

The Need for Greater Standardization of Cargo Handling Procedures

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Introduction

Standardization is a
cornerstone of safety

Consistent action and reaction, based on use
of standard procedures, can be effectively
applied to improve the safety and the
efficiency of cargo handling.



Introduction

- The actions of many organizations must be carefully coordinated.
- Combinations of shippers, packages, containers, and aircraft are virtually limitless, and can change constantly, even within one airline.
- Variety of processes, methods, individuals and organizations, in combination with lack of consistency, increases level of risk.



Introduction

There are many risk areas in the handling of cargo

Problems in any step of the process can result in safety deficiencies, some of which may not be detected until an incident or accident occurs



Cargo versus Passenger Operation

Potential for cargo to be handled, loaded and documented incorrectly is greater for an all-cargo aircraft airline operation than for a passenger airline operation

This is due to a greater exposure to:

- various types & sizes of cargo,
- increased weights involved and
- different containers available



Proper Cargo Loading

One crucial factor is correct computation of the aircraft weight and balance.

- The “weight” portion is straightforward

It is important to know what each piece of cargo weighs in order to avoid exceeding a specified limit.



Proper Cargo Loading

One crucial factor is correct computation of the aircraft weight and balance.

- Significance of the “balance” or Center of Gravity (CG) portion is more subtle

If cargo is placed in the wrong location, the total weight obviously won't change, but the airplane operation may still have been dramatically impacted.



Improper Cargo Loading?



Errors

Potential for significant weight errors is greater for all-cargo aircraft than for passenger aircraft

- Passenger operations use actual cargo weight and a “standard” passenger weight to determine aircraft gross weight and CG.
- Cargo aircraft payloads are of every shape, size, and weight.



Errors

Potential for significant weight errors is greater for all-cargo aircraft than for passenger aircraft

- In passenger operations, if the number of people is significantly different than the actual count, that is easily discovered.
- For cargo aircraft, if the weight of a pallet is not correct the error is not as obvious.



Errors

Documentation provides opportunity for error

- Non standardized forms are used to identify:
 - Size,
 - Weight, and
 - Nature of container
- Data on these documents is entered manually and can result in:
 - Transposition of numbers,
 - Misidentification of containers, and
 - Logging of the wrong weight information



Actual Account Of Documentation Problems

- Report involves a 747-400 parked on the ramp
- The load sheet revealed a 9-ton discrepancy with the onboard aircraft weight and balance system.
- The following problems were encountered when attempting to reconcile the load sheet (L/S) with the main deck pallets:



Actual Account Of Documentation Problems

- 1) Some pallets were listed on the L/S using net weights.
- 2) Some were listed using gross weights.
- 3) Several had incorrect weights.
- 4) Several pallets had no tags at all.

[Airport x] load control advised us to use gross weights to reconcile the L/S. The [airport y] staff produced a telex from [airport z] Cargo advising us to use the net weight.



Weigh Scales

A weigh scale is the equipment used to determine the weight of the cargo and containers (ULD, pallet and other load devices).

- IATA has a recommended tolerance for scale accuracy of $\pm 1\%$.
- Some domestic and international carriers use the IATA tolerance while others use a different tolerance.



Weigh Scales

There is currently no FAA standardized or recommended tolerance. This is left to the scale manufacturer & operator

- ALPA advocates no more than $\pm 1\%$.

Calibration frequency of the scale is critical in maintaining its tolerance.

- Frequency must ensure the accuracy of the weight being measured.



Loading & Handling Of Cargo

Problem areas:

- Mishandling of cargo
- Damage to cargo, ULD, Pallet and Aircraft
- Damage to a package, container or pallet may not immediately be observable (e.g. a leaking container inside a larger container).



Loading & Handling Of Cargo



Actual Account Of Mishandling Cargo

NTSB investigated a fire that destroyed freight on an aircraft pallet. The following is taken from the narrative of the report.

- Pallet off loaded from inbound flight
- At 1120, a company equipment operator picked up a pallet loaded with lithium batteries from a dolly and tried to set it on the ground near the cargo facility. .



Actual Account Of Mishandling Cargo

- To get the pallet to slide off the forklift blades, the operator stopped his vehicle quickly.
- As the pallet came off the blades, it rolled onto its side against a pallet from another shipment.



Boeing B-747, San Francisco

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IMAGE BY: WERNHER KRUTEIN

• PHOTOVAULT © •

Actual Account Of Mishandling Cargo

- The overturned pallet was left resting against the second pallet until 1233.
- The operator who righted the pallet said that the pallet seemed to be “top-heavy” and difficult to maneuver.
- Another equipment operator stated that several batteries were on the ground near the area where the pallets had been separated, indicating that some of the boxes of batteries may have been damaged.



Actual Account Of Mishandling Cargo

- At 1457, overturned pallet picked up again and moved next to another pallet containing lithium batteries and cargo.
- 3-minutes later a company equipment operator noticed smoke, followed quickly by a small fire on the back of the previously overturned pallet.
- While pallet was being moved, fire spread to the adjoining pallet containing lithium batteries.



Both pallets then erupted in flames



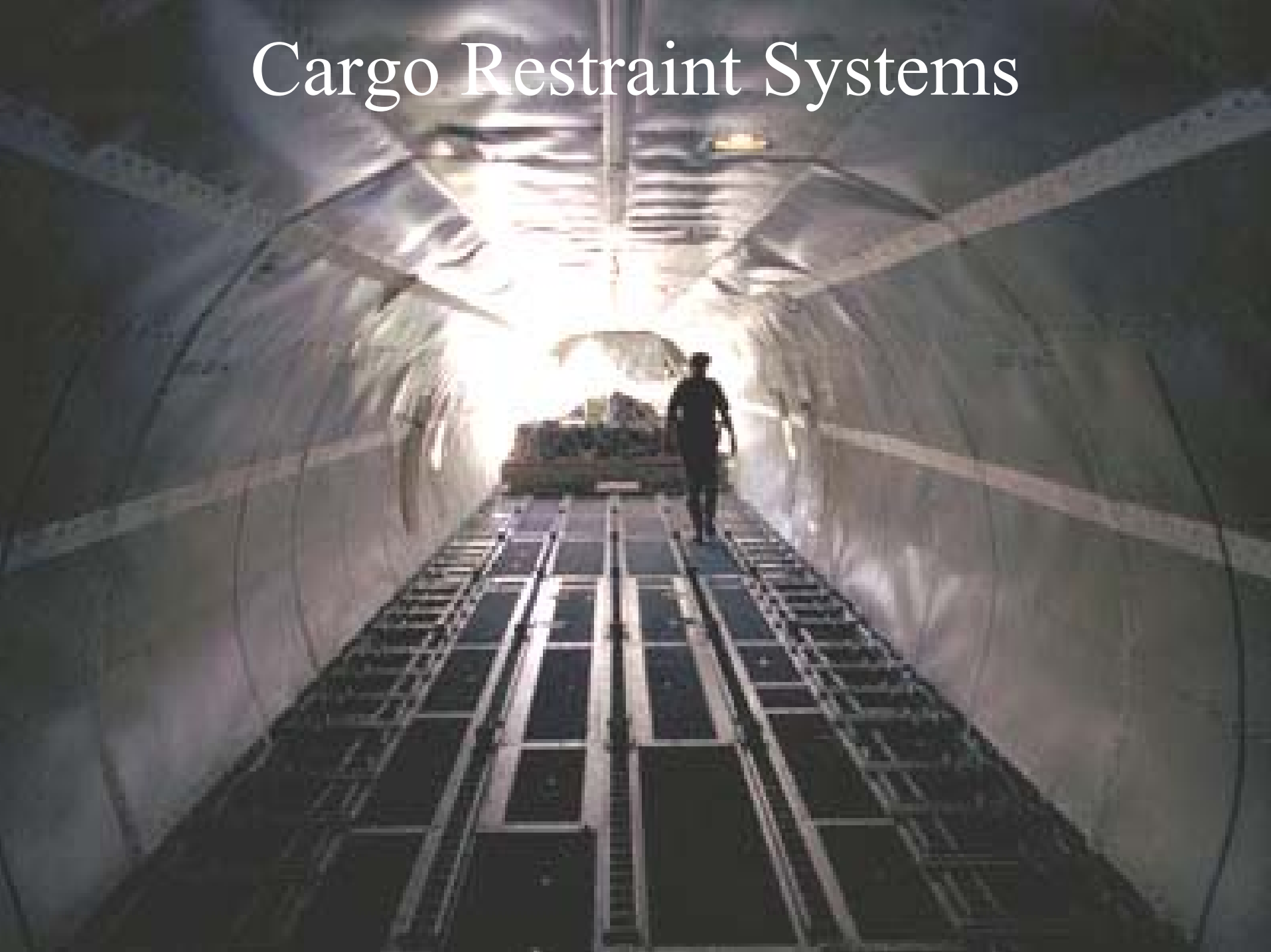
Actual Account Of Mishandling Cargo

This pallet had not been loaded onto an outbound aircraft during the approximate 2 hours it was at the cargo facility after the damage had been done.

Had that been the case, the fire would have been inside a cargo aircraft in flight.



Cargo Restraint Systems



Cargo Restraint Systems

Cargo restraint systems and their proper use are vital in securing the cargo load in the aircraft to prevent movement or shifting during all phases of the flight.

A load shift can change the CG of the aircraft to the point possibly rendering the aircraft incapable of flight.



Build-Up Of Pallets

An unsafe situation can exist when:

- The pallet has a high center of gravity (i.e. “top heavy”).
- The pallet is unbalanced laterally (i.e. “side load”).
- Movement of the contents within the pallet changes the Form allowing for netting or other securing devices to be rendered useless.



Cross Loading Operations

A cross load operation is when cargo is offloaded from an arriving aircraft and left on the ramp waiting to be loaded onto another aircraft.

Daily Operations

Reliability of moving cargo in a timely manner drives the industry and commands the flight schedules, work schedules and work place



Ground Personnel Training

Ground personnel operate from different sets of manuals and company directives than other groups.

- Manuals are generated from separate departments within a company and cover different areas, the directives many times do not incorporate or make reference to the safety items in the other manuals.



Ground Personnel Training

Flight crews have been tasked to perform functions that should be accomplished by individuals specifically trained in handling and loading cargo.

- Pilots do not receive sufficient training concerning the use and functions of cargo restraint systems and their components used in securing cargo loads on pallets and onto the floor of freighters to be the final authority on the security of the load.





Recommendations

- Develop standardized forms to contain specific, safety-critical information in load documentation, load manifests, and other forms used in the loading or cross loading of an aircraft.
 - Design and use of such forms should minimize the potential of incorrectly reporting weight and pertinent location information.



Recommendations

→ Develop a uniform weigh scale tolerance and frequency of calibration for scales used in air cargo operations. ALPA recommends a tolerance of plus or minus one percent ($\pm 1\%$) and a frequency of calibration of the weigh scale sufficient to maintain the tolerance.



Recommendations

- Develop standard procedures and guidance material to allow personnel performing or supervising safety-critical tasks to verify that all task steps are completed in the proper sequence.
 - Ensure supervisory personnel are not overloaded in their responsibilities such that it would prevent them from properly exercising their safety responsibility.



Recommendations

→ Ensure training programs for cargo supervisors, loaders and ramp personnel include familiarization with the safety implications of aircraft being loaded incorrectly. Curriculum should contain operational information used by the flight crew and awareness of the potential problems that incorrectly loaded, unsecured or damaged cargo placed in a ULD or on a pallet may have on ground personnel, occupants when in flight, and the aircraft fuselage and structure.



Thank You

