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Advancing  
Free Trade for Asia-Pacific  
Prosperity

# Air Cargo Focus: Special Cargo

## TPTWG45 – AEG, Agenda Item 5.3

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Presented by: United States

# Topics



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- Three Classifications of Cargo
- Concerns
- Actions/Findings
- Accomplishments
- Work In Progress
- Impact on Safety
- Resources

# Background



- **What is air cargo?**

ICAO Annex 9 and ICAO Doc 9284: cargo is any property carried on an aircraft other than mail and accompanied or mishandled baggage.

- **Why is it important? Facilitation of air commerce**

It allows objects of all shapes, sizes and weights to be shipped quickly around the world.

IATA indicates that the amount of goods that travel by air each day is more than \$18.6 billion USD.

ICAO and IATA project annual increases in air cargo shipments

# Three Classifications of Cargo



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## Bulk Cargo

- Individual pieces loaded and not restrained
  - (Lo-Lo = lift on–lift off)
- Aircraft structure provides necessary restraint for flight loads.
- Requires some loading skills.



# Three Classifications of Cargo



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## Unit Load Device (ULD)

- Rolled on — rolled off.  
(Ro-Ro)
- Grouped within a device.
- Restraint provided by system of locks restraining the device.
- Certain skills are needed, but restraint calculations not required



# Three Classifications of Cargo



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## Specialized cargo: Special procedures cargo and Dangerous Goods

- Requires advanced skills to determine how much restraint is needed based on calculations and unique methods defined in the airplane's weight & balance manuals.
- NOTE: Some airplanes do not have structural provisions for special cargo
- More common on freighter conversions.



# What is Special Cargo?



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Cargo that requires special handling and securing/restraining procedures within the limitations specified in the Airplane Flight Manual (AFM) / Weight and Balance Manual (WBM) approved by the type certificate / supplemental type certificate. Special cargo may be enclosed in an approved bulk compartment if the WBM has limitations supporting procedures for securing and restraining the special cargo.

# What is “Special Cargo”?



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**All of this  
is special  
cargo!**

Cargo placed on top of an airplane 463L pallet and restrained using straps instead of the required nets. The cargo is not a ULD.



# What is “Special Cargo”?



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**So is this.**

The cargo is not restrained by the cargo loading system on the Boeing 747.



# What is “Special Cargo”?



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**And this is  
special  
cargo.**

A car **strapped  
to a pallet** is not  
a certified ULD  
(no net).



# Special Procedures Cargo

## – Examples



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- Tall, rigid, sharp or piercing cargo
- Automobiles and other wheeled cargo
- Cargo that has rods, pipes, or beams
- Heavy machinery
- Items that could become projectiles
- Overweight, overhanging, or oversized items
- Live animals
- Perishable cargo
- Temperature-controlled unit load devices (ULDs) or active ULDs

# Dangerous Goods Cargo



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- ICAO Annex 18: Dangerous goods - is articles or substances which are capable of posing a risk to health, safety, property or the environment, and which are shown in the list of dangerous goods in the ICAO Technical Instructions (ICAO Doc 9284) or which are classified according to those instructions.
- Dangerous goods include items such as, but not all inclusive of:
  - Explosives and gases
  - Flammable liquids and solids
  - Toxic and infectious substances
  - Radioactive material
- This type of cargo requires handling and restraint procedures in accordance with the ICAO Technical Instructions and CAA regulatory requirements.

# What are our concerns?



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- **The accident rate of cargo operations is eight times that of airline operations; misloaded cargo has played a role in multiple, fatal accidents.**
- **Of these, accidents due to loss of control in-flight represent almost 43 percent of the fatalities in the year reported – and this number has increased from 33 percent in 2015.**
- **The 2017 ICAO Safety Report identified that 61.3% of all aircraft accidents in 2016 fell into three high-risk accident occurrence categories:**
  - Runway safety related events
  - Loss of control in-flight
  - Controlled flight into terrain

# U.S. Operator Accidents Related to Cargo



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- **1996** – May 11 – ValuJet Flight 592 – DC9, crashed in the Florida Everglades just after takeoff due to a fire in the cargo compartment caused by improperly stored cargo, killing all 110 people on board
- **1997** – August 7 – Fine Air Flight 101 – DC8, crashed on Miami International Airport just after takeoff due to improper lock down of cargo, killing 3 flight crew and 2 people on the ground
- **2013** – April 29 – National Airlines Flight 102 – Boeing 747-400CB, stalled and crashed just after takeoff from Bagram Airfield after the cargo broke loose, killing the seven crew

# Actions after ValuJet



- The ValuJet accident involved dangerous goods – in this case, oxygen generators. It focused additional effort within the FAA, its U.S. Department of Transportation modal partner, Pipeline and Hazardous Materials Safety Administration (PHMSA) and industry on dangerous goods transport.
- ICAO Annex 18 SARPs and related material were strengthened.
- Even today world focus tends to remain on transport of dangerous goods as opposed to other specialized air cargo:
  - ICAO Cargo Safety Subgroup (CSSG)

# ICAO Cargo Safety Subgroup



**Original tasking from the Air Navigation Commission (ANC):**

***“Introduce a requirement for Operators to conduct risk assessments on carriage of cargo.”***



**Necessary to address a gap in safety highlighted by the transport of large quantities of lithium batteries...**

In the case of an incident/accident, it may be possible for the cargo compartment capabilities to be overwhelmed by certain items being transported.

CSSG established in Nov 2016 as a sub group of the FLTOPS Panel, comprising members from three ICAO Panels:

Flight Operations, Airworthiness, and Dangerous Goods.

**Target applicability date of 2020, with 2 elements to the ICAO SARPS (Standards and Recommended Practices)**

1. Amendment to Annex 6, Operation of Aircraft, with key mandates as follows:
  - a) A specific safety risk assessment to be conducted by Operators
  - b) A responsibility on O.E.M.s to ensure necessary technical information is provided to Operators
2. New guidance manual (Document) published in support of the Annex 6 amendment

# Actions on Special Cargo Accidents



## 1997 Fine Air Flt 101 accident:

FAA established the Cargo Strategic Planning Group (CSPG) - joint Flight Standards and Aircraft Certification team to study air cargo safety issues and develop recommendations for a comprehensive solution:

- Identify issues related to the transportation of cargo by air
- Respond to safety recommendations made by the NTSB
- CSPG did a one time review/clean-up
- Developed FAA Advisory Circular (AC) 120-85, Air Cargo Operations. First issued June 20, 2005. provides recommendations for:
  - air carriers for managing air carrier cargo operations.
  - what items should be included in an air carrier cargo operations system..
  - Original Equipment Manufacturers (OEM), Parts Manufacturer Approval (PMA) holders, Technical Standard Order (TSO) holders, and airplane owners and operators who manufacture their own parts.
  - the certification of unit load devices (ULD), restraints, and airplane cargo handling systems.

# Actions on Special Cargo

## 2013 National Airlines Flight 102 Accident

- FAA formed a Cargo Focus Team (CFT) to:
- determine whether systemic problems exist in handling special air cargo loads;
- take appropriate action; and
- address forthcoming NTSB recommendations
- Established via FAA Notice 8900.262



# Actions on Special Cargo



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## 2013 National Airlines Flight 102 accident

NTSB final report on from  
B-747 accident published  
July 29, 2015

**“Fine Air all over again”  
(NTSB)**

Six safety  
recommendations

- **A-15-13:** Revise guidance to specify use of (FAA)-approved data for methods for restraining special cargo. Remove FAA accepted data.
- **A-15-14:** Create a loadmaster certification.
- **A-15-15:** Review manuals to ensure cargo operations is based on relevant FAA-approved data (special emphasis on special cargo restraint).
- **A-15-16:** Define responsibilities for principal inspectors for the loading, restraint, and documentation.
- **A-15-17:** Initial and recurrent training for principal inspectors
- **A-15-18:** Surveillance deferrals.

# Findings from Operator WBCP Review



CFT reviewed all FAA Air Operator Certificate Holder Weight and Balance Programs. Typical findings were:

- Source documents:
  - Programs are not derived from approved sources (TC/STC WBMs)
  - Operating limitations exceeded
  - WBMs - Not provided or cannot be found
- Cargo Restraint Methods:
  - Use of procedures not defined by TC/STC WBM
  - Computer W+B Systems – not validated, not controlled

# Typical Findings from Ramp Inspections



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All outboard tie downs are in passenger seat tracks. Problems occur if:

- strength of track is too low;
- spacing of tie-downs is incorrect.



# Ongoing and Emerging Issues



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Military 463L pallets

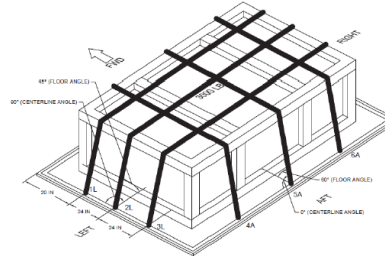
## Straps to pallets

**Improper Use of  
Wrap Straps**

Boeing 737-200  
STC

Missing contact on face  
of cargo in forward, aft,  
and side loads.

SAMPLE CARGO STRAPPING PLAN 1  
This section provides a sample strapping plan and calculations required to restrain a box weighing  
3000 LBS (1360 KG) to an 88" x 128" pallet using six cargo straps spaced more than 20 IN apart.

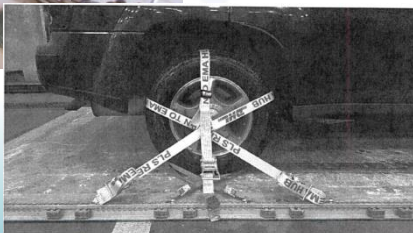


Horse containers



Pallet  
couplers

Chains to  
pallets



Vehicle wheel bonnets



Vehicle transports



Animal pens

# Ongoing and Emerging Issues



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# Accomplishments



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## **Safety Alerts for Operators (SAFO)/Information for Operators (InFO)**

- SAFO 13005 Part 121 Air Carriers Transporting Heavy Vehicle Special Cargo Loads
- SAFO 13008 Part 121 Air Carriers Performing Special Cargo Loads Operations
- SAFO 17003 Non-compliance with a Manufacturer's Federal Aviation Administration (FAA) – approved Aircraft Weight and Balance Manual (WBM)
- SAFO 17004 Cargo Retention Methods Using Pallets Straps
- InFO 13012 FAA-approved Boeing 747 Sample Weight and Balance Manual (WBM)
- InFO 15010 Approved WBM Supplements for Certain Boeing Aircraft

## **Notices:**

- N8900.317 Accepting/Revising Manuals for All Parts 91K, 121, 125, and 135 Certificate Holders/Operators Transporting Cargo on Transport Category Aircraft
- N8900.262 Review of Weight and Balance Control Programs Including Special Cargo Operations

## **Advisory Circular (AC) 120-85A, Air Cargo Operations**

- Dated 6/25/15 – revision expected August 2018
- Provides guidance for developing a cargo operations program as part of the weight and balance control program (WBCPs).

# In Progress: Evaluations and Notices



- CFT is using Safety Assurance System (SAS) Certificate Holder Evaluation Process (CHEP) to evaluate WBPs
- Notice on delineation of WBP responsibilities:
  - Guidance to principal inspectors on certificate management responsibilities
  - Overview of the responsibilities between the ASI disciplines and aircraft certification. (NTSB A-15-16)
  - Display the overlap, and specific areas of discipline responsibility in relation to elements of weight and balance, airplane limitations, and cargo operations

# In Progress: WBCP Reviews



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- **29 Cargo operations /45 Passenger operations)**
  - 33 of 75 initial reviews complete (97% of Cargo Operators/11% Pax Operators)
- **29 of 75 reviews complete/closed (76% of Cargo Operators/16% Pax Operators**
- **Passenger Operations and Cargo**
  - 57% of cargo between the Americas and Europe is on a passenger airplane (Boeing)
  - U.S. passenger service flew 7.95 billion revenue ton miles of cargo last year. (FAA)

# In Progress: OpSpecs



## E096 – Title Change

- Revised from Weight and Balance Control Procedures to Aircraft Weighing

## A002 Definitions

- Updated with definitions for Bulk cargo, Special Cargo and Approved ULD Cargo

## Cargo OpSpecs

- A196 – Bulk and Approved ULDs
- A396 – 300 series OpSpec for Special Cargo

# In Progress: Loadmaster – Industry Tasking



## Aviation Rulemaking Advisory Committee (ARAC)

- Accepted the task on March 23, 2016.
- ARAC Loadmaster Certification Working Group (LCWG) has been formed
- Report & recommendations due for FAA review and acceptance no later than 24 months from the publication date of this notice in the Federal Register, FY2018.

# In Progress: FAA Air Cargo Course



## Two part course:

- FAA27100256 – Air Cargo Operations web-based training (WBT)
  - FAA21000056 – Air Cargo Operations Practical Applications Workshop (PAW) that will be held at the FAA Academy in Oklahoma City, OK.
- First FAA Class to ASIs April 6, 2017
  - FAA will make these courses available for industry participation FY18.

Please direct all questions to Ms. Connie Stone at [connie.ctr.stone@faa.gov](mailto:connie.ctr.stone@faa.gov)

# Impact on Safety



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- CFT has enhanced safety through:
  - Reducing non-compliant practices through CFT reviews
  - Guidance:
    - AC 12-85A, SAFOs, InFOs
- Enhancing cargo knowledge within the FAA:
  - Outreach
  - Enhanced FAA cargo course
  - Custom cargo workshop for PIs
  - Interdependence with CMOs

# Impact on Safety



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- Working with industry partners to create expanded methods for cargo restraint.
  - Atlas, Boeing, Cargolux, GE, Kalitta, National, Rolls, UPS, and VRR
- Working with SAE and IATA for compliant cargo practices
- Consistency
  - Level playing field with U.S. carriers
  - Outreach to FCAAs

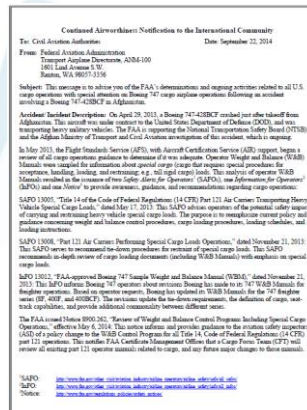
# International Outreach



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- **Began 2014** – Continued Airworthiness Notification to the International Community (CANIC) on intermodal containers

- **March 2017** Letter to CAAs Informing them of ramp inspection findings related to cargo



## New ICAO GSI Air Cargo Course, #18702 for CAA Inspectors –

- International version of internal FAA course for its own inspectors
- Validation in June 2018
- Expected delivery September 2018
- FAA training contact: 9-awa-aia-intl-training@faa.gov

# Resources - Cargo Focus Team



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- *Cargo Focus Team (CFT) exists as a permanent technical resource for cargo operations.*
- For cargo operations questions or suggestions contact CFT @ [9-NATL-Cargo-CFT@faa.gov](mailto:9-NATL-Cargo-CFT@faa.gov)

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