Airport Safety Week: Day 5 Toolbox Talk – Electric Vehicle Safety in the airport context

The adoption of electric vehicles (EVs) has gained significant momentum worldwide due to their environmental benefits and the reduction of greenhouse gas emissions. Airports, as major transportation hubs, have also started to integrate electric vehicles into their operations, including ground support equipment and passenger shuttles. While EVs offer several advantages, they also bring unique risks to airport environments, particularly concerning fire safety. In this article, we will explore the specific risks associated with using electric vehicles at airports and strategies to mitigate these risks effectively.

EVs at airports are subject to various stressors, such as rapid charging, and mechanical damage. Severe mechanical, thermal, or electrical damage to an EV battery pack can lead to battery fire, a process called ‘thermal runaway’., where a damaged battery cell heats up uncontrollably, potentially causing a catastrophic fire and can also cause an explosive environment. Airport-based fire teams and emergency services must be prepared to and as this technology is implemented– stay informed.

Battery Fires

One of the primary concerns with electric vehicles is the risk of battery fires. Electric vehicle batteries store a significant amount of energy. Airport operations involve a bustling environment with multiple vehicles in proximity, making it crucial to assess the potential consequences of a battery fires.

Mitigation Measures:

1. Battery Management Systems (BMS): Implement advanced BMS technology to monitor and manage battery health. BMS can detect anomalies and prevent overcharging or overheating, reducing the risk of thermal runaway.
2. Regular Maintenance and Inspection: Establish strict maintenance schedules and conduct regular inspections to identify potential battery issues and replace damaged components promptly.

Charging Infrastructure

Airports often have dedicated charging stations for electric vehicles, which can pose additional fire risks. Faulty charging equipment or improper electrical connections can lead to electrical fires that endanger both the vehicle and surrounding infrastructure.

Mitigation Measures:

1. Professional Installation: Ensure that charging infrastructure is installed by qualified electricians who understand the specific requirements and safety measures for EV charging.
2. Overcurrent Protection: Install overcurrent protection devices and circuit breakers to prevent electrical overloads and short circuits, which can cause fires.
3. Proper Ventilation: Design charging areas with proper ventilation to dissipate heat generated during charging, reducing the risk of overheating and thermal incidents.

Emergency Response Planning

Electric vehicles will become integrated into airport operations and will be located within safety sensitive areas- they may also be in remote or challenging-to-access areas, making it harder for fire crews to reach and extinguish fires quickly. Developing efficient response plans and ensuring access to firefighting equipment in these areas is essential.

Airport fire safety experts need to seek specialist advise to identify emerging hazards and assist in modifying existing emergency response plans. These plans should include training for airport personnel, coordination with local fire departments, and the availability of specialized equipment.

Mitigation Measures:

1. Training and Awareness: Train airport staff to recognize the signs of EV-related incidents and respond appropriately. This includes knowing how to safely approach and handle electric vehicles and charging equipment (available now through EV FireSafe add link)
2. Coordination with Local Authorities: Collaborate closely with local fire departments and emergency responders to establish clear lines of communication and coordination in the event of an EV-related incident.
3. Impact on Business Continuity Plans

Environmental Concerns

Electric vehicle incidents at airports can lead to hazardous material releases, including battery chemicals and toxic fumes. Airport fire safety experts must be prepared to address these environmental concerns promptly.

Mitigation Measures:

1. Spill Containment Measures: Implement spill containment measures around charging stations and EV storage areas to prevent hazardous materials from spreading in the event of an incident.
2. Evacuation Plans: Develop evacuation plans that consider the potential release of toxic fumes and ensure the safety of passengers, airport personnel, and first responders.

The adoption of electric vehicles at airports is an important step toward reducing environmental impact, but it also introduces new fire safety challenges. Airport authorities, in collaboration with relevant regulatory bodies, must proactively address these risks. This involves implementing robust maintenance protocols, investing in specialised firefighting equipment, ensuring charging infrastructure safety, and providing comprehensive training to airport personnel. By addressing these concerns, airports can continue to embrace clean energy solutions while safeguarding the safety and security of passengers and airport operations. Fire safety must remain a top priority in the aviation industry's transition to electric vehicles.

Additional Resources:

Electric Vehicle Safety Risks	https://cosmosmagazine.com/technology/materials/ev-fire-risks/
Electric Vehicles in Australia	https://www.evfiresafe.com/evs-in-australia
Incidents Involving Electric Vehicles in Australia	https://www.afac.com.au/auxiliary/article/incidents-involving-electric-vehicles
Instructions for lithium-ion battery firefighting in vehicle fires (English PDF)	https://publikationen.dguv.de/regelwerk/publikationen-nach-fachbereich/feuerwehren-hilfeleistungen-brandschutz/feuerwehren-und-hilfeleistungsorganisationen/3926/fbfhb-024-instructions-for-lithium-ion-battery-firefighting-in-vehicle-fires?c=155
Five cars destroyed at Sydney Airport after battery from luxury electric vehicle ignite	https://www.smh.com.au/national/nsw/five-cars-destroyed-at-sydney-airport-after-battery-from-luxury-electric-vehicle-ignites-20230912-p5e43h.html