



Fleet Forward:
Future-Proofing Airport Operations Vehicles
FIRE SAFETY

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General Information

Lithium-ion Battery Fires:

- High concentrations of metals are released during lithium-ion thermal runaway event: Lithium, nickel, cobalt, manganese and copper are.
- Other highly toxic gases: *Hydrogen Fluoride*, Hydrogen Chloride, Hydrogen Cyanide, Phosphoryl Fluoride, Carbon Monoxide, Sulfur Dioxide, and Methane
- A typical fire will burn around 1,000°F (538°C) vs a lithium-ion fire which will burn between 1,500°F and 2,500°F (815°C – 1,371°C)



General Information



Challenges with EV Fires

Strategies and Tactics:

- The Lithium-ion battery fire debates is ongoing.
- Strategies and tactics are constantly changing.
- Suppression vs Control
 - Free Burning
 - Protect Exposures
 - Protect People



Challenges with EV Fires

Tools:

- Blanket.



Challenges with EV Fires

Tools:

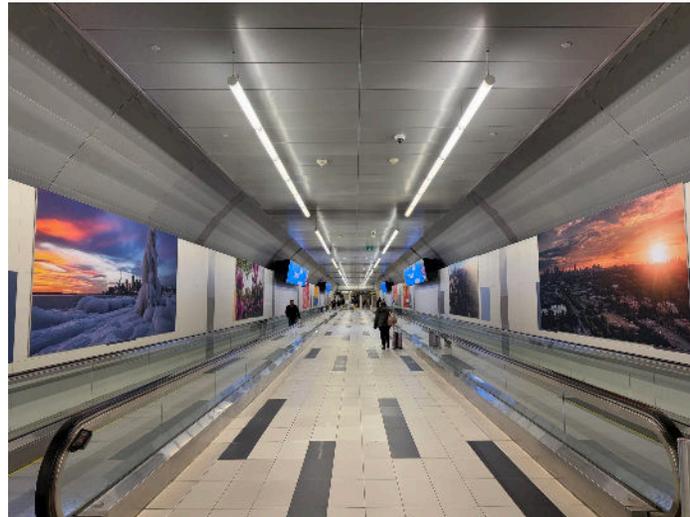
- Blanket.
- Specialized nozzles.
- Encapsulating agent.
- UL & NFPA are working on a Class “L” Standard



Prevention

Rules implemented at CYTZ

- No e-Bikes or Scooters in elevators and tunnel.
- Charging is done outdoors.
- No storage of e-bikes and scooters indoors.
- Protect the Ferry at all cost.



New ARFF Vehicles

Hybrid vs Full Electric vs Diesel

- Hybrid – the best of both worlds.
 - Faster vehicle
 - No emission while driving
 - Diesel backup
 - Cost
- Full Electric
 - Cost
 - Less maintenance
 - No emissions driving and pumping
 - How long can it operate on a single charge



New ARFF Vehicles

Hybrid vs Full Electric vs Diesel

- Hybrid – the best of both worlds.
 - Faster vehicle
 - No emission while driving
 - Diesel backup
 - Less maintenance
- Charging Infrastructure and speed.
- No TC regulations on electric ARFF vehicle.
- How will they handle Canadian winters?
- How long will your tires last?



Adapting to the Future

- Transport Canada requires better understanding and regulations.
 - How will the requirement for extinguishing agent change with electric planes
- More research is needed.
- What happens to the vehicle if you need to replace the battery?
- EVs cannot be utilized for Runway Friction Test



In Closing

- EV Fire Safety is an ever-changing landscape – Be patient and adaptable.
- Your EV response protocols should match those of your local Fire Department.
- Protect your people, equipment, and operations.
- Considering an Electric or Hybrid ARFF Vehicle?
 - Do your research, and
 - Conduct a risk assessment.