

Testimony of Michael Skaza, Vermont Fire Academy Chief of Training

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Electric vehicles present a new host of hazards that must be managed before any mitigation measures can be employed. With the number of electric vehicle registrations in Vermont increasing by 44% in 2023 alone, we need to ramp up the training and tools that responders need to manage emergencies involving electric vehicles.

When an electric vehicle is involved in a fire or motor vehicle crash, responders need to quickly identify the vehicle as electric, immobilize the vehicle, and disable it before they can begin fire suppression or victim rescue efforts. With gasoline powered vehicles, responders are quickly able to immobilize a vehicle simply by chocking the wheels, yet an electric vehicle has such high torque that it can overcome the chocking and climb over it. Gasoline powered vehicles are obvious when their engines are running due to the noise of a running motor, signaling responders that the ignition needs to be turned off, but electric vehicles can be on and completely silent, ready to move unexpectedly at any moment. This can have catastrophic results if responders are working near or within the vehicle. If an electric vehicle is not properly identified prior to performing a vehicle extrication, responders and victims are placed at additional risk by damaged high voltage components or by cutting through high voltage circuits during the rescue.

Added measures must be taken to disable an electric vehicle during an emergency, but those measures can only be employed if responders properly identify the vehicle as an electric vehicle. Once identified, the vehicle can be disabled by disconnecting the 12-volt

battery, cutting specific cables identified by the manufacturer, or removing a dedicated fuse specified by the manufacturer. With each model being different, responders must consult with emergency response field guides to determine the appropriate disabling action and to determine where it is safe and unsafe to cut during a rescue. With so many variations across models, you can see that the emergency response to an electric vehicle incident can be very complicated.

This gets even more complicated when we must consider special tactics if the electric vehicle is on fire or is at risk of being on fire. Physical damage, overheating, overcharging, manufacturing defects, or even mismatching parts can cause lithium-ion batteries to enter a condition known as thermal runaway. This is where a single cell failure results in a reaction that generates heat, increasing the intensity of the reaction until the battery explodes in fire that is often uncontrollable. These fires produce copious amounts of acutely toxic and extremely flammable gas that creates an environment that is quickly untenable.

I would like to focus on electric vehicle identification and provide some insight surrounding how complicated this can be in an emergency. Vehicle manufacturers have done very well to make electric vehicle models look remarkably unrecognizable from their gas-only counterparts. In many cases the differentiation between a gas-only model and an electric model is as subtle as a variation in the exterior trim package. Some manufacturers rely on subtle differences in exterior badging to identify a model as an electric vehicle. Some manufacturers such as Tesla, Rivian, and Lucid have no electric identifying badging on their

vehicles whatsoever; assuming that their name alone will provide recognition of an electric vehicle.

To make identification even more of a challenge, the level of inspection that must be done to identify an electric vehicle may have to be done in poor lighting, with smoke and fire conditions obscuring the manufacturer's identifiers, or with damage that has destroyed the exterior identifiers. The provision of a universal electric vehicle identifier, such as that displayed on a license plate, would aid responders in the rapid identification of an electric vehicle. As a first responders I can tell you that even in the most damaging of crashes, license plates fare well and are often still legible even after a crushing impact. Providing a license plate with a universally recognized identifier for electric vehicles will decrease the time it takes responders to identify an electric vehicle, allow strategies and tactics for victim rescue and fire suppression to be developed more quickly and accurately, result in improved outcomes for injured crash victims, and improve the safety of responders who are working at these incidents. Responders work within a time frame referred to as the "golden hour and platinum 10 minutes". The golden hour is the target time in which to have a trauma patient in an operating room to increase survivability. To reach that goal, we work within the "platinum 10 minutes" which is the target time access the trauma patient and have them enroute to definitive care. We have the potential to shave minutes off this ticking clock if we can immediately identify a vehicle as an electric vehicle.