companies have been looking into these risks and exchanging knowledge gathered, while **initiating some mitigating measures, such as developing training programmes with asset operating companies**.

It is increasingly important for them to do so. EVs and hybrid power currently account for about 2% of all cars sold globally, but the proportion is growing and expected to increase exponentially. According to the EV sales database EV Volumes, 2.1 million 'plug-in' vehicles were sold in 2018, 64% higher than 2017.

Meridiam projects are responsible for operating over 2000km of roads and higways, across 12 different countries in Europe, North America and Canada.

Many of Meridiam's highways projects contain at least one tunnel. **Safety plans for responding to incidents, especially fires, are a vital part of operations for these projects**, which are exchanging knowledge and best practice via the Meridiam Tunnel Club (see box 2).

The story of unique risks of EVS and hybrid vehicles starts in Europe, partly because several high-profile and well-documented fires have occurred in European tunnels. The Mont Blanc disaster of 1999 and the Gotthard road tunnel fire in 2001, tragically claimed 39 and 11 lives respectively.

Since then, the safety of the operation of road tunnels in general has improved a great deal through regulations introduced since 2001, with greater use of fire detection, ventilation, CCTV and communication technology, for example.

One major Meridiam highway project is the A5 Ostregion PPP north east of Vienna, covering 51km of A5 motorway, including four tunnels.

The Chief Technical Officer of the project concessionaire, Bonaventura Strassenerrichtungs, is Peter Pelz: "Our tunnels are all twin-bore with single direction traffic, so avoiding contraflows and all four are relatively short and have safety passages and

A5, Austria

the latest fire safety technology. **So, while safe operation of tunnels is paramount to us, consideration of risks with regard to EVs applies equally to the whole network, including vehicle storage areas**," Peter says.

Bonaventura and its operating contractor have experience of dealing with an EV fire incident, which occurred outside of the A5 tunnels and was dealt with safely. Subsequently, **Bonaventura has undertaken studies of EV safety issues in partnership with the A5 project grantor, Austria's national highway authority ASFiNAG.**

The results reveal there is little evidence that EVs and hybrids are any more likely to catch fire than conventional cars, but battery powered vehicles display distinct characteristics in the event of a fire.

For instance, they can **ignite explosively and burn at very high temperatures**, giving off toxic smoke due to chemicals present in the batteries. **Use of water is appropriate for fighting the flames, but about double the time and quantity of water is usually needed to fully extinguish the fire**.

Special consideration then has to be given to cooling and monitoring the vehicle, due to the **risk of reignition**, which is why storage of damaged EVs – separately from other flammable materials – is critical.

"Here at the A5 project, **we have produced a handbook for the motorway operating company and implemented training for staff and operatives on how to respond appropriately**, including with suitable storage areas for recovered EVs and hybrid vehicles," Peter says.

Bonaventura and its operating contractor have a limited role in recovery and safe keeping of fire damaged vehicles, which remain the responsibilities of local authorities. **The operator is establishing concrete boxes for storing and shielding recovered EVs**, however and Bonaventura has been liaising with local fire services.

"We have found firefighters are generally not very well prepared for the additional and

Allego

BACKING THE SWITCH TO ELECTRIC VEHICLES

Meridiam has signalled its intent on supporting the uptake of electric vehicles, with acquisition of the EV charging specialist Allego.

The company is well placed, with a strong foothold for providing charging solutions – design, installation and operational support – for a wide ranging and rapidly expanding market across Northern Europe.

In 2018, Allego provided 7,000 charging points for public and private sector organisations and the firm expects to install around 14,000 in 2019, as it embarks on an ambitious expansion plan. **Allego has targeted reaching one million charging points within five years**.

Potential partners for Allego include service station and car parking operators, plus national and local authorities. "**The plan involves developing various partnerships, while remaining independent, not allied to any one landowner or operator**," says Allego's Chief Financial Officer, Clive Pitt.

This comes as numerous governments across Europe are seeking to encourage greater uptake of EVs as one way of working towards climate change targets. Vehicle manufacturers have also signalled confirmation of the direction of change, Clive says: "A lot of work has been done on battery technology in recent years; sizes of battery packs are reducing and their range is increasing. The latest models from the major OEMs are all slightly different, but they are all heading towards the same place of full electric power.

"If you look at the different EV and hybrid vehicles available, this year the number stands at about 90. Next year there will be 220 different models on sale, **which makes clear the direction the automotive market is going in**." ■

unique treatment required when dealing with EVs and hybrid vehicles. Likewise, manufacturers' recommendations do not say enough about storage and cooling requirements after fires," says Peter.

"It is important for these things to be thought through and acted upon, at a national level and by operators of individual highway projects. The Austrian Ministry is aware of the issues and ASFiNAG is carrying out additional testing."

Miami Access Tunnel (MAT), the concessionaire company responsible for the Port of Miami Tunnel (POMT) project in Florida, has also been investigating the particular characteristics of electric vehicles. As part of efforts to mitigate the risks, **training on EVs and how to deal with incidents has been held for 'first responders'**, in partnership with POMT's O&M contractor and the Miami Dade Fire Department, with sponsorship from the manufacturer Tesla.

"We had a team from Tesla come in and demonstrate to operatives and the Fire Department the ins and outs of Tesla vehicles, such as where the batteries are located and housed, where the cables run and how and where to cut them," says MAT Chief Executive, Chris Hodgkins.

Tesla vehicles make up 67% of all EVs on US roads. "So it made sense to choose that particular company for the training," Chris says. "**Different OEMs produce different vehicle designs, but the fire department and operations team at POMT are aware of the important considerations in preparation for them all now**.

"What is apparent is that what you see is not always what you get. Batteries in EVs can be overheating without you knowing and it's important to be aware that if fire or smoke is seen, the vehicle could still be attached to a power source, at which point water cannot be used to extinguish the fire until the EV is disconnected. **Being aware of the potential hazard is vital, but it's not an unknown danger with proper training best practices**."

Meridiam's highway projects are continuing to gather further data on EVs and other changes to vehicles and traffic conditions. This type of information is shared within Meridiam through the Meridiam Tunnel Club. **It maintains regular meetings and updates between its members, as just one way that Meridiam projects exchange knowledge and best practices**.

In Miami, further collaborative training is planned between MAT, the operator, and emergency services. **The project has also established a 'safe zone' outside the tunnel for the Fire Department to use for checking any damaged and recovered EVs, "to give certainty they will not ignite hours later", Chris says**.

"For managing assets effectively, it's all about staying constantly vigilant to any changes, possible risks and ways to mitigate them. We are now looking at the feasibility of **a new type of fire safety blanket**, while looking out for any innovation that can help us remove damaged or broken-down vehicles from the tunnel as quickly as possible to maintain the safety of drivers and operating personnel." ■

POMT, FL

L2, France

THE MERIDIAM TUNNEL CLUB

Meridiam's Tunnel Club consists of senior executives from 8 major highway PPP projects and meets three to four times every year – at least twice in person.

A key member of the Club is Jean-Michel Martinez, who was also CEO of the L2 project in Marseille - a 10km highway with many tunnels and cut and covers. As a board member, Jean-Michel has experience of tunnel developments at other PPPs, including the Presidio Parkway in San Francisco, POMT in Miami and Denver's Central 70 project.

"**The subject of risk from EVs is complex, but it is very important to pose the question of levels of risk and how to mitigate them for tunnels, given the severity of fires and their consequences in the past**," Jean-Michel says.
"We have been discussing this issue for about a year now and on the whole, found it surprising how unprepared fire services are for dealing with EVs at present. So far there have been very few serious incidents involving EVs and hybrid vehicles. They are still very seldom,

POMT, FL

but we must still be prepared. "Our project teams are not fire departments and have limited responsibility with regard to dealing with serious traffic incidents, but meetings and liaison over the issue of EVs have been initiated with fire services, to start the process of asking the important questions."

It was only through exchanges within the Tunnel Club that some members became aware of the heightened risk of EV fires for some time after incidents have occurred. Jean-Michel says: "It's important we maintain discussions and exchanges of information between different project teams, to give regular updates, which is the basis of the Tunnel Club.

"Specifically with regard to EVs, it is clear that initiating relevant training for operatives is important and that such training has to be regularly followed-up and updated to make sure we really stay abreast of what is a changing situation as numbers of EVs grow. **Road tunnels have stringent regulations for dealing with vehicles carrying hazardous goods, but nothing as yet in terms of special consideration for EVs, so we have to be ready**." ■

SEPTEMBER 2019 - A5: www.a5nordautobahnsued.at; POMT: www.portofmiamitunnel.com; Allegro: www.allegro.eu; L2: www.l2-marseille.com