

Air Cargo Focus: Special Cargo

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By: Federal Aviation Administration (FAA)

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Federal Aviation Administration

Topics

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





Background

• What is air cargo?

- 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.
 - ICAO and IATA project annual increases in air cargo shipments



Three Classifications of Cargo

Bulk Cargo

- Individual pieces loaded and not restrained
 - (Lo-Lo = lift on—lift off)
- Aircraft structure provides necessary restraint for flight loads.







Three Classifications of Cargo

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

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 and balance manuals
- NOTE: Some airplanes do not have structural provisions for special cargo
- More common on freighter conversions







What is Special Cargo?

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"

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"

So is this.

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







What is "Special Cargo"

And this is special cargo.

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





Special Procedures Cargo – Examples

- 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 outsized items
- Live animals
- Perishable cargo
- Temperaturecontrolled unit load devices (ULDs) or active ULDs



Dangerous Goods Cargo

- ICAO Annex 18: Dangerous goods 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?

- 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 inflight 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



US Operator Accidents Related to Cargo

- 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 three flight crew and two 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, the 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 Flight 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

2013 National Airlines Flt 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.



Cargo on National Airlines Flt 102



One of two M-ATVs (secured by chains to its respective pallet) during loading onto the accident airplane via a side door aft of the left wing.

One of three Cougars (secured by chains to its respective double-pallet platform) during loading onto the accident airplane via a side door aft of the left wing.



Diagram of Special Cargo Load



The loaded positions of the two M-ATVs (blue) and three Cougars (yellow) with respect to select airplane body station (BS) locations.







- The cargo was not properly restrained.
- National Airlines' procedures in its cargo operations manual:
 - Omitted required, safety-critical restraint information from the airplane manufacturer (Boeing) and the manufacturer of the main deck cargo handling system (Telair, which held a supplemental type certificate [STC] for the system)
 - Contained incorrect and unsafe methods for restraining cargo that cannot be contained in ULDs.
 - Did not correctly specify which components in the cargo system were available for use as tie-down attach points,
 - Did not define individual tie-down allowable loads,
 - Did not describe the effect of measured strap angle on the capability of the attach fittings.









Air Cargo Focus:







Findings from Operator WBCP Review

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

- 1. Source documents
 - Programs are not derived from approved sources (TC/STC WBMs)
 - Operating limitations exceeded
 - WBMs Not provided or cannot be found
- 2. 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

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

Certification





Pallet couplers

Chains to pallets



Vehicle wheel bonnets

Straps to pallets

Wrap Straps

and side loads.

STC

Boeing 737-200



Operations



Horse containers



Animal pens

Vehicle transports



Federal Aviation Administration

Air Cargo Focus:

Ongoing and Emerging Issues





Air Cargo Focus:



Accomplishments

• Safety Alerts for Operators (SAFO)/Information for Operators (InFO)

- SAFO 13005 Part 121Air 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)
- SAFÓ 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 June 25, 2015 revision expected April 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: US - WBCP Reviews

- 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: US 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 Certified ULD Cargo

Cargo OpSpecs

- A196 Bulk and Certified ULDs
- A396 300 series OpSpecs for Special Cargo



In Progress: Loadmaster – Industry Tasking

Aviation Rulemaking Advisory Committee (ARAC)

- Task accepted on March 23, 2016
- ARAC Loadmaster Certification Working Group
 (LCWG) is formed
- Report and 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 for ASIs April 6, 2017
- FAA will make these courses available for industry participation FY18.

Please direct all questions to Ms. Connie Stone at <u>connie.ctr.stone@faa.gov</u>



Impact on Safety

- CFT has enhanced safety through:
 - Reducing non-compliant practices through CFT reviews
 - o Guidance:

- AC 120-85A, SAFOs, InFOs

- Enhancing cargo knowledge within the FAA:
 - o Outreach
 - Enhanced FAA cargo course
 - Custom cargo workshop for PIs
 - Interdependence with CMOs



Impact on Safety

• 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
 - o Level playing field with U.S. carriers
 - Outreach to FCAAs



International Outreach

- Began 2014 Continued Airworthiness Notification to the International Community (CANIC) AVS Safety Risk Assessment Report
- 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-intltraining@faa.gov



Resources - Cargo Focus Team

Cargo Focus Team (CFT) exists as a permanent technical resource for cargo operations.

Contact CFT at <u>9-NATL-Cargo-CFT@faa.gov</u> for cargo operations questions or suggestions.



Questions?



Air Cargo Focus:



Federal Aviation Administration