Lithium-Ion Battery Fires

Introduction

- Lithium-ion technology is expanding rapidly.
- Found in automobiles, storage systems, consumer products (phones, scooters, bicycles, tools).
- Increasing frequency of battery-related incidents in San Francisco.
- Presents new hazards for firefighters and the public.
- Training Bulletin 24-01 Lithium Ion Battery Awareness

Key Hazards (1 of 2)

- Toxic Atmosphere: Release of hydrogen fluoride, phosphorus pentafluoride, phosphyl fluoride.
- Severe respiratory and systemic health risks.
- High Heat Release: Fires reach up to 3,000°F.

Key Hazards (2 of 2)

- Unique Combustion Properties: Lithium can burn without oxygen.
- Explosion Potential: Hydrogen gas buildup creates explosion hazard, especially in confined spaces.
- Thermal Runaway: Rapid, uncontrollable chemical reaction.
- May occur seconds to days after damage.
- Reignition possible up to 21 days post-incident.

Safety Considerations

- Toxic gases released within 2–3 seconds of failure.
- Inhalation hazard often exceeds fire hazard.
- Explosion potential is a primary concern.
- Department Policy:
- - Firefighters shall not operate in immediate hazard area without:
- • Positive-pressure respiratory protection
- • Full structural PPE

Evolving Technology

- Lithium-ion batteries are constantly evolving.
- Hazards and failure mechanisms remain under study.
- SFFD is:
- - Monitoring research
- - Collaborating with peer agencies
- - Updating best practices and training

Closing

- Lithium-ion fires are a growing public safety challenge.
- Require adapted tactics, training, and resources.