



Focus on Safety

ELECTRIC AND HYBRID VEHICLE EMERGENCY GUIDANCE

SUMMARY

Electric vehicles and hybrid vehicles, which contain power plants that utilize both internal combustion engines and batteries to generate power, are becoming more prevalent within our industry and are being utilized more frequently at marine terminals, shipyards, and at marine construction sites. These vehicles are becoming more frequently utilized because of their recharging capabilities and/or low fuel consumption. EVs and Hybrid vehicles are generally operated as supervisor trucks, forklifts, and other transportation/material conveyance. Though fires occurring with EVs are considerably more rare than with Hybrid vehicles, due to the hazards, it is vital that our members understand how to properly manage and respond to an incident or collision involving either type of vehicle, even if your organization does not own or utilize them. Remember, sustainability-conscious vendors, subcontractors, and even employees utilizing or parking their personal vehicles on-site could inadvertently cause an incident that must be managed properly.

Despite their green image, there are many hazards that come along with the use of electric vehicles and Hybrid Vehicles. EVs and HVs (partly) are energized by lithium batteries, which are surrounded by coolant; if the coolant leaks away from the battery components, this can potentially cause a thermal runaway, which is a rapid increase in temperature and pressure resulting in a fire that is extremely hard to control once started; these fires may also reignite after extinguishing. Reports of EV fires document that these types of vehicles take much more time and effort to extinguish compared to vehicles with normal combustion engines. Electric Vehicle manufacturing company, Tesla, suggests in their battery SDS that emergency responders take a deluge-style approach when an electric vehicle has ignited after an incident. Tesla recommends that first responders should prepare to fight an EV fire with 3,000 – 8,000 gallons of water for a single vehicle. As a point of reference, a regular fire truck only carries 500-1000 gallons of water at one time, rendering it useless against an electric vehicle without a fire hydrant. This immense amount of water is required to get the batteries to a cooled state, which extinguishes the fire.



Figure 1: An Uncontrolled Electric Vehicle Fire at a Charging Station Spreads Rapidly

In the event of an EV or HV fire, should remember to inform emergency services that the incident involves an electric or hybrid vehicle, then help direct them to the nearest fire hydrant if known and safe to do so.

In addition to the thermal hazards that accompany fires involving electric and hybrid vehicles, those in the immediate area are at risk of electric shock from high-voltage components of damaged lithium batteries. In an incident, if any electrically conductive portion of the vehicle frame contacts an electrical source, such as damaged batteries, the exterior of the vehicle could become energized, causing increased difficulty

managing the life safety hazards on the scene. In this instance, any person touching the exterior of the damaged electric vehicle could be shocked or electrocuted due to the massive amount of power stored in the batteries.



CONSIDERATIONS

To prevent additional hazards and risks of serious injuries, consider the following safety tips when faced with an EV accident:

- Inform all emergency responders that the vehicle is electric or hybrid.
- Assume the vehicle is fully powered, even after a crash.
- Roll down the windows before shutting down the vehicle.
- Remove the ignition key, and keep at least 16 feet away from the vehicle, as some vehicles are energized by simply being near the key.
- Do not touch the engine compartment, battery, exposed electrical components, or any wiring under the hood that can cause electrical shock.
- Maintain a safe distance from any electric or hybrid vehicle that has suffered extensive damage.
- Contact an authorized service provider or vehicle manufacturer for repairs. Individuals should not attempt to repair a damaged electric or hybrid vehicle.
- Report any leaking fluids, bubbling, sparks, or smoke coming from the vehicle and, if safely possible, remove other fire hazards from around the vehicle.
- Do not store a severely damaged electric or hybrid vehicle inside of a building or within 50 feet of any combustible materials.
- Note that damage to the high voltage system in an electric vehicle can result in a delayed release of toxic fumes from battery acids or flammable gases such as hydrogen.



Safety. Live It. Share It.

NFPA actively maintains a collection of Emergency Response Guides from 35+ alternative fuel vehicle manufacturers. The guides are free to download. To access these documents, visit the web page below:

<https://www.nfpa.org/Training-and-Events/By-topic/Alternative-Fuel-Vehicle-Safety-Training/Emergency-Response-Guides>

DEPARTMENT/LOCATION: _____ **MEETING DATE:** _____
Meeting Lead By: _____ Time Started: _____
Title: _____ Time Finished: _____

1. **Open Meeting & Present** Safety Topic: _____
2. **Read** minutes from previous meeting.
3. **Persons present (Print & Sign)**

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4. **Updates** – Status of previously presented safety concerns. Discuss any pending items.

5. **Incidents** – Concentrate on accident causes to make everyone more aware. Discuss incidents or near misses that have occurred since the last meeting. Summarize incidents and any injury trends. Review corrective actions that have been taken or are needed.

6. **Inspection/Audits** – Discuss findings and corrective actions of safety inspections made since last meeting.

7. **New Information** – Ask for employee suggestions. Discuss new procedures, safety policy changes, etc.

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