



ICAO Training on Lithium Batteries

September 2016

Abu Dhabi, U.A.E.



Overview

- Background on Lithium Batteries in Air Transport
- International Standards for the Transport of Dangerous Goods (DG) – Annex 18



Overview

- Dangerous Goods Air Carrier Inspections
- Classification of Dangerous Goods
- Dangerous Goods List: Lithium Batteries
- Dangerous Goods Special Provisions:
Lithium Batteries



Overview

- Lithium Battery Packing Instructions
- Dangerous Goods Transport Documentation
- Dangerous Goods Markings
- Dangerous Goods Labels



Overview

- Passenger Exceptions for Lithium Batteries
- Lithium Battery Air Transport Regulation Compliance Concerns



BACKGROUND



Background

- In 1999, a pallet of lithium metal cells in cargo was transported on a passenger flight from Japan to Los Angeles, CA, US. The pallet of batteries was mishandled after it was off-loaded from the aircraft. Several hours later it caught on fire and burned to the ground. The fire department was not able to put out the fire.



Background

- This incident was the beginning of major concerns with the hazards of transporting lithium metal and lithium ion batteries in air transportation
- Based on that incident, the US FAA started conducting fire safety testing on lithium metal batteries



Background

- It has been over 16 years since that incident, and the international standards and air transport community has been working to better understand the hazards with lithium batteries as well as mitigate the risks with this evolving technology.



Background

- The current regulations on lithium batteries that will be covered in this training are an evolution and reaction to the information gathered in incidents and laboratory testing that has been obtained in the previous 16 years.



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INTERNATIONAL STANDARDS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS



International Standards for the Safe Transport of Dangerous Goods

Annex 18:

- Requires that dangerous goods are carried in accordance with the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air (the “Technical Instructions”).



International Standards for the Safe Transport of Dangerous Goods

Annex 18:

- States are required by Annex 18 to have inspection and enforcement procedures to ensure that dangerous goods are being carried in compliance with the requirements.



International Standards for the Safe Transport of Dangerous Goods

Annex 18:

- To ensure DG does not put an aircraft and its occupants at risk there are international Standards which each State, under the provisions of the Chicago Convention, are required to introduce into national legislation. This system ensures governmental control over the carriage of dangerous goods by air and gives world-wide harmonization of safety standards.



DANGEROUS GOODS AIR CARRIER INSPECTIONS



Dangerous Goods Air Carrier Inspections

- Air Carrier Manuals specific to Dangerous Goods
 - Comprehensive & Current Manuals are critical to the safe transport of DG at an air carrier
 - Review of the manuals can be a very good first step in the preparation of a dangerous goods inspection of an air carrier



Dangerous Goods Air Carrier Inspections

- Air Carrier Training Programmes specific to Dangerous Goods
 - Comprehensive and Current Training Programmes is a key building block to success in an air carrier's promotion of both safety & compliance
 - Review of the Training Programmes and auditing training courses specific to DG is a great way to evaluate the air carriers implementation of their approved training.



Dangerous Goods Air Carrier Inspections

- Dangerous Goods Acceptance – Passenger Service
 - Clear training and policy in manuals helps keep this potentially complicated subject clear to air carrier staff always short on time
 - With the many dangerous items that passengers bring in their baggage, an air carrier must constantly reinforce the rules



Dangerous Goods Air Carrier Inspections

- **Dangerous Goods Acceptance – Cargo**
 - When an air carrier chooses to transport DG, the acceptance process is the most critical aspect in ensuring safe transport
 - An air carrier needs current and proper training, policies, & support for its acceptance staff to be successful



Dangerous Goods Air Carrier Inspections

- Dangerous Goods Storage – Warehouse
 - Even though the storage of DG in the warehouse does not seem that critical, mishandling a DG package could lead to a delay in an incident while it is on board the aircraft in flight
 - Following proper handling and storage procedures in regards to DG in the warehouse is important



Dangerous Goods Air Carrier Inspections

- Dangerous Goods Loading – Pallets, ULDs, carts/dollies, Aircraft
 - The proper segregation of DG on a pallet, cart/dolly, and an aircraft is very important to the safety while in-flight
 - The proper acceptance and transport of Cargo Aircraft Only (CAO) DG shipments is a critical function to ensure safety is maintained



Dangerous Goods Air Carrier Inspections

- Air Carrier Dangerous Goods Training Records
 - An air carriers DG Training Records for all its staff should be organized, accurate, & current.
 - Problems with DG training records could indicate an air carriers lack of support of the implementation of their entire Training Programme



Dangerous Goods Air Carrier Inspections

- Air Carrier Offering of Dangerous Goods Company Material (COMAT)
 - For both air carriers that transport and air carriers that do not transport DG, preparing DG COMAT for transport is an important safety function
 - The air carrier should have detailed policies and procedures on the storage, processing and transport of DG COMAT



Dangerous Goods Air Carrier Inspections

- Air Carrier Compliance with the Provision of Information
 - Policy, procedures, and training is the key to successful completion of the Part 7, Chapter 4 requirements
 - Items required: Info to Pilot-in-Command, Emergency Response Info, reporting of DG accidents, incidents, undeclared, & occurrences, and the retention of documents



LITHIUM BATTERY AIR TRANSPORT REGULATION COMPLIANCE CONCERNS



Lithium Battery Air Transport Regulation Compliance Concerns

- Packages misdeclared as Section II (PI-965 or 968) when they are really Section IA or Section IB lithium battery packages
- It is difficult or impossible to determine if a shipment is misdeclared by the outside of the package alone



Lithium Battery Air Transport Regulation Compliance Concerns

- Two (2) types of packages are most common:
 - 1) A package with lithium ion cells larger than 20 Wh, lithium ion batteries larger than 100 Wh, lithium metal cells larger than 1 g, or lithium metal batteries larger than 2 g



Incident Example

- Package was labeled as PI-965 Section II.
(The phone number was present on the label, but has been obscured)





Incident Example

- Package contained 2 batteries with a Watt-hour rating of 462.5 Wh each (well over the 100 Wh limit of Section II).





Lithium Battery Air Transport Regulation Compliance Concerns

- Two (2) types of packages are most common:
 - 2) A package with more than 8 lithium ion cells equal to or less than 20 Wh, more than 2 lithium ion batteries equal to or less than 100 Wh, more than 8 lithium metal cells equal to or less than 1 g, or more than 2 lithium metal batteries equal to or less than 2 g



Lithium Battery Air Transport Regulation Compliance Concerns

- Falsification of the required proof that the lithium cell or battery is in conformance with requirements of each test in the UN Manual of Tests and Criteria, Part III, Section 38.3
- Difficult to determine unless a full test report is obtained on the cell or battery



Lithium Metal Batteries on Passenger Aircraft

- Lithium Metal batteries – PROHIBITED
- Lithium metal batteries packed with equipment – 5 kg (11 pounds) net weight or less or primary lithium batteries or cells and the package contains no more than the number of lithium batteries or cells necessary to power the piece of equipment
- Lithium metal batteries contained in equipment - 5 kg (11 pounds) net weight or less or primary lithium batteries or cells and the package contains no more than the number of lithium batteries or cells necessary to power the piece of equipment



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CAA CHALLENGES IN THE OVERSIGHT OF DG AIR TRANSPORT



CAA Challenges in the Oversight of DG Air Transport



REFERENCES

- **IATA Battery Guidance Document**

<https://www.iata.org/whatwedo/cargo/dgr/Documents/lithium-battery-guidance-document-2015-en.pdf>

- **DHL Lithium Battery Interactive Tool**

http://www.dhl.com/content/dam/downloads/g0/express/shipping/lithium_batteries/lithium_batteries_interactive_tool.pdf



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QUESTIONS?