

# **Lithium Battery**

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# The Demand for Lithium Batteries

- The global market for lithium-ion batteries is expected to double to \$22.5 billion in 2016 from \$11.7 billion in 2012. Driven by the demand for consumer goods and automobile.



*Source : Mountain View, Calif.-based market research firm Frost & Sullivan.*

# Why are Lithium Batteries Regulated in Transportation?

- Can be dangerous if not packaged and handled properly while in transportation
- Risks include short circuits, overheating or fire
- Fires involving lithium batteries are difficult to extinguish

# In the NEWS

- July 2016, the U.S. Consumer Product Safety Commission recalled half a million hoverboards due to safety hazards.



- This September Samsung announced a world wide recall of its Galaxy Note 7 smart phones after some issue concerning the phone batteries



# Cause of Battery Failure

Failures of these battery or cells can occur for a number of reasons :

- Poor battery pack design
- Poor protection electronics design or manufacture
- Poor charger/system design or manufacture resulting in Overcharging of battery
- External abuse of cells

# Action by Regulator



## Decision taken by ICAO Council effective 01<sup>st</sup> April, 2016

- All Lithium ion battery banned from passenger aircraft



- State of Charge of not more than 30 percent for Lithium ion battery for carriage



- Strong rigid outer packaging required for air transport.

# What is the Industry doing

- Outreach and Education on Lithium Battery Transport Regulations ( IATA Lithium battery workshops , Dangerous Goods Working Group, Training )
- Industry guidance documents on shipping lithium batteries  
<http://www.iata.org/whatwedo/cargo/dgr/Documents/lithium-battery-guidance-document-2016-en.pdf>
- Operators to conduct Risk assessment

# Challenges face by the Industry

- Non-compliant shippers
- Enforcement by national authorities
  - <http://www.mirror.co.uk/news/technology-science/technology/amazon-prosecuted-transporting-dangerous-lithium-ion-5942721>
- US regulatory system versus the rest of the world



# E-commerce & Lithium batteries

- Shippers must get it right the first time
- Shippers of dangerous goods to provide evidence of their competency
- Training to Frontline staff

# E-commerce & Lithium batteries

- [https://www.ups.com/content/us/en/resources/ship/packaging/guidelines/batteries.html?WT.mc\\_id=VAN701573](https://www.ups.com/content/us/en/resources/ship/packaging/guidelines/batteries.html?WT.mc_id=VAN701573)

The screenshot shows a web browser window displaying the UPS website. The browser's address bar shows the URL: [https://www.ups.com/content/us/en/resources/ship/packaging/guidelines/batteries.html?WT.mc\\_id=VAN701573](https://www.ups.com/content/us/en/resources/ship/packaging/guidelines/batteries.html?WT.mc_id=VAN701573). The website header includes the UPS logo, the text "United States", and navigation links for "New User", "Log-In", "Changing Languages", and "Contact Us". Below the header is a navigation menu with tabs for "My UPS", "Shipping", "Tracking", "Freight", "Locations", "Support", and "UPS Solutions". The main content area is titled "Shipping Batteries or Devices with Batteries" and features a sidebar with a "Support" menu. The main text includes a section titled "Important: New Lithium Battery Regulations for 2016" with sub-sections for "International Regulations for 2016" and "Passenger Aircraft Ban for Lithium Ion Batteries". A "Next Steps" section provides additional links for shipping lithium batteries.

**Support**

- [Help Center](#)
- [Getting Started](#)
- [Shipping](#)
  - > [Shipping with UPS](#)
  - > [Import/Export](#)
  - > [Packaging and Supplies](#)
  - > [UPS Guide for Shipping Ground and Air Hazardous Materials](#)
  - > [How to Use This Guide](#)
  - > [49 CFR and UPS](#)
  - > [IATA and UPS](#)
  - > [Hazardous Materials Service Definition](#)
  - > [UPS Standard Dangerous Goods Service between the U.S. and Canada](#)
  - > [Shipper's](#)

**United States** | [New User](#) | [Log-In](#) | [Changing Languages](#) | [Contact Us](#)

[My UPS](#) | [Shipping](#) | [Tracking](#) | [Freight](#) | [Locations](#) | [Support](#) | [UPS Solutions](#)

## Shipping Batteries or Devices with Batteries

- ♦ [Important: New Lithium Battery Regulations for 2016](#)
- ♦ [Types of Batteries](#)
- ♦ [Lithium Battery Documents for Retail](#)

### Important: New Lithium Battery Regulations for 2016

**International Regulations for 2016:** The international regulations applicable to air shipments of lithium batteries have changed. Compliance with the new regulations is **mandatory** effective **April 1, 2016**.

The international regulations applicable to air shipments of lithium batteries have changed. The International Civil Aviation Organization (ICAO) Council has approved amendments in relation to the lithium battery provisions in the ICAO Technical Instructions. These amendments include:

- ♦ **Passenger Aircraft Ban for Lithium Ion Batteries:** All shipments

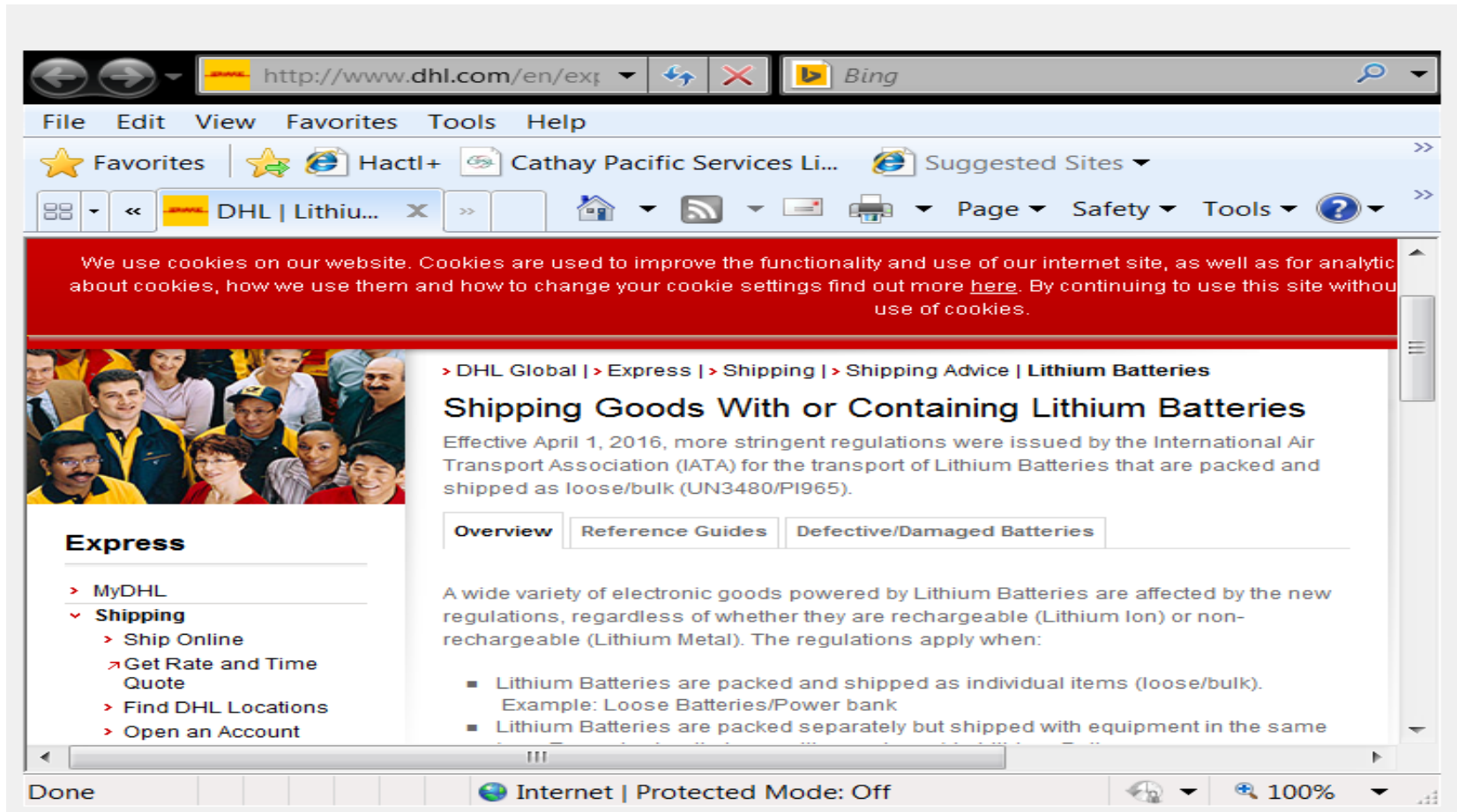
**Next Steps**

Many batteries, such as lithium metal or lithium ion, require special shipping considerations.

- [Learn How To Ship and Pack Many Battery Types](#)
- [Learn How to Apply for Lithium Metal Battery Shipper F Approval](#)
- [View the U.S. Lithium Battery](#)

# E-commerce & Lithium batteries

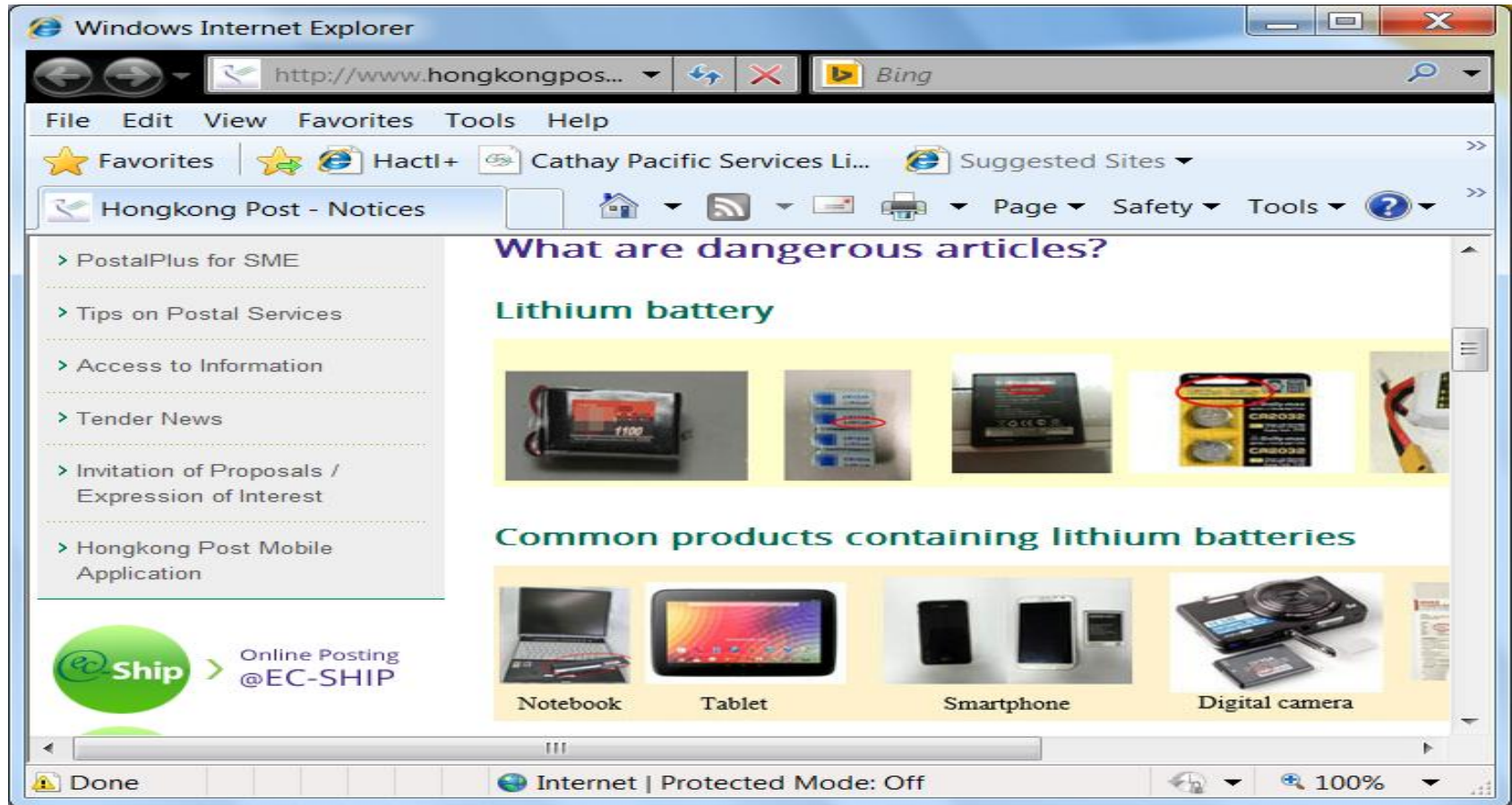
- [http://www.dhl.com/en/express/shipping/shipping\\_advice/lithium\\_batteries.html](http://www.dhl.com/en/express/shipping/shipping_advice/lithium_batteries.html)



The screenshot shows a web browser window displaying the DHL website. The address bar shows the URL: [http://www.dhl.com/en/express/shipping/shipping\\_advice/lithium\\_batteries.html](http://www.dhl.com/en/express/shipping/shipping_advice/lithium_batteries.html). The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The Favorites bar shows several sites, including Hactl+ and Cathay Pacific Services. The main content area features a red banner with a cookie notice. Below the banner, the page title is "Shipping Goods With or Containing Lithium Batteries". The breadcrumb trail reads: > DHL Global | > Express | > Shipping | > Shipping Advice | Lithium Batteries. The main heading is "Shipping Goods With or Containing Lithium Batteries". The text below the heading states: "Effective April 1, 2016, more stringent regulations were issued by the International Air Transport Association (IATA) for the transport of Lithium Batteries that are packed and shipped as loose/bulk (UN3480/P1965)." There are three tabs: "Overview" (selected), "Reference Guides", and "Defective/Damaged Batteries". The main text under "Overview" reads: "A wide variety of electronic goods powered by Lithium Batteries are affected by the new regulations, regardless of whether they are rechargeable (Lithium Ion) or non-rechargeable (Lithium Metal). The regulations apply when:" followed by a list of two items: "Lithium Batteries are packed and shipped as individual items (loose/bulk). Example: Loose Batteries/Power bank" and "Lithium Batteries are packed separately but shipped with equipment in the same". On the left side, there is a navigation menu under the heading "Express" with options: "MyDHL", "Shipping" (expanded), "Ship Online", "Get Rate and Time Quote", "Find DHL Locations", and "Open an Account". The browser's status bar at the bottom shows "Done", "Internet | Protected Mode: Off", and "100%".

# E-commerce & Lithium batteries

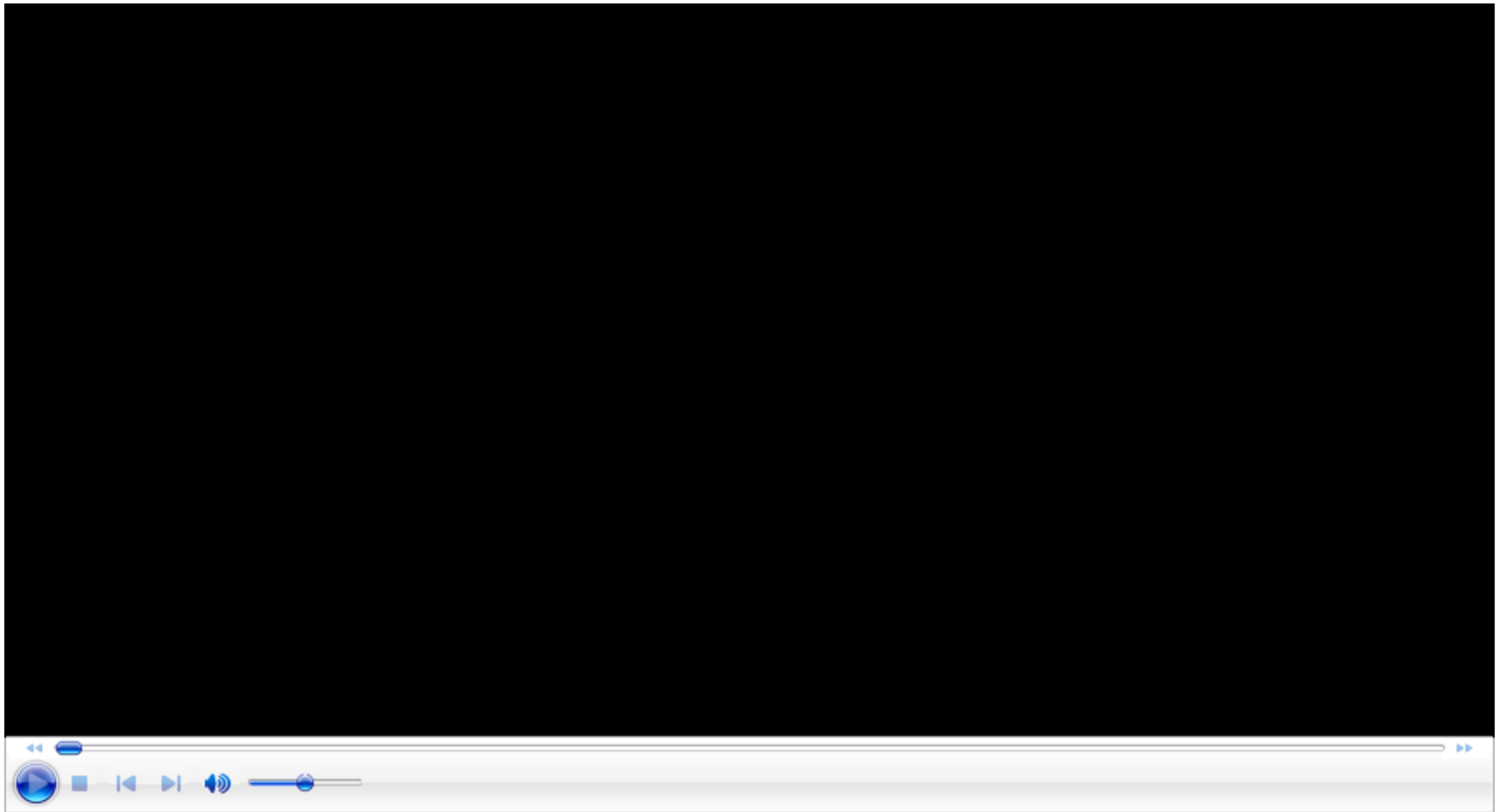
- [http://www.hongkongpost.hk/en/about\\_us/whats\\_new/notices/index\\_id\\_106.html](http://www.hongkongpost.hk/en/about_us/whats_new/notices/index_id_106.html)



# Fire Containment Covers for pallets (FCC)

- Prevent fire spreading to next pallet/container
- Provide containment of the fire for a period of time.
- Built to withstand temperatures up to 900°C .

# Lithium ion and metal batteries on fire under Fire Containment Cover (FCC)



# Fire Resistant Containers (FRC).

- Tests with lithium ion cells have resulted in explosions due to gas build-up.
- May prevent Halon 1301 from penetrating into the container when used in a Class C compartment
- Airlines are encouraged to conduct safety risk assessments.

# 5000 Lithium-ion Batteries in a Fire Resistant Container (FRC) with an Internal Fire Suppression System



*Fire suppression system installed on ceiling of FRC*

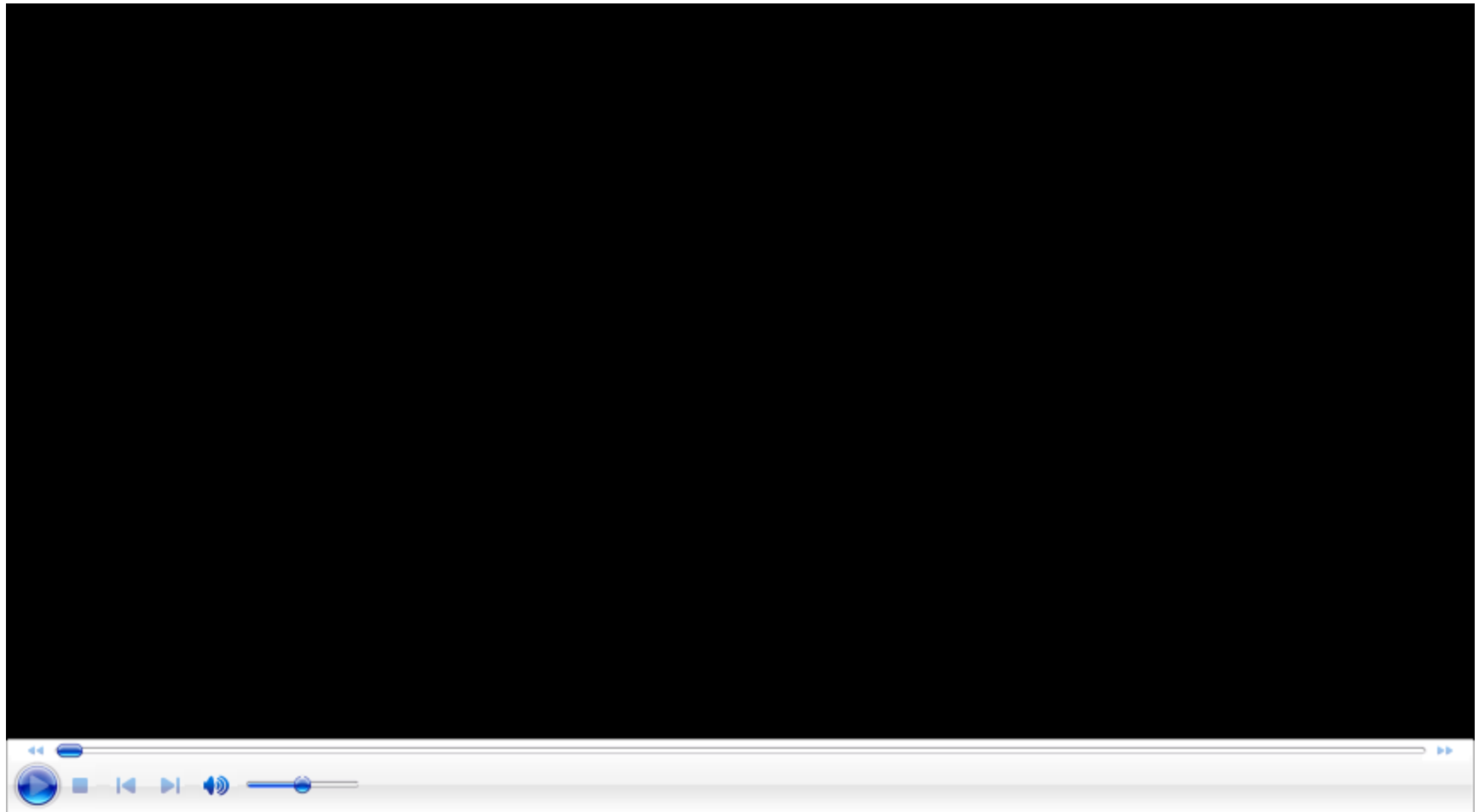


*Remaining free space inside FRC loaded with cardboard boxes filled with shredded paper.*

**Source : FAA**



# Ignition of Flammable Gases Vented from Batteries in Thermal Runaway



# The Way Forward Together

- No man is an Island.
- To achieve Safety we need to adopt the multi-layered approach :
  - Proper QMS to prevent the possibility of a battery failure.
  - Should an accident occur to minimize the impact.



**Thank you**