GLASTONBURY FIRE DEPARTMENT

STANDARD OPERATING GUIDELINES

SOG NUMBER:	FDO-514	ISSUED DATE:	08-12-22	EFFECTIVE DATE:	08-12-22
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CATEGORY: EMERGENCY OPERATIONS - GENERAL

SUB-CATERGORY: FIRE GROUND OPERATIONS

SUBJECT: RESPONDING TO A MOTOR VEHICLE ACCIDENT INVOLVING ELECTRIC AND HYBRID VEHICLES

RELATED GUIDELINE:

Section I – Introduction

A. Objective

As the number of electric and hybrid vehicles increase, the Department must continue to modify its tactics to properly respond to and protect its firefighters. Extricating and cutting into an electric vehicle is inherently dangerous. When responding to an electric or hybrid motor vehicle accident there are additional challenges firefighters must consider.

B. Applicability

Any vehicle accident, especially those that are identified as either electric or hybrid.

C. Reference

FireRescue1 - Electric Vehicle Response: Fire Attack and Extrication Basics – Patrick Durham
Firehouse – University of Extrication: Modifying Extrication for Electric Vehicles – Ronald Moore

Section II - General Description

Arriving at any motor vehicle accident requires that a proper size up of be performed. The size up should include the extent of damage, and if any of the vehicle's electrical components are compromised. Understanding the vehicle's construction is also an important aspect when responding to an accident involving an electric or hybrid vehicle.

Electric and hybrid vehicles are now being designed around the high voltage battery. This concept has resulted in most manufacturers designing a battery that is located entirely underneath the vehicle. The battery structure is intended to be a structural member of the vehicle and required to dissipate crash energy during impacts with minimal penetration into the box itself. This also changes the weight distribution of a vehicle, as these batteries can weigh as much as, if not more than, 1,500 pounds.

The battery structure is a watertight, fire-resistant box that can be made out of steel, aluminum or composite materials. Inside the box are smaller battery modules, containing many individual battery cells. The box contains high-voltage components, wiring and cooling systems.

The box is fire resistant for two reasons:

1. If there is a thermal runaway event inside of the box, manufacturers want the fire to stay in the box to protect the vehicle's occupants.
2. If there is a fire outside of the vehicle, the goal is to keep the battery cells from going into a thermal runaway event.

Section III – General Warning and Precautions Associated with Electric Vehicle Extrication

1. Vehicle construction and weight distribution could change standard strategies for stabilization.
2. The outer edges of the battery structure mate to, or are considered part of the rocker panel.
3. If undamaged, this is typically a safe location for rescue struts or cribbing.
4. NOTE: with an Electric Vehicle on its side do **NOT** use any holes that may have been caused by the crash. Do **NOT** pierce, puncture, or create any purchase points in the battery case for rescue struts or jacks.
5. Electric vehicles should be lifted at the rocker panel.
6. If the high-voltage battery is intact, an airbag lift could be acceptable on the bottom of the vehicle.
7. Be certain to complete any lifts over a large surface area.

Section IV – Considerations for Conducting Extrication Evolutions with Electric and Hybrid Vehicles:

When conducting an extrication evolution involving an electric or hybrid vehicle the following steps need to be followed:

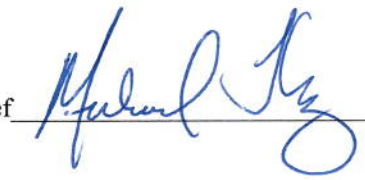
1. Identify the make and model of the vehicle as rescue procedures are specific for individual models.
    a. Even vehicles produced by the same manufacturer might have shutdown procedures or 12-volt battery locations that differ from one another.
2. Note vehicle badging is optional for vehicles that are sold in the United States.
    a. There are various Apps to quickly determine important rescue-related features about any vehicle.
3. Chocking of both the front and rear wheels is critical, as a means of preventing unwanted forward or rearward movement.
4. Remember everything in the vehicle is electric e.g. door locks, door latches, door windows, and power seats.
    a. These vehicles will also feature a keyless or smartphone ignition system and onboard computer system that necessitates a slight change in the 12-volt power down protocol
    b. When eliminating the 12-volt power everything essentially becomes frozen in that position.
    c. Without power an unlatched door is essentially a jammed door, the electric parking brake enables the vehicle from being pushed, pulled or dragged.
5. Prior to disabling the 12-volt system, all doors should be unlocked and windows lowered even if it is determined that they may not be needed for extrication. Coordination between the inside rescuer and the individual tasks with isolating the 12-volt system is key.
6. Note that newer vehicles, including electric vehicles are performing better in accidents because they are being constructed with ultra-high-strength steel.
7. Have a charged hose line in place that is staffed with a minimum of two (2) firefighters in full personal protective equipment, including self-contained breathing apparatus, as there may be a significant risk of a delayed fire.
8. When performing an extrication evolution make sure that everyone is aware that the vehicle is either electric or hybrid.
9. Assign a safety officer to watch for either smoking, popping, sputtering, or if anyone begins to experience eye, nose, throat irritation. This could be an indication of harmful/flammable gasses begin released. Extrication personnel will need to pull back and don self-contained breathing apparatus.

10. Consideration needs to be given for the patient(s) if harmful/flammable gasses are suspected of being released by using a vent fan to blow fresh air into the passenger compartment of the vehicle.
11. Removal of trim needs to be taken into consideration in order to verify what is being cut into before actually making any cuts into the vehicle's structure.
12. DO NOT cut any high-voltage cabling (bright orange).
13. High voltage cabling is often being routed in the center of the vehicle away from typical cutting points.

Section V – Post Incident Recommendations:

1. Notify the tow operator that they will be removing an electric or hybrid vehicle.
2. All electric or hybrid vehicles should be transported on a flatbed.
3. If there's damage, or suspected damage, there is a risk of a delayed fire.
4. Advise tow operator to store the vehicle outside, and at least 50 feet from any structure.
5. Tow operator should contact either a local dealer or manufacturer to obtain instruction in how to render the vehicle is safe.

Section VI – Approval

Fire Chief  Date of Approval 8-12-22