

Lithium-Ion Battery Incidents in Recycling

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Agenda

- Brief overview of Lithium-Ion batteries and hazards
- Present real-world Li-Ion incidents in transportation and recycling facilities.
- Discuss prevention strategies.
- Discuss response best practices for when incidents occur.

Lithium-Ion Battery Overview



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Where LIB's Are Found



- Consumer electronics
- Vapes/e-cigs
- Power tool batteries
 - Use/abuse
 - Tik Tok
- E-bike/Scooter packs
- Embedded batteries in everyday items
 - Phones, toothbrushes, etc

Why MRFs and Haulers Encounter Failures

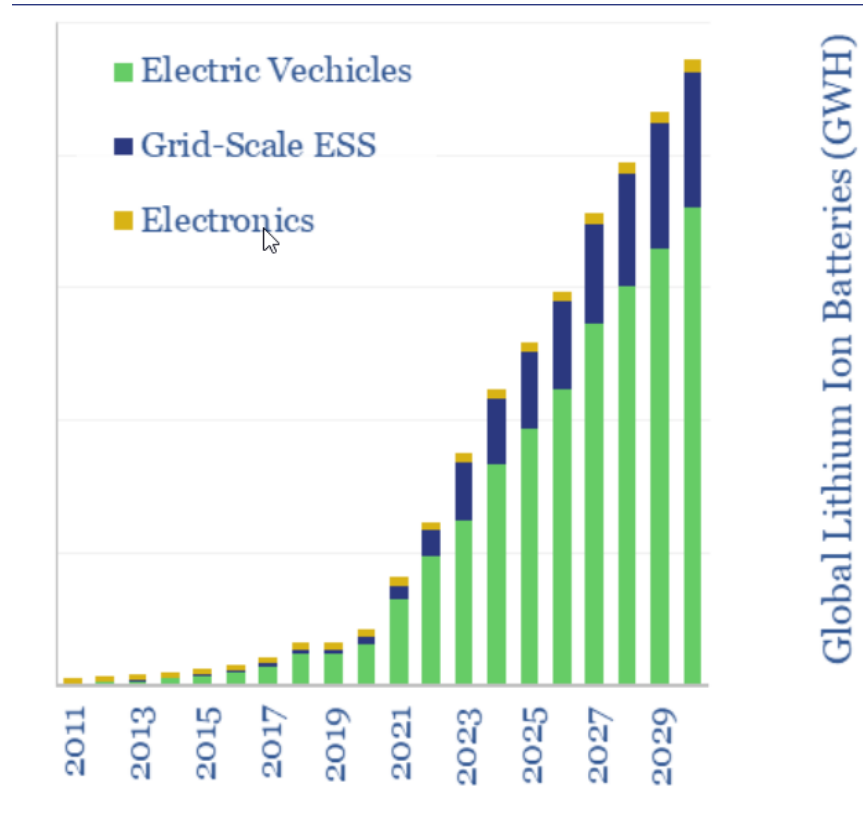
- - Crushing forces
- Puncture from sorting equipment
- Heat buildup under load
- Unrecognized embedded batteries



Hazard Mechanism

- Internal short
 - Heat production
 - Venting & gas release
 - Ignition
- Thermal propagation in loads of recyclables

Current Trends & Statistics



System Wide Risk: From Home Pickup to MRF

- Lack of public knowledge in terms of recycling practices
- Batteries entering curbside recycling
- Increased challenges for haulers, transfer stations, and MRFs



Observed Incident Trends



- Increased mid-route truck fires
- Increased sorting-line fires
- Small battery device causing disproportionate damage

Impacts

- Facility shutdowns
- Truck loss or emergency dumps
- Safety risks to workers and responders



Case Studies

Fredericktown LIB Fire

- Facility operated as a Critical Minerals Recovery Facility.
- Accepted batteries from various sources:
 - Consumer drop-offs
 - Bulk industrial contracts
 - Municipal collection centers

Fredericktown LIB Fire

- Morning of October 3rd, 2024
- 911 lines blew up with reports of a large explosion felt miles away
- One worker killed, several other injured.
- At time of arrival, facility was well involved.
- FD applied water but noticed they were making little to no progress.

Fredericktown LIB Fire

- Transitioned to defensive mode & protecting exposures.
 - Due to water reacting with materials in the pile causing additional smaller explosions.
- Roads were closed, schools and homes evacuated due to smoke plume.
 - Others on the outskirts of plume were told to shelter in place.



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MoDNR Investigation Revealed:

- The cause was found to be multiple issues that all worked together to create a waterfall effect.
 - Improperly stored or damaged LIB
 - Stored without adequate Thermal Protection
 - Lack of chemistry segregation
- There was no:
 - Uniform labeling
 - Discharge verification
 - Size organization
 - Compatible chemistry
 - Or state of charge readings.

MoDNR Investigation Cont

- Facility lacked basic screening tools such as infrared thermal cameras, voltage meters, or designated isolation areas for “suspect” units
- Batteries were allowed to be stored in bulk and not segregated by things such as size, chemistry, and state of charge (SOC)
- Facility lacked smoke particulate detectors or HF gas sensors to indicate early stages of fire.
- Water used for suppression efforts
- Zoning issues:
 - Allowed to operate near farmland and residential areas
- Local emergency services
 - Poor LIB training/polices

GFL – Dafter Twp

- March 27th, 2026
- Dafter Fire Department dispatched for a commercial structure fire.
- Responded with two engines, one tanker, and brush truck.
- Arrived to find smoke coming from the building.
- Staff states that a large volume of trash, a compactor, and semi-trailer were actively burning.

GFL – Dafter Twp

- Mutual aid requested bringing additional two tankers and ladder truck from surrounding areas.
 - EMS also requested for standby
- Trailer was pulled out of the building and dumped in parking lot to deal with the contents that were burning.
- Upon investigation of the scene, a LIB powered E-scooter was found and believed to be the source of ignition.



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GFL – Dafter Twp – Rd 2

- June 4th, 2026
- Dispatched back to GFL for another fire in the facility.
- Trailer was removed from building prior to FD arrival.
- FD assisted in extinguishing the fire.
- Mutual aid was again requested due to water supply issues
 - Received 1 additional tanker and command officer from Sault FD
- Investigation revealed a discarded LIB power drill set which is believed to be the source of ignition.

Dafter ESS 2026-06-04 09:53:17



Hauler Incidents



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Strategies to Prevent Future Incidents

Public Prevention

- Proper disposal education
 - Place in plastic bag
 - Taping over terminals
 - Guidance on swollen, punctured, or leaking batteries
- Retailer & Municipality drop-off points
- Challenges with vapes & small-format batteries
- Approx 15% of Americans correctly understand LIBs cannot be placed in standard curbside trash or recycling bins



Prevention - Haulers



- Driver awareness training
- Pre-Trip checks & load monitoring
- Safe dump locations
- Recognition or early warning signs

Prevention – Facilities

- Presort program improvements
- Identification of battery containing devices
- Isolation bins for suspicious items
- Facility changes after real incidents



Best Practices for Responding to Incidents



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For Haulers

- What drivers should do if smoke/fire is detected
- Communication protocols
- Emergency dump principals
- When to call fire/hazmat
- Work with local responders to pre-plan
- Tips learned from actual cases

For Facilities

- Recognizing early signs (smoke, odor, popping sounds)
- Staff response protocols
- Activation of suppression system
- Evacuation & Isolation procedures
- Coordination & training with local responders

For Responders

- Understanding battery-driven fire behavior in MRF environments
- Hazards: re-ignition, off-gassing, confined spaces
- Preferred extinguishing agents
- Hot load Management
- Post-incident monitoring

Summary & Takeaways

- Li-Ion batteries create real hazards during transport and processing
- Incidents are increasing system-wide
- Prevention & response rely on training, awareness and coordination
- Small format batteries cause a majority of incidents
- Practical steps exist for haulers, facilities, and responders

Q&A

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