



Overcoming Obstacles in Transitioning Fleets to Electric Vehicles: Zero Emission Charging Safety Education

Claire Hazzard
Program Administrator

March 12, 2026

Agenda

- Introduction to MassCEC
- Introduction to EVICC
- Introduction to the Medium and Heavy-Duty Mobile Charging Solutions Program
- Safety Education Pannel
 - Better Together Brain Trust (BT2)
 - Boston Safety Training
- Question & Answer
- Closing

ACCELERATING DECARBONIZATION

We contribute to meeting our state's ambitious climate goals by tackling barriers to widespread use of clean energy and climate technology in buildings, transportation, and the grid.



MASSCEC'S WORK BY FOCUS AREA

EMERGING CLIMATE TECH

We help new climate-focused businesses grow faster by backing a vibrant community of researchers, startups, and established industry players - creating an ecosystem where they connect and thrive.



LARGE SCALE DEPLOYMENT: OFFSHORE ENERGY

We're building a cutting-edge offshore energy industry, marshaling world-class ports while addressing supply chain and workforce development challenges.



CLEAN ENERGY & CLIMATE WORKFORCE DEVELOPMENT

We're growing a diverse and talented clean energy workforce by supporting a dynamic network of community-based organizations, labor, training providers, schools and employers committed to a sustainable future for all.



Electric Vehicle Infrastructure Coordinating Council (EVICC)

- ▶ In 2024, the EVICC awarded MassCEC \$38M to increase access to charging infrastructure for various sectors
- ▶ EVICC identified **mobile charging** as a promising technology that can help fleet owners electrify without the need for immediate large-scale investment in charging infrastructure
- ▶ The Medium- and Heavy-Duty Mobile Charging Pilot is funded as one of four pilot programs designed to increase access to EV charging across sectors



Commonwealth of Massachusetts

Electric Vehicle Infrastructure
Coordinating Council

Initial Assessment to the General Court
August 11, 2023

Medium and Heavy-Duty (MHD) Mobile Charging Solutions Program

PROGRAM OVERVIEW

- ▶ The Program will accelerate the electrification of four MHD fleets (class 3-8) through the deployment of mobile charging stations and Zero Emission Vehicles (ZEVs)
- ▶ Increase access to Mobile Charging and reduce barriers to EV adoption for MHD fleet owners and operators in MA

PROGRAM SERVICES

- ▶ **Mobile Charger Deployment and MHD ZEVs**
 - Fund the deployment mobile charging stations and ZEVs for four participating fleets
 - Charging stations and MHD ZEVs are being deployed March 2026
 - The Program is fully enrolled
- ▶ **Public Facing Resources**
 - Tools to support future MHD fleet owners and operators through mobile charger procurement and deployment
 - Resources will be published in December 2026. Visit our [webpage](#) to view the **Technology Inventory**

Panelists



Nicole Price Voudren
President, BT2 Energy



Dean Vanasse
President, Boston Safety Training

Zero Emission Charging Safety Education Training

SAFELY USING AND MANAGING ZERO-EMISSION VEHICLES AND CHARGING EQUIPMENT

In partnership with the MassCEC's Medium- and Heavy-Duty Mobile Charging Pilot

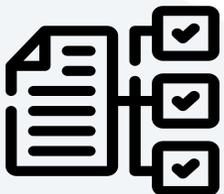
Presentation Themes



- Why EV Charging Safety Matters
- Charging Infrastructure Basics
- EV Battery and Electrical Hazards



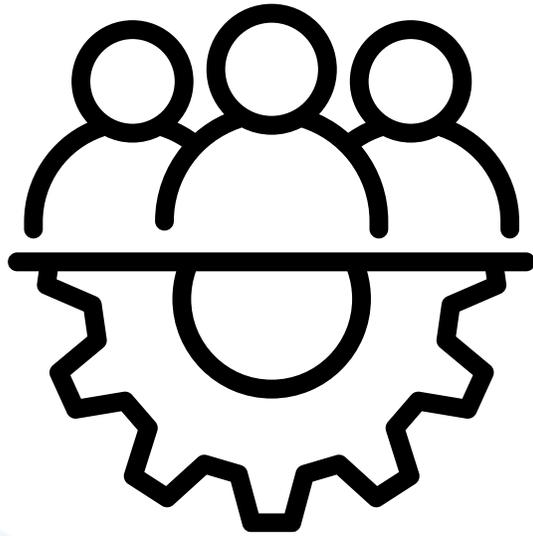
- Operational Safety for Fleet Personnel
- Charging Incident Realities
- Incident Response and Emergency Coordination



- Continuous Safety Improvement
- Resources and Questions

Roles and Responsibilities Overview

EVERYONE IS RESPONSIBLE FOR SAFETY



- ▶ Safety is the prevention of harm or injury to one's health, body or property. With knowledge we can reduce the likelihood of negative occurrences. This training endeavors to provide some of that knowledge.

Fleet Owner Responsibilities

ENSURING COMPLIANCE, SAFETY TRAINING, AND EMERGENCY PREPAREDNESS



Compliance

Fleet owners must ensure **adherence** to safety regulations (OSHA 1910) and standards (NFPA 70E), establishing protocols that promote safe operation and maintenance practices.



Training

Implementing comprehensive **training** programs for drivers and staff is essential to reinforce safety practices and enhance operational efficiency within the fleet. This includes making manufacturer literature available to involved employees.



Emergency Preparation

Effective emergency **preparedness** entails developing clear response plans, conducting regular drills, and ensuring all personnel are familiar with emergency protocols and contacts.

Personnel & Charging Operator Responsibilities

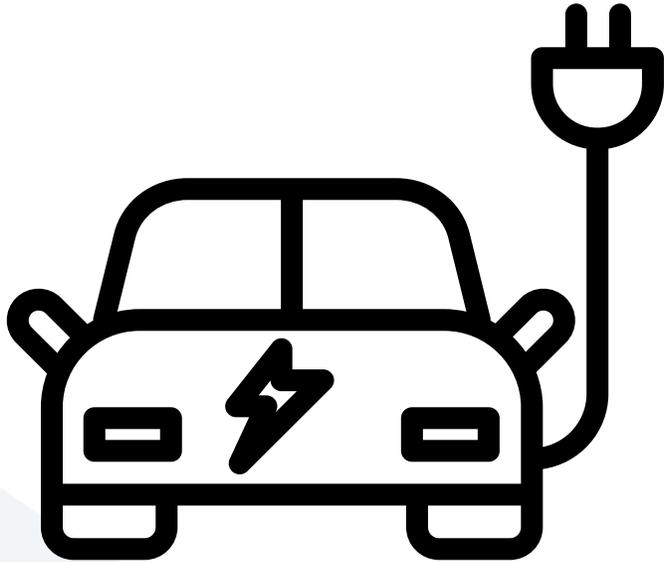
ADHERING TO SAFETY PROTOCOLS

- All personnel must strictly adhere to established safety **protocols**, ensuring **compliance** with operational standards, promptly **reporting** any hazards or incidents to maintain a safe working environment for everyone involved.



Electric Fleet Systems Overview

TECHNICAL CONTEXT FOR EV FLEETS



Though we group zero-emission fleets together in day-to-day language as “electric vehicles” or “EVs”, real-world **operations vary** widely by vehicle type, class (size) route profile, climate, terrain, charging strategy, and organizational needs.

UNDERSTANDING KEY COMPONENTS AND SAFETY AWARENESS



Battery Systems

Electric vehicles operate with **advanced** battery systems that store energy, enabling efficient performance and longer range capabilities for daily travel.



High-Voltage Awareness

Operators must be trained in **high-voltage** awareness, understanding the risks and safety protocols to prevent electric shock, arc flash, arc blast, thermal and chemical burn injuries.

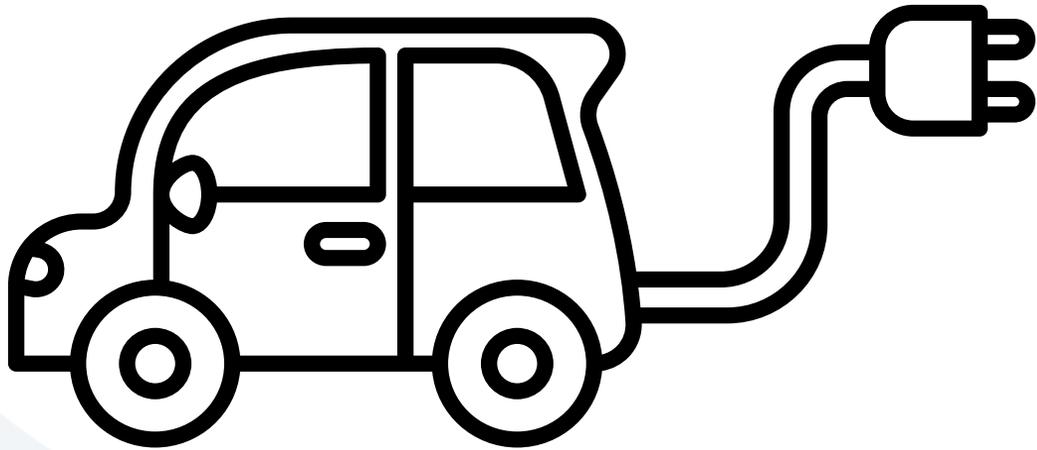


Charging Types

Familiarity with charging **types**, including AC and DC fast charging, is essential for efficient vehicle operation and maximizing fleet uptime.

Charging Models Overview

ELECTRIC VEHICLES RECEIVE AND MANAGE ENERGY IN DIFFERENT WAYS



With knowledge of charger types, power levels, connector standards, site design, and load management strategies, we can reduce downtime, protect equipment, and support reliable operations.

For more information on charging types, please see: <https://goclean.masscec.com/ev-charging-types/>

Battery Energy Storage Systems

COMPARING UTILITY-CONNECTED AND OFF-GRID SOLUTIONS

- ▶ Battery energy storage systems play a crucial role in **enhancing grid stability**. Understanding the differences between utility-connected and off-grid systems allows fleets to optimize energy use and maximize efficiency.
- ▶ Battery appearance can vary from large-scale BESS (top), or smaller, embedded systems in mobile charging equipment.



Charging Models

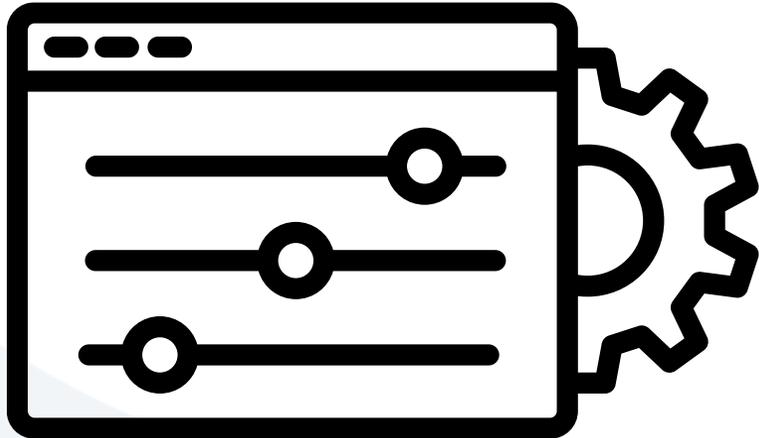
- Common charging models include:
 - **permanent:** affixed to the ground
 - **mobile:** trailer-mounted, road permitted
 - **semi-permanent:** pad-, pallet-, skid-mounted, or containerized for efficient relocation
- Charging models are available in various scales designed to meet diverse fleet needs.



Size Diversity

Hazard Awareness Protocols Overview

ESTABLISHING OPERATIONAL SAFEGUARDS



Hazard awareness protocols and operational **safeguards** are the structured practices used to identify risks, prevent incidents, and protect personnel, equipment, and facilities.

Hazards can vary broadly from vehicle to vehicle, fleet to fleet, and even season to season.

Hazard Types



Electrical Hazards

Electrical hazards can cause serious injuries, including **electric** shocks, arc flash, arc blast, thermal and chemical burn injuries making awareness essential for safe fleet operations.



Mechanical Hazards

Mechanical hazards involve **moving** parts and equipment malfunctions, necessitating adherence to safety protocols during maintenance and operation.



Thermal Hazards

Thermal hazards such as **overheating** batteries can lead to fires; proper monitoring is crucial to prevent incidents.



Environmental Hazards

Environmental hazards include adverse **weather** and **site** conditions, which can significantly affect vehicle performance and operator safety.

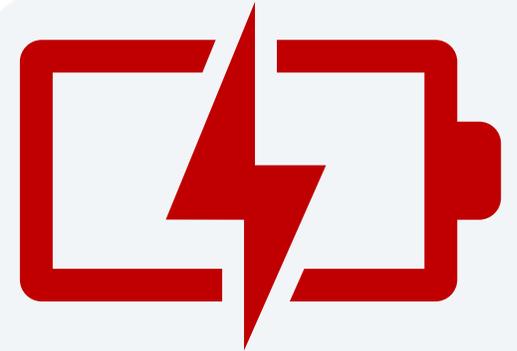
Battery Specific Hazard-Thermal Runway

- Thermal runaway occurs when a lithium-ion battery cell short circuits and starts to heat up uncontrollably.
- If a cell is abused, chemical reactions generate heat and toxic and flammable gases. The heat speeds up these exothermic reactions producing more heat and gases.



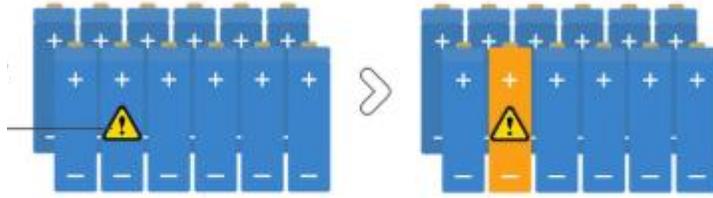
Battery Specific Hazard-Thermal Runway

- Heating continues until the cell produces more heat than it can release to its surroundings. Released heat will start to affect other nearby battery cells.
- When the generation of heat becomes self-sustaining then the cell is experiencing **thermal runaway**, an unstable chemical reaction that is hard to bring under control.
- This results in potential explosion, off gassing, ignition of the cells, and vapor cloud explosion.

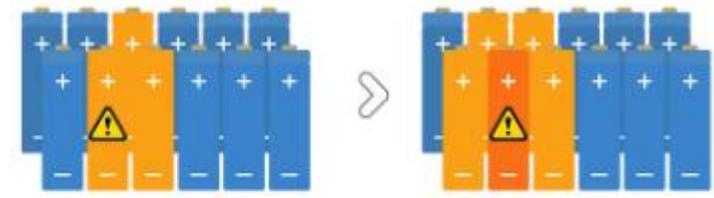


Battery Specific Hazard-Thermal Runaway

Cell affected
by short
circuit



Heating affects
neighboring cells



Heavy metal particles
present as a dark cloud,
followed by a white
vapor cloud of toxic
flammable gasses



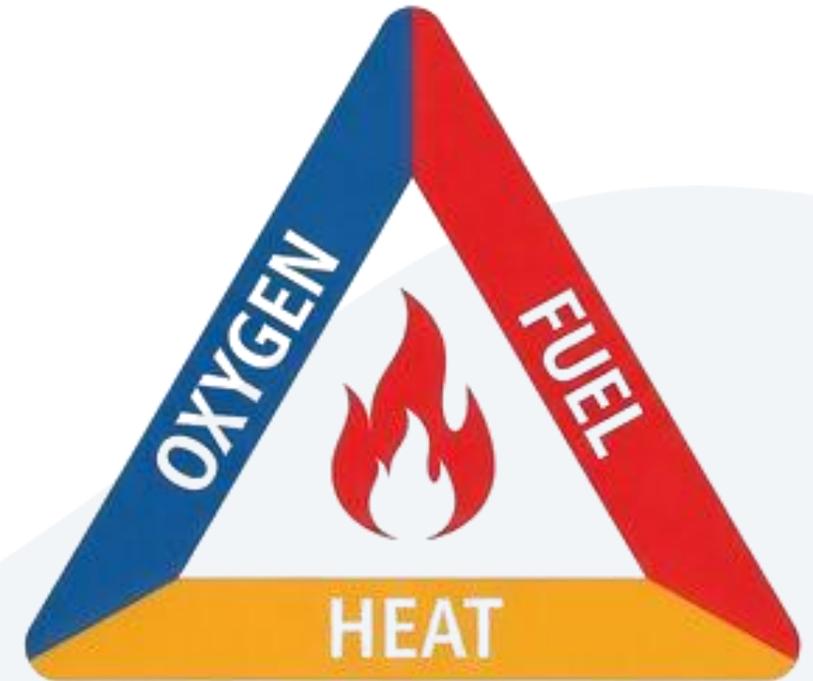
Ignition will occur
anywhere between
seconds & minutes
of the white vapor
cloud showing



Battery Hazards

PRIMARY HAZARD: THERMAL RUNAWAY AND FIRE

- EV batteries contain all elements of the fire triangle: heat (ignition source), fuel, (combustible material), and oxygen.
- EV fires are self-sustaining and cannot be “extinguished” in the traditional sense.
- Focus on:
 - Dissipating heat
 - Preventing propagation
 - Minimizing exposure to flames and gases
 - Waiting for emergency responders



The Ingredients for Fire: Heat (ignition source), Fuel (combustible material), Oxygen

Battery Hazards

ELECTRICAL HAZARDS

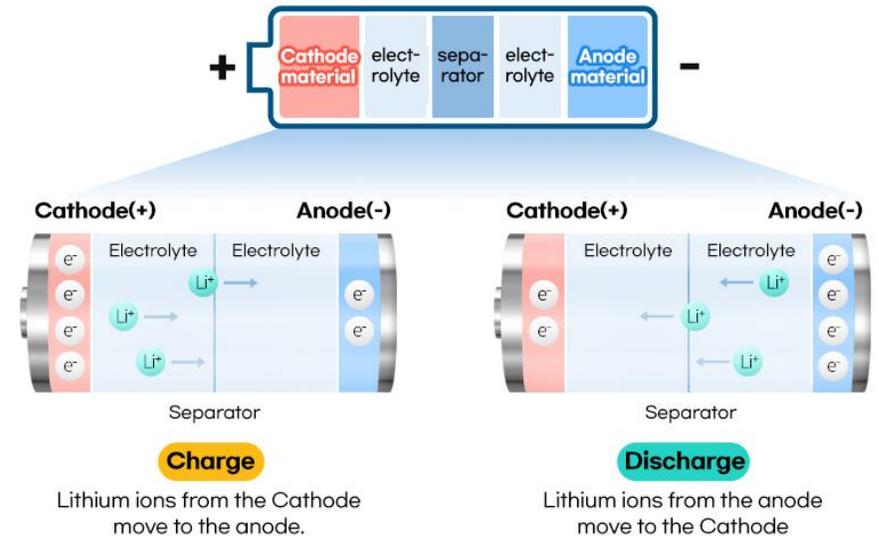
- Potential Risks: electric shock, arc flash, arc blast
- Risk is reduced through engineering controls like insulation, finger safety components, and isolation and guarding



Battery Hazards

ELECTROLYTE EXPOSURE

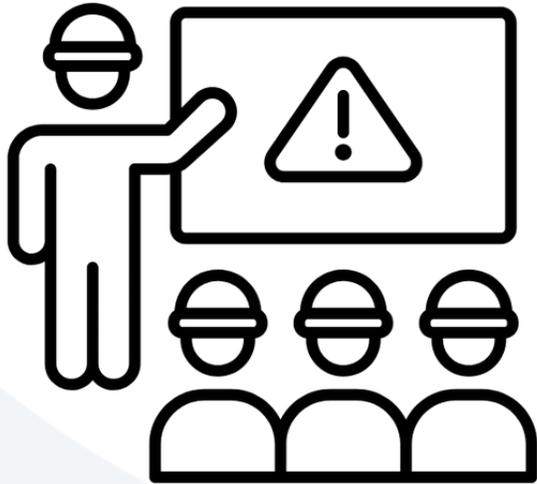
- Modern EV batteries use minimal gel-based electrolyte in sealed cells
- Exposure is rare and typically only during battery failure
- *Do not touch spilled or leaking electrolyte*



EV battery electrolytes allow lithium ions to move between the battery's positive and negative electrodes through the gel medium.

Electrical and Battery Safety Overview

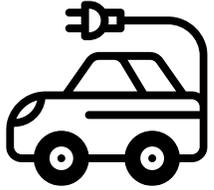
UNDERSTANDING OPERATOR BOUNDARIES



Operator boundaries **define the limits** of what personnel are trained and authorized to inspect, operate, or service. With knowledge of voltage levels, arc flash potential, thermal events, and proper response procedures, we can reduce the likelihood of injury, equipment damage, and service disruption.

Operational Safety

KEY PRACTICES FOR SAFE ELECTRIC FLEET OPERATIONS



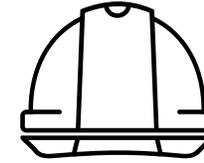
Vehicle Positioning

Proper vehicle positioning minimizes hazards and ensures clear access to charging stations, improving safety for operators and pedestrians alike.



Cable Management

Effective cable management prevents tripping hazards and potential damage to charging equipment, promoting a safer work environment for all personnel.



Personal Protective Equipment

Utilizing appropriate personal protective equipment (PPE) is essential for safeguarding operators against electrical hazards and ensuring safe work practices during fleet operations.

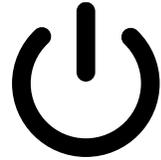
High-Voltage Safety Essentials

KEY PRACTICES FOR OPERATORS



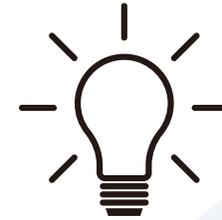
High-Voltage Awareness

Operators must understand the **dangers** associated with high-voltage systems, including potential electric shock, arc flash and blast hazards as well as thermal and chemical burns, to ensure safety during operations and maintenance activities.



Safe Shutdown

Proper **procedures** must be followed for safely shutting down high-voltage systems to prevent accidental energization and ensure that all personnel are aware of the shutdown process and its significance.

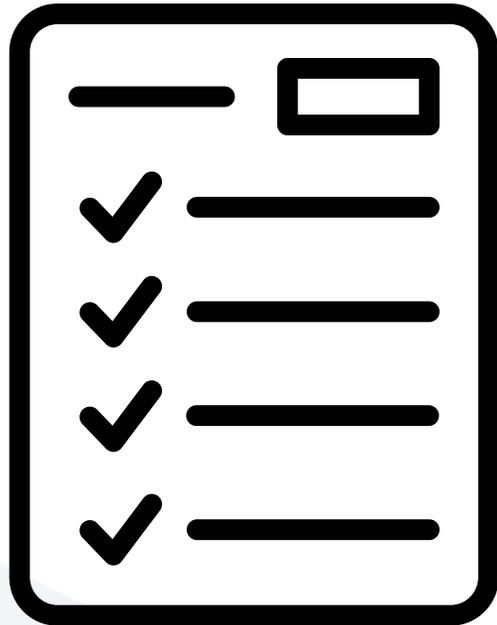


Situational Awareness

Maintaining situational **awareness** is crucial for operators, as it involves being alert to environmental conditions, potential hazards, and the state of the equipment during electric fleet operations.

Operator Do's and Don'ts Overview

ESSENTIAL GUIDELINES FOR SAFETY



There is no one-size-fits-all checklist for ensuring operator safety, but there are some consistent starting points!

General Safety Guidance

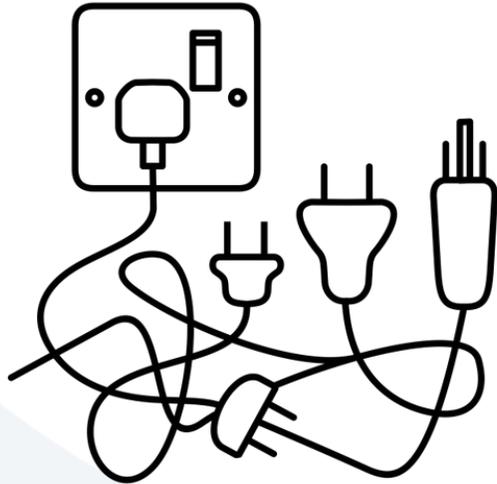
DO'S AND DON'TS



- Understand your individual role and responsibilities.
- Do not exceed your training and knowledge.
- Read and understand the manufacturer's literature for your specific equipment type(s).

EV Charging Basics

DO'S AND DON'TS



- Use only compatible equipment.
- Inspect all equipment (hardware, cables, connectors) for damage before use.
- Use extra care in wet environments.
- Cable management - Keep cables clear of other mobile and stationary equipment to prevent tripping hazards and damage.

EV Charging Equipment Specifics

DO'S AND DON'TS



- Overcurrent Protective Devices (OCPD) such as fuses, circuit breakers, and ground fault circuit interrupters (GFCI) protect equipment and end users.
- Only reset devices if you are **authorized** and **qualified** to do so and only after the purpose of the operation was identified, rectified and it is safe for the personnel and the equipment to reset.

Charging Incident Anecdotes

REAL-WORLD KNOWLEDGE REINFORCES PRACTICAL SAFETY AWARENESS

- Charging does not inherently increase fire risk. This misconception is common, especially on social media.
- Although Incidents at charging hubs are very unlikely, there is a need for emergency response planning:
 - On-site hydrants
 - Fire apparatus access
 - Pre-incident planning
 - Water run-off management
- In properly operating road-registered EVs, overcharging to the point of fire is electrically almost impossible when using compliant, professionally installed charging equipment.
- Most charging-connected fires are believed to involve vehicles previously damaged prior to charging.

Emergency Response Preparedness Overview

STRATEGIES FOR ABNORMAL CONDITIONS



Real-world **events vary** widely in severity, cause, complexity, and required response, from equipment faults to thermal events or utility disruptions, and even compounded events. Knowledge of alarm indicators, shutdown procedures, evacuation routes, and coordination with emergency services, can reduce confusion, limit escalation, and protect people and assets.

Recognizing Emergencies

IDENTIFYING KEY INDICATORS OF POTENTIAL HAZARDS

- ▶ Employers must establish an **Emergency Action Plan (EAP)** for the response to emergencies. Personnel shall be trained on these plans. Plans shall include, but not be limited to, response to abnormal equipment conditions, overheating, smoke, fires, and equipment physical damage.



Alarms

Alarms serve as crucial alerts for immediate attention, indicating possible emergencies that require swift action and response from personnel.



Smoke

The presence of **smoke** can signal a fire or overheating equipment, necessitating urgent evacuation and investigation to ensure safety.



Heat

Elevated **heat** levels indicate potential electrical issues or equipment failure, prompting operators to check systems and mitigate risks effectively.

Emergency Action Plan Assistance

WHERE CAN YOU GET STARTED IN CREATING YOUR OWN EAP?



*Scan QR Code for Quick
Access to OSHA EAP
Assistance*

- ▶ OSHA
 - <https://www.osha.gov/emergency-preparedness/getting-started>

- ▶ NFPA
 - NFPA 1600-Standard on Continuity, Emergency, and Crisis Management
 - <https://www.nfpa.org/for-professionals/codes-and-standards>

- ▶ Federal Help
 - <https://www.ready.gov/business/emergency-plans>

Training and Improvement Overview

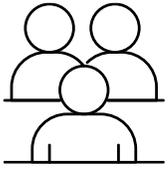
SUSTAINING A SAFETY CULTURE: PRACTICE, PRACTICE, PRACTICE!



Ongoing education, reflection, and adaptation help organizations respond to evolving technologies and operational realities. A sustained focus on learning reinforces **shared responsibility** and continuous progress.

Training Requirements

KEY ASPECTS OF SAFETY TRAINING FOR FLEETS



Target Audiences

The training is **designed** for fleet drivers, supervisors, maintenance personnel, and contractors to ensure comprehensive safety understanding.



Training Frequency

Regular training sessions are required annually, with additional refreshers scheduled based on fleet operations and any incident reviews.



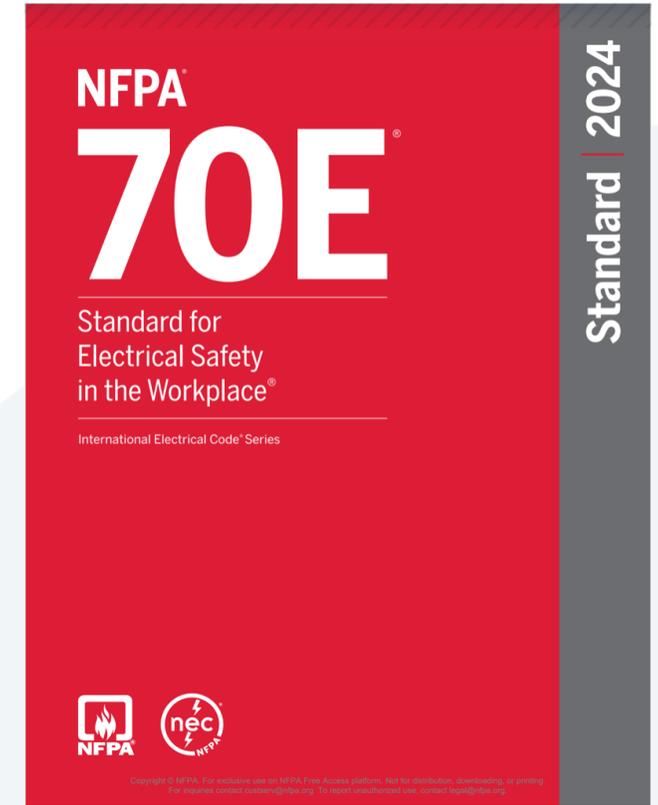
Documentation Needs

Accurate **records** of training sessions, participant attendance, and completed assessments must be maintained for compliance and future reference.

Training Resources

DIVERSE RESOURCES AVAILABLE

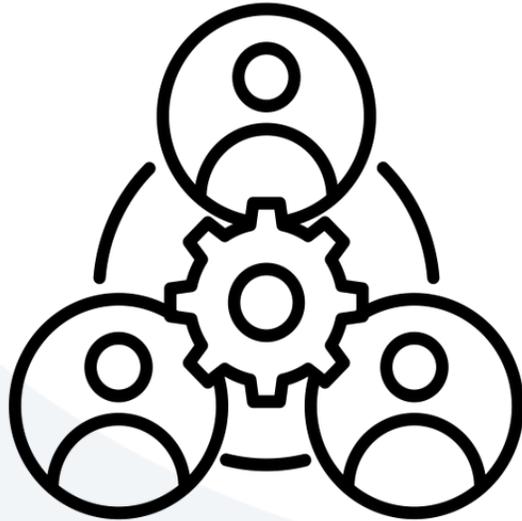
- ▶ Manufacturer's Literature
- ▶ General Liability Insurance Company
 - Templates
- ▶ Consensus Standards
 - NFPA-70E
- ▶ Safety Training Companies
 - Boston Safety Training Inc.
- ▶ Global resources
 - EV Firesafe
 - <https://www.evfiresafe.com>



The NFPA 70E establishes safety practices to protect workers from electrical hazards.

Integrating Safety Programs Recap

ENHANCING FLEET SAFETY SYNERGY



Effective fleet safety requires **collaboration** between electrical, environmental, and emergency programs, ensuring comprehensive training and protocols that prioritize safety while addressing diverse operational challenges across all scenarios.

Fleet Safety Best Practices

THANK YOU!

Consider implementing protocols for safe operations today



Additional Resources



MassCEC Resources

➤ National Fire Prevention Association (NFPA)

- MassCEC, in collaboration with NFPA, is offering two FREE, self-paced online safety training courses for emergency responders and firefighters

- **Alternative Fuel Vehicle Training**

Scan the QR code and
use code **MASSCEC1** to
register →



- **Energy Storage and Solar Safety Training**

Scan the QR code and
use code **MASSCEC2** to
register →



➤ Mass Fleet Advisor (MFA)

- MFA provides free technical assistance for medium- and heavy-duty fleets interested in exploring their fleet electrification options through personalized Fleet Electrification Reports

- If you want to...

- Learn more
- Check your eligibility
- Sign up?

- Visit <https://www.massfleetadvisor.org/>

Questions?



Missed our first three sessions?

Meet Mobile Charging Manufacturers (Parts 1&2) and Mobile Charging Solutions Case Studies | [Recording & Slides](#)

Coming Soon

MassCEC MHD Mobile Charging Solutions Demonstration: Summer 2026



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