

## BULLETIN

NO.: 24-136  
DATE: September 9, 2024  
TO: All Personnel  
FROM: David Picone, Battalion Chief, Health and Safety Officer  
SUBJECT: **Tailboard Safety** - Hazards of Lithium-Ion Battery Fires

This new Tailboard Safety message addresses the unique hazards, challenges, scene assessment, and more.

The Occupational Health & Safety Committee's (OHSC) aim is to make these messages easily accessible to the crews and relevant to the time of year and individual safety concerns identified by training, administration, and current events.

The attached Tailboard will be placed in the 1st Quarter

- All other prior Tailboards can be found in Vector Solutions @
  - Logged in:
    - Use the following link: [Tailboard Safety Folder](#)
    - Or file path: [San Diego Fire Rescue Department File Center > Health & Safety > !Safety Communications > !Tailboard Safety](#)
- Tailboard Table of contents (attached)

**Supervisors of all Fire-Rescue Divisions** select a Tailboard Safety Message and discuss it with their personnel.

- Fire Operations:
  - During the morning meeting of the division's 'first-day' back (twice monthly)
- All other divisions
  - One topic monthly to review with staff
  - One (different topic) monthly to post at all site locations
- Please review this as a crew
  - Supervisors can add their crew members for assignment completion on all Health & Safety material

Any questions should be directed through the chain of command.

- Refer to **SDFD Operations Manual**
  - **SI 10 Section 04 Safety Communications**

Questions regarding this content can be directed through your chain of command or to Battalion Chief Robert Rezende, at 858.442.2695, or [rrezende@sandiego.gov](mailto:rrezende@sandiego.gov).

Don't hesitate to contact the Health and Safety Office at [SDFDHealth&Safety@sandiego.gov](mailto:SDFDHealth&Safety@sandiego.gov) with comments or areas of improvement. For all other questions, contact HSO/Battalion Chief David Picone at 619.533.4466 or [dpicone@sandiego.gov](mailto:dpicone@sandiego.gov)



The Health & Safety App's QR code  
login: [SDFD@wellness.com](mailto:SDFD@wellness.com)  
password: support  
24/7 support 833-SDFD-HSO (733-3476)



# Tailboard Safety Messages

Jan-March	April-June
18 Watchouts & the Standard Firefighting Orders 2023	Africanized Honey Bees 2023
Attitude is Everything 2023	Air Drop Safety 2023
Cancer Risk Reduction 2023	Apparatus Backing 2023
Driving Situations 2023	CAPP Review 2023
Hazard Recongnition 2023	Eye Protection 2023
Health & Safety in the Workplace 2023	Fentanyl 2023
Hydration 2023	FF LODD Statistics 2021
MRSA 2023	Hand and Power Tools 2023
Roadway Safety 2023	Neon Signs 2023
Safety and Maintenance of Hand Tools 2023	Office Safety 2023
SCBA Immersion in Water 2023	Vertical Ventilation Safety 2023
Seat Belt Safety 2023	Supervisors 10 Commandments of Safety 2023
Unsafe Acts 2023	Office Cleanliness 2023
Tensioned Cable Safety 2023	Rescue Board 2023
Raised Foundation Hazards 2023	Taking Short Cuts 2023
Organophosphate 2023	Equipment Usage During Red Flag Warnings 2023
Hazards of Lithium-Ion Battery Fires 2024	Unconscious Patient Behind the Wheel 2023
July-Sept	Oct-Dec
Coastal Rescuer Safety 2023	Carpal Tunnel Syndrome 2023
Confined Space Hazards 2023	Freeway Response Guidelines 2023
Exercise Warm Up and Cool Down 2023	Hand Tool Injuries 2023
Ground Ladder Safety 2023	Lifting Safety 2023
Internally Grounded Power Tools 2023	Office Environment Safety 2023
Leadership Influences on Safety Culture 2023	Office Lighting 2023
Office Mishaps and Causes for Concern 2023	Personal Safety at Vehicle Fires 2023
Rescue Water Craft Situational Awareness 2023	Rescue Water Craft 2023
Seatbelts Save Lives 2023	Rhabdomyolysis Dangers 2023
Solar Panel Safety 2023	Safe Parking at Incidents 2023
Station Safety Considerations 2023	The Use of Highway Flares 2023
Warning Signals of Extreme Fire Behavior 2023	Transient Encampment Fires 2023
Dangers of Energy Drinks 2023	High Pressure Gas 2023
Eye Strain 2023	Hydrogen Sulfide 2023
Natural Gas Incident Safe Practices 2023	Medical Information on Smart Phones 2023
Hazard Tree - Tree Mortality Awareness 2023	Hazardous Materials Operations 2023
Apparatus Floors and Leaf Blower Use 2023	Liquified Petroleum Gas 2024
	Compressed Natural Gas 2024



# San Diego Fire-Rescue Department Health & Safety Office Tailboard Safety

## Topic: Hazards of Lithium-Ion Battery Fires

### BACKGROUND:

Lithium-ion batteries are ubiquitous in modern technology, powering everything from smartphones, electric scooters, electric vehicles, and energy storage systems. However, their energy density also poses unique challenges in emergency scenarios. Identifying potential hazards, including thermal runaway and toxic atmospheres, requires implementing proactive risk assessment and mitigation strategies. Key aspects such as scene assessment, establishment of safe perimeters, and implementation of specialized equipment and PPE are needed to ensure public and responder safety.

### HAZARDS

- Batteries may rupture and vent toxic flammable gases and/or explode violently when the gases ignite when subject to the following:
  - Thermal – Hot or Cold temperatures
  - Physical – Impacted, crushed, pierced, etc.
  - Electrical – Overcharging or forced discharge, including internal manufacturing defects or internal short-circuiting
  - Moisture impacting electrical components or during drying after being wet
- It may be difficult to discern if a lithium-ion battery pack or cell is compromised; a Thermal Imaging Camera (TIC) may not pick up the resulting heat signatures.
  - **Note:** A thermal imaging camera shall not be relied upon to determine if a Lithium-Ion battery pack or cell is compromised
- *Thermal Runaway:*
  - When the stable state of batteries/cells rapidly fails due to mechanical (impact, trauma, etc.), electrical (overcharge, over-discharge, internal short, etc.), or thermal (temperature extremes) insult, the cell transitions from a stable state to an unstable state and then to catastrophic failure of the cell. Once thermal runaway begins, it will propagate (spread, domino effect) to the adjacent battery cells. It may only take seconds for this dangerous event to take place.
  - Usually, a “pop” or rupture sound is heard preceding Thermal Runaway with pressurized white gas (flammable/toxic gases) venting moments before ignition.
  - Water may not prevent a battery from entering thermal runaway. If it penetrates the battery case, water may provide a cooling effect on the adjacent battery cells. This cooling may reduce propagation to other cells.
  - Dry Chemical is ineffective for any type of lithium-ion-related extinguishment



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Assistant Chief, Emergency Operations

**Robert Logan**  
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New Safety Tailboards, Messages, Feedback, Suggestions and/or Reporting to the OHSC - [SDFDHEALTH&SAFETY@SANDIEGO.GOV](mailto:SDFDHEALTH&SAFETY@SANDIEGO.GOV)

“Promoting Safe and Healthy Lives”





# San Diego Fire-Rescue Department Health & Safety Office Tailboard Safety

- *Flammable and Toxic Gases:*
  - Lithium-Ion batteries in thermal runaway produce many different gases. These gases combine to form a flammable, explosive, and toxic atmosphere. Toxicity and flammability levels vary depending on specific battery technology and manufacturer.
- *Unexpected Reignition:*
  - Lithium-Ion Batteries are known to unexpectedly re-ignite (with no warning) minutes, hours, or even days after all visible fire has been extinguished. Reignition is a common occurrence and should be expected.
- *Explosive force.* As noted in several incidents across the nation, lithium-ion batteries have ruptured and ignited with such force that walls were blown down, resulting in structural damage and extensive fire spread.

## **Safety Resources**

- [FSRI: Science of Fire and Explosion Hazards from Lithium-Ion Batteries](#) (course)
- [FSRI: Fire Service Considerations with Lithium-Ion Battery ESS](#) (course)
- [USFA: Battery Fires: Before, During, and After the Incidents](#) (webinar)
- [Tactical Considerations: Battery Energy Storage Systems](#) (worksheet)
- [Tactical Considerations: Battery Electric Vehicles](#) (worksheet)
- [Tactical Considerations: Micro Mobility Devices](#) (worksheet)
- [SDFD Public Safety Awareness: Lithium-Ion Safety](#) (video)