



# San Diego Fire-Rescue Department Training & Education Division **TRAINING DRILL**

Training and Education Division

Date: June 1, 2021

Subject: Electric and Electric Hybrid Vehicle Fires

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New Training Drills,  
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**Background:**

Hybrid and electric vehicles have been popular for the better part of two decades. Increased range, lower prices, and stylish body styles have made these vehicles more prevalent than ever before. Many of us are aware of unique challenges associated with these vehicles, such as not cutting the orange high voltage wires, disconnecting the battery, and ensuring the vehicle is truly turned off. However, there are challenges associated with fires in these vehicles that our members need to be aware of in order to safely and efficiently extinguish them.

Lithium batteries power hybrid and electric vehicles such as Tesla, Prius, and Volt. Lithium is very volatile when exposed to air, and damaged lithium batteries can cause intense, explosive fires. Consequently, fires involving lithium batteries pose challenges not present in what we might consider standard vehicle fires. A Tesla crashed into a tree in Indianapolis, Indiana, and broke into several pieces, leaving a 150-yard debris field. The vehicle's lithium batteries caught fire and began exploding in and onto the street, making access difficult for firefighters. It took 20 minutes for firefighters to extricate one of the occupants due to the fire.

In another incident in Texas, a Tesla crashed into a tree and burned for four hours. Fire crews who battled the fire reported using 23,000 gallons of water to extinguish the fire because the batteries kept reigniting.

Although this fire danger applies to any vehicle with a lithium battery, the batteries in Teslas occupy almost the entire floor pan between the wheels. This means the vehicle batteries are especially susceptible to damage from collisions and firefighters performing extrication. Tesla's First Responder Guide gives rescuers information about areas to avoid in a vehicle extrication scenario. The First Responder Guide from Tesla, other electric and hybrid vehicle manufacturers, and the NFPA all have information about fighting fires in a vehicle with lithium batteries. Although fires not involving the batteries can be fought like any other vehicle fire, rescuers should **not** make contact with any high voltage components during overhaul. If the battery does catch fire, is exposed to high heat, or damaged, be prepared to use much more water than you would use for other vehicle fires.

The NFPA and vehicle manufacturers recommend considering an additional water source (hydrant or additional engine(s)) and using "copious" amounts of water to extinguish the fire and continue cooling the battery after extinguishment. In addition, the vehicle "MUST BE MONITORED for at least one hour after it has been completely cooled....DO NOT RELEASE THE VEHICLE TO SECOND RESPONDERS, such as law enforcement and towing personnel until there has been no heating detected for one hour."



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Furthermore, towing personnel need to be advised to store hybrid and electric vehicles at least 50 feet from any exposure, such as offices or other vehicles in the yard due to the possibility of reignition.

## **Discussion Points:**

- High voltage wires
  - <http://sdfd.targetedsafety.com/drillmanual/Chapter22/pdf/Chapter22.pdf>
- Secondary Water Supply (hydrant, water tender, additional engine)
- Apparatus placement/consider the debris field

## **Action Items/Drills:**

- Watch the videos provided in the links below and discuss.
- Review NFPA and vehicle manufacturer guidelines for vehicle extrication and vehicle fires.

## **For additional information, follow the links below:**

- [Fire Officials Say Dealing With Tesla Vehicle Fires Still A Learning Process - YouTube](#)
- <https://www.firehouse.com/operations-training/news/21219035/tx-crews-battle-fatal-tesla-crash-fire-for-nearly-four-hours>
- <https://www.tesla.com/firstresponders>
- <https://www.indystar.com/story/news/crime/2016/11/03/2-killed-fiery-tesla-crash-near-downtown/93227456/>
- <https://www.nfpa.org/News-and-Research/Fire-statistics-and-reports/Research-reports/Electrical-safety/Electric-Hybrid-Vehicle-Safety-Training-for-Emergency-Responders>

## **References:**

- <https://www.nfpa.org/News-and-Research/Fire-statistics-and-reports/Research-reports/Electrical-safety/Electric-Hybrid-Vehicle-Safety-Training-for-Emergency-Responders>

The Training & Education would like to thank Captain Aaron Bothwell for his contribution to the above Training Drill.

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