



# HAZMAT AWARENESS: A PARTS WARS STORY

Recognizing Hazmats in Aircraft Parts

2018 ASA Annual Conference

Workshop L

# Today's Scope: Recognizing Hazmat

- What is Hazmat?
- Visual Cues
  - Markings
  - Labels
  - Dangerous Goods Declarations
- The Nine Hazard Classes
  - Nature of Each Hazard Class
  - Aircraft Parts Within Each Hazard Class
  - Specific Labels

# Hazmat Training is Required by Law

- Required under U.S. law
  - PHMSA regulations
  - FAA air carrier and repair station regulations
- Required under international law (ICAO standards)
- Minimum standards for recurrent training:
  - Every three years for hazmat employees subject to U.S. law
  - ICAO recommends once every two years
    - This has been adopted as a legal standard by many countries
  - Air carrier hazmat employees are required to be trained every two years in the U.S.

# Who Must Get Trained

- Hazardous materials employees:
  - Someone who directly affects hazardous material transportation safety
  - Someone who loads, unloads, or handles hazardous material during employment
  - Shippers including packers and shipping agents
- Includes anyone who makes ANY safety decision that could affect safe transportation of hazardous materials

# Required Training Subjects

- General hazmat awareness and familiarity with the general provisions of the regulations
- Able to recognize and identify hazardous materials
- Specific regulatory requirements applicable to functions performed by the employee
- Modal-specific training
- Security awareness and threat recognition
- Emergency response, self-protection measures and accident avoidance methods and procedures

# This is NOT *That* Training

- We do not have time today to address all of the required topics
- BUT this class should make you sufficiently familiar with hazardous materials to be able to identify them, and bring them to the attention of a properly trained person in your facility
- At the end of this workshop we will talk about how to get full training

# What is “Hazmat”?

- Hazardous Materials [U.S. term]
- Dangerous Goods [non-U.S. term]

# DOT 49 C.F.R. § 171.8

## Hazardous Material Definition

- [A] substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of subchapter C of this chapter.
- A similar description exists under ICAO standards (also found in the IATA Dangerous Goods Regulations)



# Summary of Hazardous Materials

- *Determined by DOT to pose an unreasonable risk to health, safety, and property*
- Includes:
  - Materials listed in the 172.101 tables
  - Materials that meet the defining criteria for hazard classes and divisions in part 173 of the regs (we will talk about those defining criteria, soon)
  - Special categories
    - hazardous substances
    - hazardous wastes
    - marine pollutants
    - elevated temperature materials

# Identifying Hazmat: Markings and Labels

- Hazardous materials communications designed to convey certain information about the contents of a package



Label

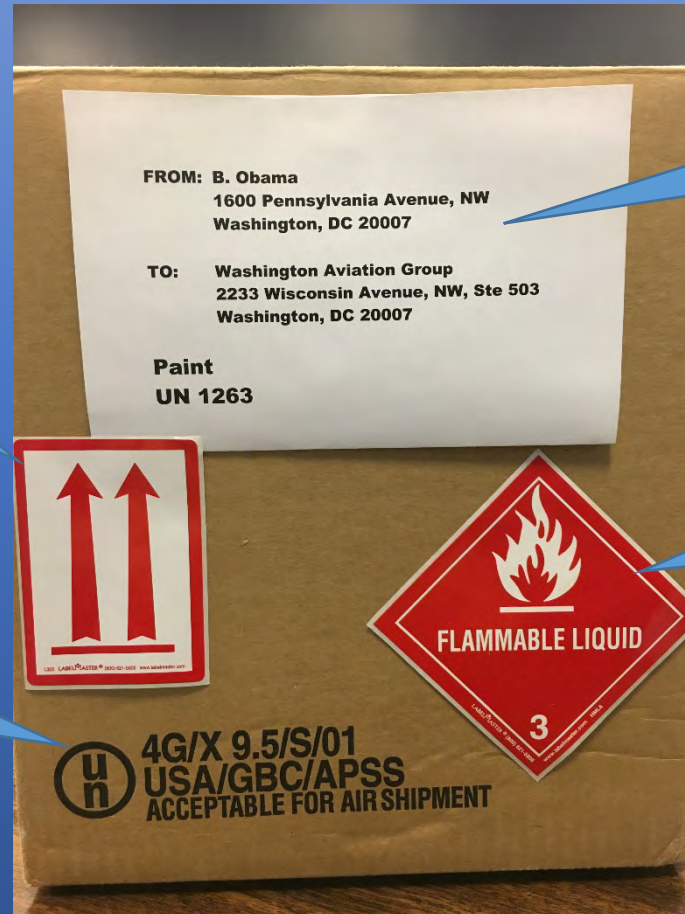
Mark

Acetone  
UN 1090  
From: Joe Shipper  
1707 H Street, NW  
Washington, DC 20006  
To: Recipient, Inc.  
734 15<sup>th</sup> Street, NW  
Washington, DC 20006

# Identifying Hazmat: Features on the Package

Orientation Arrows  
(not hazmat-unique!)

Packaging Specification



Marking

Label

# Identifying Hazmat: Dangerous Goods Declarations

**SHIPPER'S DECLARATION FOR DANGEROUS GOODS**

Shipper: \_\_\_\_\_

Air Waybill No. \_\_\_\_\_

Page  of  Pages

Shipper's Reference Number (optional) \_\_\_\_\_

Consignee: \_\_\_\_\_

*Two completed and signed copies of this Declaration must be handed to the operator.*

**TRANSPORT DETAILS**

This shipment is within the limitations prescribed for: (delete non-applicable)

PASSENGER AND CARGO AIRCRAFT  CARGO AIRCRAFT ONLY

Airport of Departure: \_\_\_\_\_

Airport of Destination: \_\_\_\_\_

Shipment type: (delete non-applicable)  NON-HAZARDOUS  HAZARDOUS

**NATURE AND QUANTITY OF DANGEROUS GOODS**

| UN or ID No. | Proper Shipping Name | Class or Division (Subsidiary Risk) | Packing Group | Quantity and type of packing | Packing Inst. | Authorization |
|--------------|----------------------|-------------------------------------|---------------|------------------------------|---------------|---------------|
|              |                      |                                     |               |                              |               |               |

Additional Handling Information: \_\_\_\_\_

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.

Name/Title of Signatory: \_\_\_\_\_

Place and Date: \_\_\_\_\_

Signature (see warning above): \_\_\_\_\_

**SHIPPER'S DECLARATION FOR DANGEROUS GOODS**

Shipper: \_\_\_\_\_

Air Waybill No. \_\_\_\_\_

Page  of  Pages

Shipper's Reference Number (optional) \_\_\_\_\_

Consignee: \_\_\_\_\_

*Two completed and signed copies of this Declaration must be handed to the operator.*

**TRANSPORT DETAILS**

This shipment is within the limitations prescribed for: (delete non-applicable)

PASSENGER AND CARGO AIRCRAFT  CARGO AIRCRAFT ONLY

Airport of Departure: \_\_\_\_\_

Airport of Destination: \_\_\_\_\_

Shipment type: (delete non-applicable)  NON-HAZARDOUS  HAZARDOUS

**NATURE AND QUANTITY OF DANGEROUS GOODS**

# Identifying Hazmat: Undeclared Shipments

- Understand the nature of each of the nine hazard classes
- Understand what sorts of aircraft parts fall into each hazard class

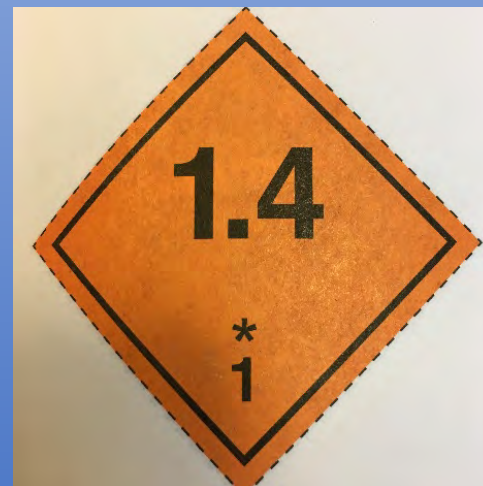


# Hazardous Materials Divided Into Nine Classes

- |                        |  |
|------------------------|--|
| Class 1: (6 Divisions) | - <u>Explosives</u>                    |
| Class 2: (3 Divisions) | - <u>Gases</u>                         |
| Class 3: (No Division) | - <u>Flammable Liquids</u>             |
| Class 4: (3 Divisions) | - <u>Flammable Solids</u>              |
| Class 5: (2 Divisions) | - <u>Oxidizers</u>                     |
| Class 6: (2 Divisions) | - <u>Toxic / Poisonous Materials</u>   |
| Class 7: (No Division) | - <u>Radioactive</u>                   |
| Class 8: (No Division) | - <u>Corrosives</u>                    |
| Class 9: (No Division) | - <u>Miscellaneous Dangerous Goods</u> |

# Class 1: Explosives

- Explosive substances
- Explosive articles
- Each explosive will have a compatibility group letter
  - Generally, do not ship different compatibility groups, together
  - Exception: compatibility groups C/D/E can be shipped together
  - Exception: compatibility group S can be shipped with other groups



# Explosives



- Including explosive squibs and actuators
- E.g., in the fire suppression systems
- Most aviation explosives are division 1.4 or 1.6

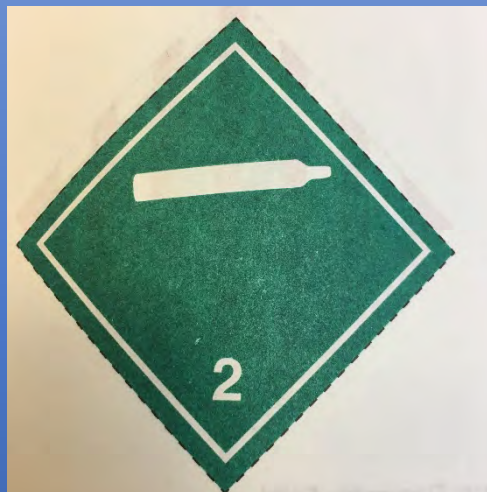


# Class 2: Gasses

- At 50° C (122° F) is has a vapor pressure of 300 kPa  
or
- Is completely gaseous at 20° C (68° F) at a standard pressure of 101.3 kPa
- *NOTE: a non-flammable gas that is below vapor pressure standards is not hazmat UNLESS it has a subsidiary hazard (e.g. O<sub>2</sub>)*

# Gasses

- 2.1 Flammable gas
- 2.2 Nonflammable gas
- 2.3 Toxic gas



# Nonflammable gas

- The pressure is a hazard
- This can include gasses found in the aviation industry, like:
  - Carbon Dioxide
  - Nitrogen
  - Oxygen

# Class 3: Flammable Liquids

- The international threshold for Class 3 is defined to include those liquids with a flash point of 60° C (140° F) or less
- U.S. standard for Class 3 is liquids with a flash point of 60.5° C (141° F) or less



# Flammable Liquids

- Fuel
- Paint
- Solvents
- Cleaners



# Class 4: Flammable Solids

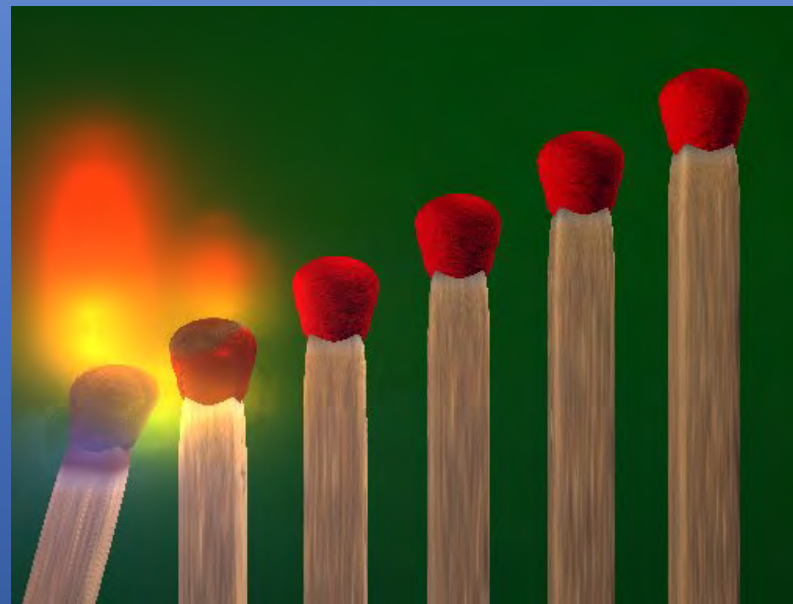
- 4.1 – Flammable solids
  - Readily combustible solids and self-reactive substances
- 4.2 – Substances Liable to Spontaneous Combustion
  - Subject to heating under normal conditions or when in contact with air
- 4.3 – Dangerous when wet
  - Contact with water causes release of flammable gasses





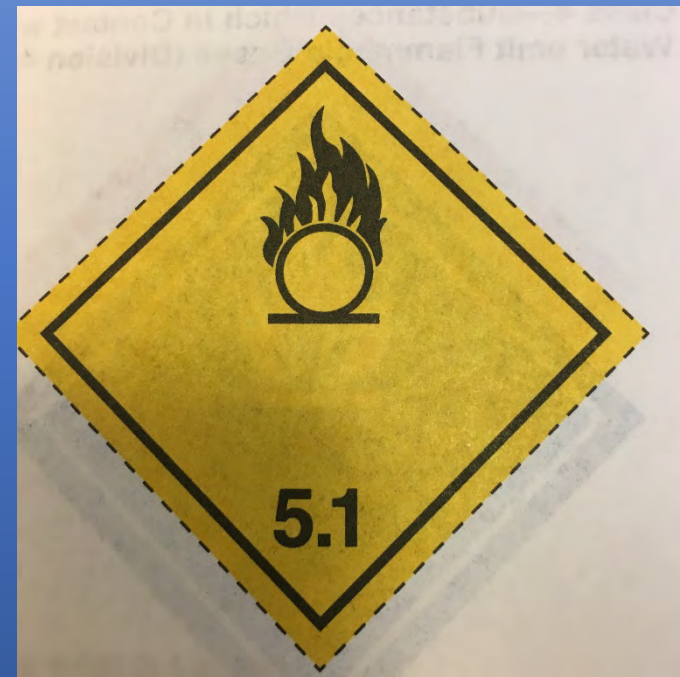
# Flammable Solids

- Matches are a good example of flammable solid
- Sodium batteries are now division 4.3



# Class 5: Oxidizers

- 5.1 – Oxidizing substances
- 5.2 – Organic peroxides





# Oxidizers

- Oxygen generators
  - Spent oxygen generators are dangerous goods, too (US distinction – spent generators are treated as class nine)
  - Be wary of passenger service units – they may contain oxygen generators!

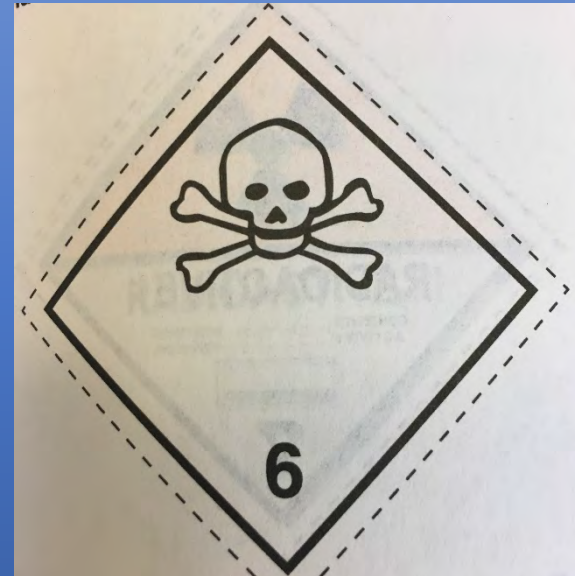


# Low-Pressure Oxygen Tanks

- Under the U.S. regulations, low-pressure oxygen tanks (below the standard for a 2.2 non-flammable gas) should be treated as hazardous materials because of the subsidiary hazard (oxidizer – division 5.1)
- But the U.S. government has published guidance that contradicts the regulations, and suggests that low-pressure oxygen tanks (below the standard for a 2.2 non-flammable gas) are no longer considered hazardous materials, despite the subsidiary hazard
  - If dealing in low-pressure oxygen tanks then you should assess all facts and consider existing guidance before deciding the right way to comply with the regulations

# Class 6: Toxics

- 6.1 – Toxic substances
- 6.2 – Infectious substances

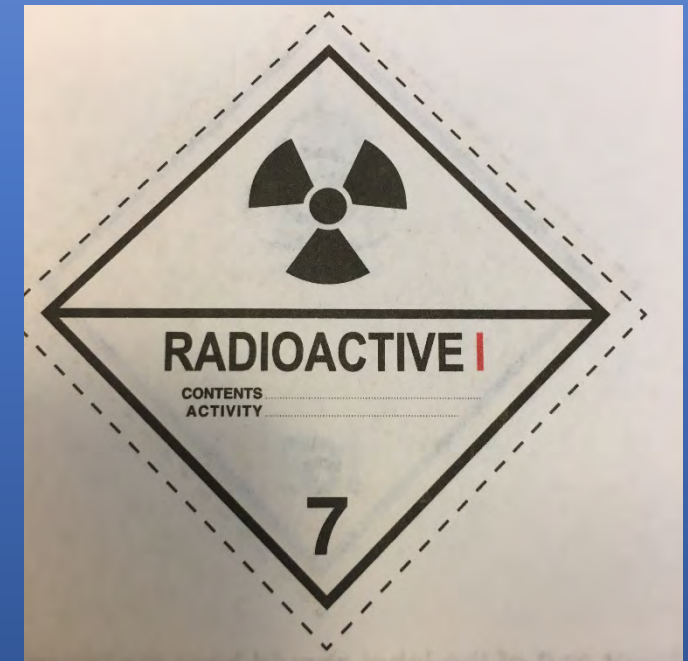


# Toxics

- Certain coatings (e.g. rust-inhibiting coatings containing strontium chromate)
- Certain greases
- Some chemical films and coatings, like older configurations of Alodine

# Class 7: Radioactives

- Anything that contains radionuclides where the activity concentration and total activity exceed certain values (found in chapter IATA 10)
- It is important to check the actual activity level!



# Radioactives

- Depleted uranium counterweights may be found in some control surfaces, particularly older ones
- Radium, used in older instrument dials



# 49 C.F.R. § 173.426: Exception for Articles Containing Depleted Uranium

A manufactured article in which the sole Class 7 (radioactive) material content is unirradiated depleted uranium, and its packaging, are excepted from the hazmat regulation requirements for specification packaging, labeling, marking (except for the UN identification number marking requirement), and if it is not a hazardous substance or hazardous waste, shipping papers and the requirements of this subpart if:

- (a) Each package meets the general design requirements of § 173.410;
- (b) The outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or other durable protective material;
- (c) The conditions specified in § 173.421 (b), (c) and (d) are met; and
  - E.g. The radiation level at any point on the external surface of the package does not exceed 0.005 mSv/h (0.5 mrem/h) and the outside of the inner packaging is marked "Radioactive"
- (d) The article is otherwise prepared for shipment as specified in § 173.422
  - Includes marking of UN #, training requirements, etc.

# Modern Radioactives on Aircraft

- Many articles with potentially radioactive isotopes (like fluorescent emergency signs) are manufactured to fall below regulated thresholds.
- Contact the manufacturer for more details about compliance!



# Class 8: Corrosives

- Materials that cause severe damage to living tissue (full thickness destruction of intact skin tissue after exposure)
- Materials that cause aluminum or steel corrosion



# Corrosives

- Batteries may be hazardous materials
- Many articles with batteries in them, like flight data recorders, must therefore be treated as hazmats



# Class 9: Miscellaneous Dangerous Goods

- Articles that present a hazard in transportation but that do not meet the requirements of another class, including:
  - Anesthetic, noxious or other similar materials that could prevent a flight crew member from correct performance of assigned duties
  - Elevated temperature materials, hazardous substances, hazardous wastes or marine pollutants



49 C.F.R. § 173.140

# New Characterization by IATA into 12 Categories *(2018 Change)*

- Aviation regulated liquid or solid
- Magnetized materials
- Elevated Temperature Substances
- Environmentally Hazardous Substances
- Genetically Modified Organisms
- Lithium Batteries
- Asbestos
- Capacitors
- Substances Evolving Flammable Vapors (certain plastics)
- Life Saving Appliances
- Things that Form Dioxins in Fires
- Other

# Class Nine Dangerous Goods Found in Aircraft

- Aircraft first aid kits
- Magnetized material
- Environmental hazards
- Life-saving appliances
- Parts with residual fuel
- Battery-powered equipment
- Engines
- Lithium batteries



# Forbidden Materials

- Listings in US HMT column 9A as ‘forbidden’
- Listings in DGR table 4.2 as ‘forbidden’
- Some materials are forbidden in passenger aircraft but not cargo aircraft, e.g.
  - motor fuel anti-knock mixture
  - Lithium metal batteries
- If an article is forbidden from transport by air under US law, but permitted under ICAO/IATA standards then it is **forbidden for transport by air**. The US law takes precedence, in the US!
  - Example: Aerosols, poison, Packing Group III

# Training Certificate to Ship Hazmat

- We offer a two day class – successful completion leads to certification under US Title 49 and ICAO/ITA standards
  - Class is open to all, but a discount for ASA members
  - Teaches you how to ship hazmat in compliance with the law
  - Live, online class. You take it from the comfort of your desk and phone, but we are live to answer your questions and guide you through the process
- Next class is September 19-20, 2018
  - Register before September 7, 2018 for the early registration discount!

# Questions?



Please feel free to ask questions



# Thank You

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