Cargo Safety Updates

Presented to: International Aircraft Fire Protection Forum

By: Dhaval Dadia

Date: June 13, 2023

Federal Aviation Administration

Cargo Safety Executive Committee

Purpose: One FAA approach to mitigate cargo safety risks

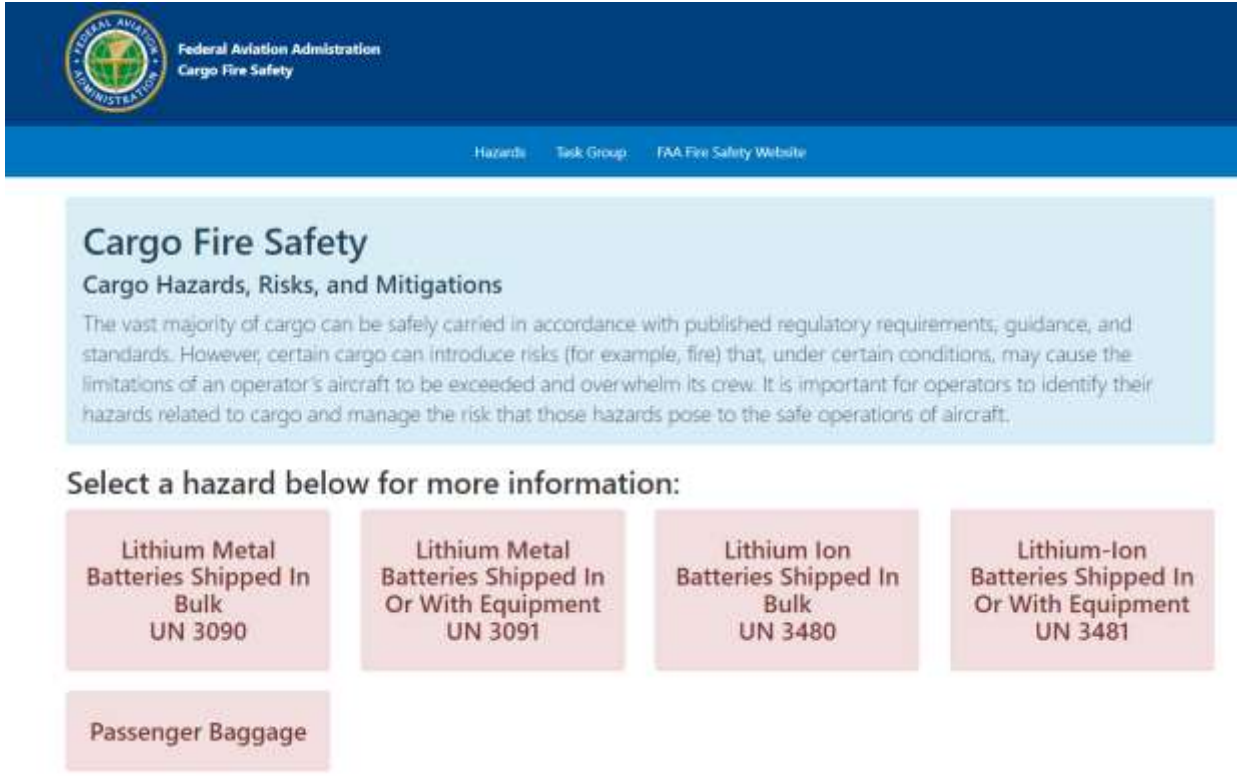
Activities:

- Cargo Safety Risk Management (SRM)
- FAA SRM Team: Safety Risk Assessment (SRA) on U.S. Mail
- Active devices in inaccessible cargo compartments
- CAST Safety Enhancements (SE) for cargo
  - SE 224 – Hazmat fires – Enhanced Fire Detection Systems
  - SE 225 – Hazmat fires – Containment and Suppression
- Dry Ice as Cargo
- Class-E Cargo Compartments
- Battery Fire Standard for containers and covers
- Thermal Runaway Events (PED fires in the cabin)

Cargo Safety Risk Management

- Fire Safety Branch developed a cargo safety website supporting AC 120-121
- https://www.fire.tc.faa.gov/cargosafety
- Website contains information related to the hazards, operational risks, and mitigation strategies related to transport of batteries shipped in aircraft in multiple ways

Cargo Safety Risk Management



Cargo Safety Risk Management

Task Group Meeting

June 15, 2023

9:00 AM – 9:45 AM

COMET MR

Dry Ice as Cargo

- Work Completed
  - Studying the effect of multiple variables on sublimation rate
  - Studying hazards from transporting dry ice to ground crew
- Current Work
  - Identifying conditions necessary for gaseous CO_2 to infiltrate the occupied areas in a cargo aircraft

Design Improvements in Class-E Cargo Compartments

Objective: Initiate a conversation and develop a research plan to enhance fire management systems in class-E cargo compartments

- Smoke evacuation
  - Improved Cabin Smoke Control
  - Aircraft Cabin Smoke Control with Converging-Diverging Nozzles
- Early smoke detection
- Fire hardening cargo liner
- Fire suppression systems for the main deck

Design Improvements in Class-E Cargo Compartments

Task Group Meeting

June 15, 2023

9:45 AM – 10:15 AM

COMET MR

Battery Fire Standard

- SAE standards for Fire Resistant Containers (FRCs) and Fire Containment Covers (FCCs) require a class-A fire load (paper, wood, cloth, etc.)
- Industry would like to develop a test to determine the capability of a FRC or FCC to suppress battery fires
  - SAE-AGE2 is working towards incorporating multiple levels of battery fires
    - Battery fire load representing a small undeclared shipment of batteries
    - Approximately 5000 lithium-ion battery fire load.

HFC Replacement

- Kigali amendment to the Montreal Protocol requires a significant reduction in the use of HFCs
- Industry moving to use refrigerants with hydrocarbons
- Current flammability standards for refrigerants
  - ASHRAE Standard 34
  - UL 60335-2-40

HFC Replacement

Task Group Meeting

June 15, 2023

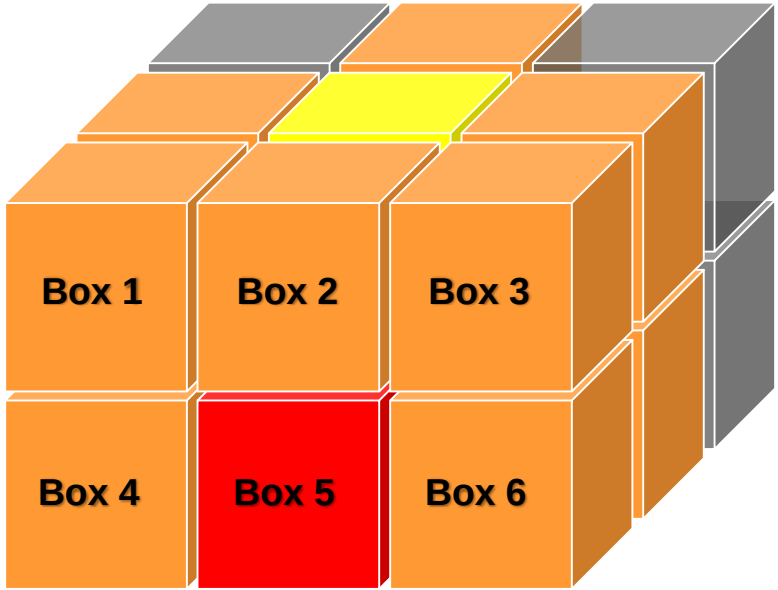
11:00 AM – 12:00 PM

COMET MR

Cargo Halon Replacement MPS

- Addition of “Multiple Fuel Fire Scenario” to the Minimum Performance Standard (MPS)
- Changes to the scenario since last presented
  - Change in locations of the flammable fluid
  - Change to the heater location on the initiating cell
  - Change to number of 180 minute test (x2)
    - Change in location of battery and flammable liquid
    - Addition of an ignition source 60 minutes into the test

Cargo Halon Replacement MPS



178 cardboard boxes (bulk scenario)

18 of which are configured as shown

Ignition Box: 15 lithium-ion cells, 500mL ethanol, 2.5lbs of shredded paper

2 – 1Gal. Jugs filled with ½Gal. Ethanol

4 – Jug Configuration

15 lithium ion cells & 2.5 lbs of shredded paper

5 @ 30% SOC, 5 @ 60% SOC, 5 @ 100% SOC

2.5 lbs. of shredded paper

30 Minute Test

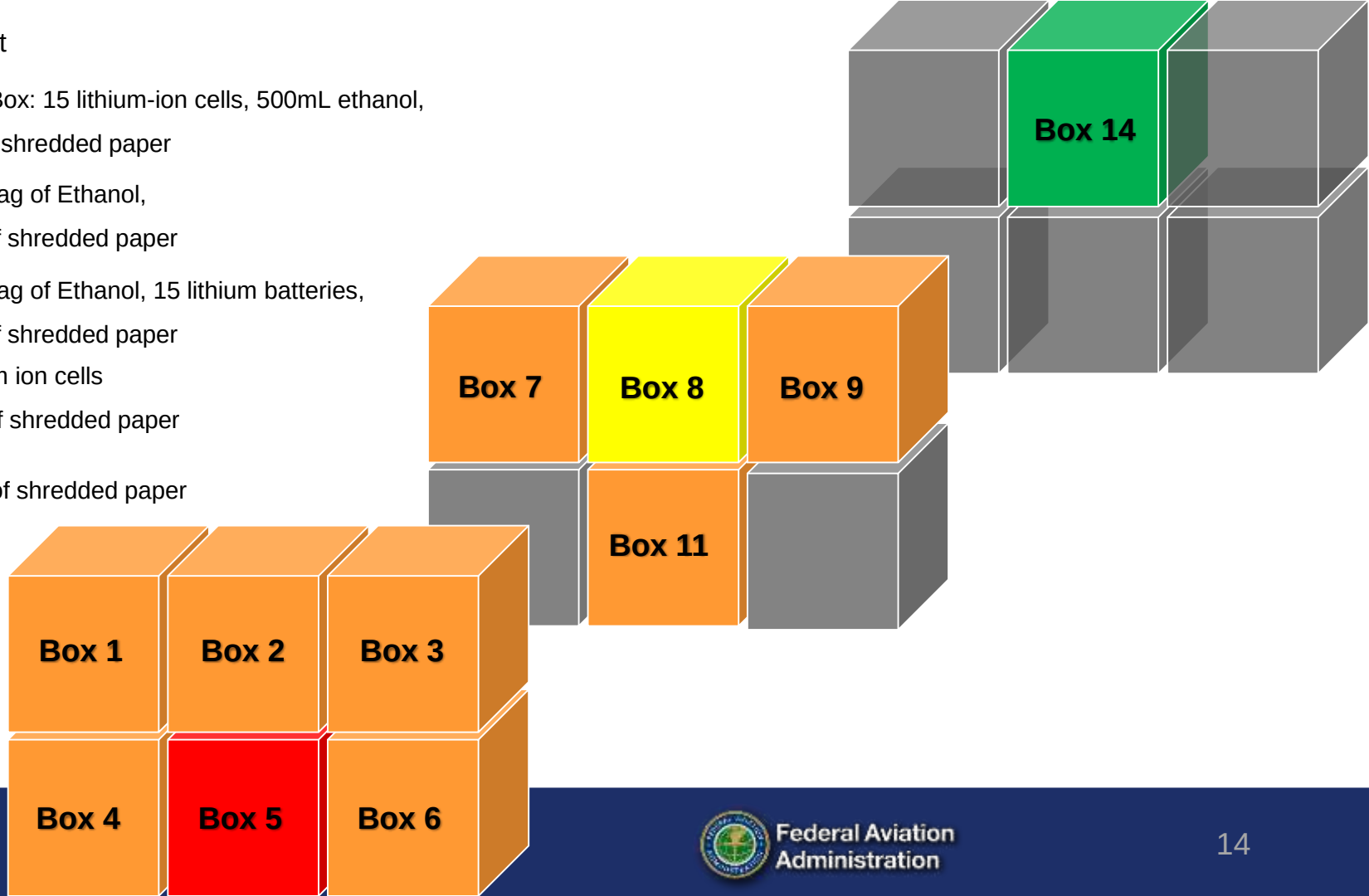
Ignition Box: 15 lithium-ion cells, 500mL ethanol, 2.5lbs of shredded paper

½ Gal. Bag of Ethanol, 2.5 lbs of shredded paper

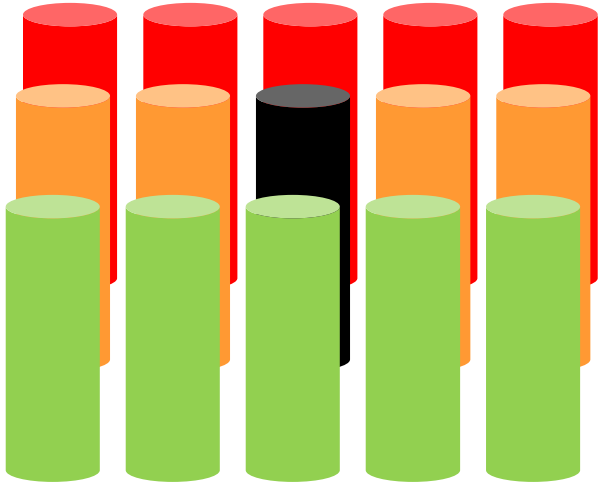
½ Gal. Bag of Ethanol, 15 lithium batteries, 2.5 lbs of shredded paper

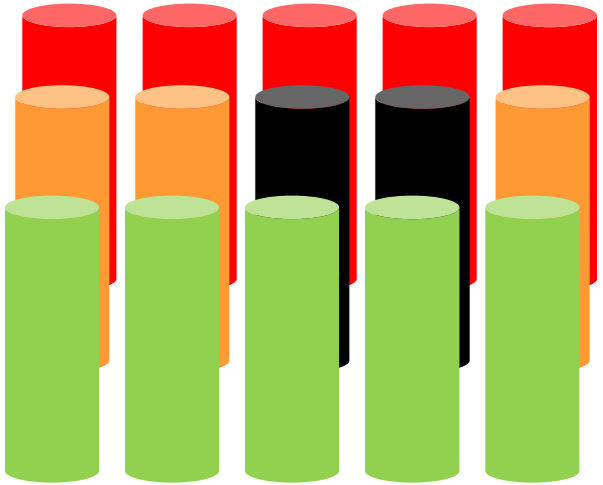
15 lithium ion cells 2.5 lbs of shredded paper

2.5 lbs. of shredded paper



Cargo Halon Replacement MPS





100% SOC

60% SOC

30% SOC

60% SOC with Film Heater

Heat 2 cells to ensure propagation

Cargo Halon Replacement MPS

Task Group Meeting

June 16, 2023

9:00 AM – 3:00 PM

AIRBUS MR

Contact

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