



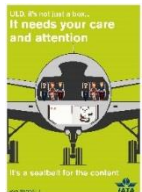
# ULD and Flight Safety?



LIAO, Zhi Yong  
Manager, Business Process & Standards  
IATA Cargo

# Agenda

- What is ULD
- Regulatory Framework around ULD
- ULD Operations Reality
- ULD Safety Campaign
- Questions to UPU



# What is a “ULD”?



# What is a “ULD”?

## 1.1 Definition of Aircraft Unit Load Device

Aircraft Unit Load Device (ULD) is a device for grouping, transferring, and restraining cargo for transit. It may consist of a pallet and an approved restraint method, or may be a container, both of which can be directly restrained onto the aircraft structure by the Cargo Loading System (CLS).

The purpose of ULD is to enable individual pieces of cargo, baggage or mail to be assembled into a standardized unit to facilitate rapid loading onto and offloading from aircraft having compatible loading and restraint systems, which directly interface with the unit. Because of this interface, they become during the flight a part of the aircraft's structure and are therefore regulated, as any other aircraft component, in order to ensure flight safety under all foreseeable circumstances.

---

# Special Purpose ULDs/ Accessories



# Special Purpose ULDs/ Accessories



## Purposes of ULD

- Eliminate manual loading and unloading
- Facilitate rapid loading/ offloading
- Protect the contents
- Maximize the use of aircraft contour
- Allow fast and easy transfer from one aircraft to another
- Special purposes ULD

The most important purpose is to secure the loads during flight

# No ULD No Business – Don't take it for granted!

PAN AM HISTORICAL FOUNDATION



DOUGLAS DC-4 BANANAS CARGO



## ULD = Aircraft Part

- ↗ ULDs are
- ↗ Aircraft flight
- ↗ ICAO A
- ↗ ICAO A
- ↗ The der



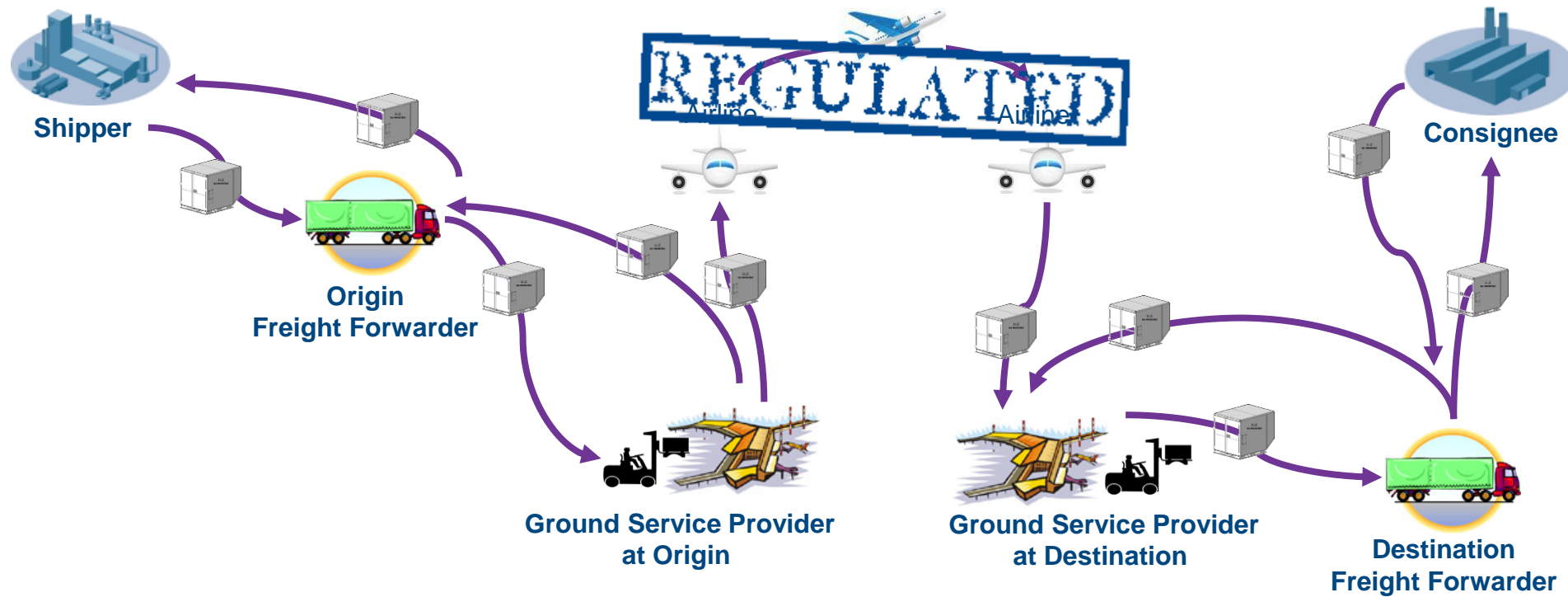
ss requirements.  
ed in:



# Regulatory Framework around ULD

State/Authority	China Civil Aviation Administration CAAC	Europe European Aviation Safety Agency EASA	Japan Civil Aviation Bureau JCAB	U.S.A. Federal Aviation Administration FAA
Area concerned				
Equipment approval requirements	CCAR-21 <i>Certification Procedures for Products and Parts</i> CTSO	EASA Part 21 <i>Certification of aircraft and related products, parts and appliances</i> CS-ETSO	—	14 CFR Part 21 <i>Certification Procedures for Products and Parts</i>
ULD design/tests and certification	CTSO C90 <i>Cargo pallets, nets and containers</i>	ETSO C90 <i>Cargo pallets, nets and containers</i>	JTSO C90 <i>Cargo pallets, nets and containers</i>	TSO C90 <i>Cargo pallets, nets and containers</i>
Aircraft airworthiness certification	CCAR-25 <i>Airworthiness Standards Transport Category Airplanes</i>	EASA CS-25 <i>Certification Specifications for Large Aeroplanes</i>	Airworthiness Standard Part 3 Civil Aeronautics Act Art. 10	14 CFR Part 25 <i>Airworthiness Standards: Transport Category Airplanes</i>
Carrier certification and operations	CCAR-121 <i>Air Carriers Certification and Operations</i>	EU-OPS 1 <i>Commercial Air Transportation (Aeroplanes)</i> OPS 1.035, 1.037 & AMC <i>Quality System Safety Management System</i>	Civil Aeronautics Act & Ordinance for Enforcement Chapter VI, Operation of Aircraft and VII, Air Transport Services and application Circulars No. 4 and 5	14 CFR Part 121 <i>Air Carriers Certification and Operations</i> 14 CFR Part 5 <i>Safety Management System</i> AC 120-59A <i>Air Carrier Internal Evaluation Programs</i>
Service providers safety system	—	EU Reg. 376/2014 Reporting, analysis and follow-up of occurrences	—	AC 120-92B <i>Safety Management System for Aviation Service Providers</i>
Operations, cargo	—	—	—	AC 120-85A <i>Air Cargo Operations</i>
Maintenance of approved equipment	CCAR-43 <i>General Rules for Maintenance</i> CCAR-145 <i>Maintenance Organization Certification</i>	EASA Part M <i>Continuing Airworthiness Rqts</i> EASA Part 145 <i>Maintenance Organisation Approval</i>	Civil Aeronautics Act & Ordinance for Enforcement Art. 20, <i>Approval of Organizations</i> and application Circular No. 2-001	14 CFR Part 43 <i>Maintenance</i> 14 CFR Part 145 <i>Repair Stations Certification</i>

# Typical ULD Operational Chain



~900,000  
ULDs in service

~\$1 Billion  
replacement cost

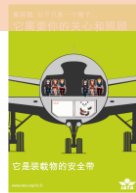
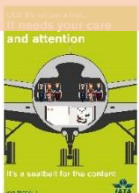
# Involved in

# 2 fatal

# accidents

~\$330 Million  
ULD repair cost

No. 1 cause of aircraft  
damage on ground



# ULD Operations Reality (ULD Damages)

**Is it regular  
wear and  
tear???**



# ULD Operations Reality (Aircraft Damages)

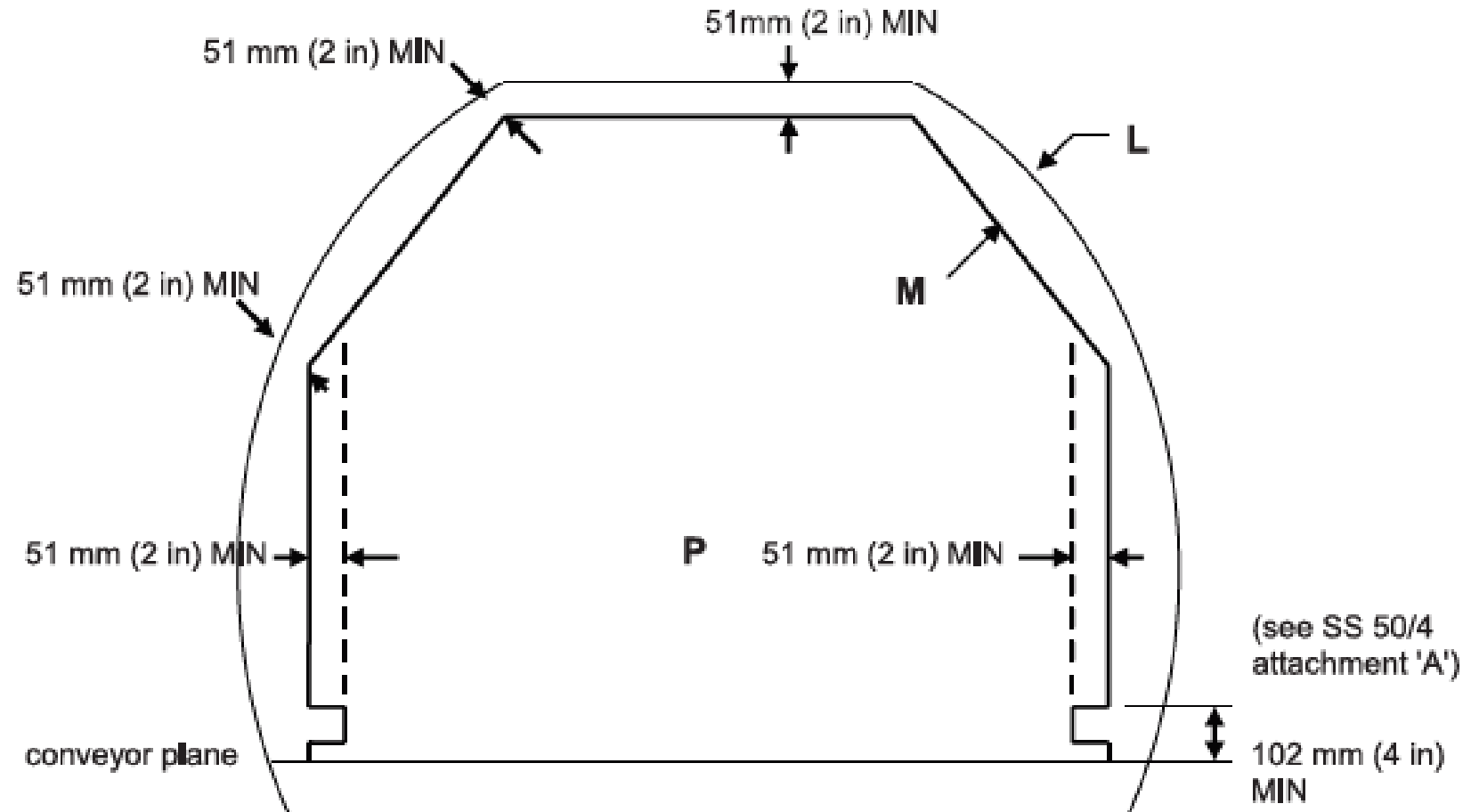


# ULD Operations Reality (Aircraft Damages)

## MAXIMUM ALLOWABLE CONTOUR AND PALLET LOAD

for aircraft inner envelope L [based on ISO 10046–Not on scale]

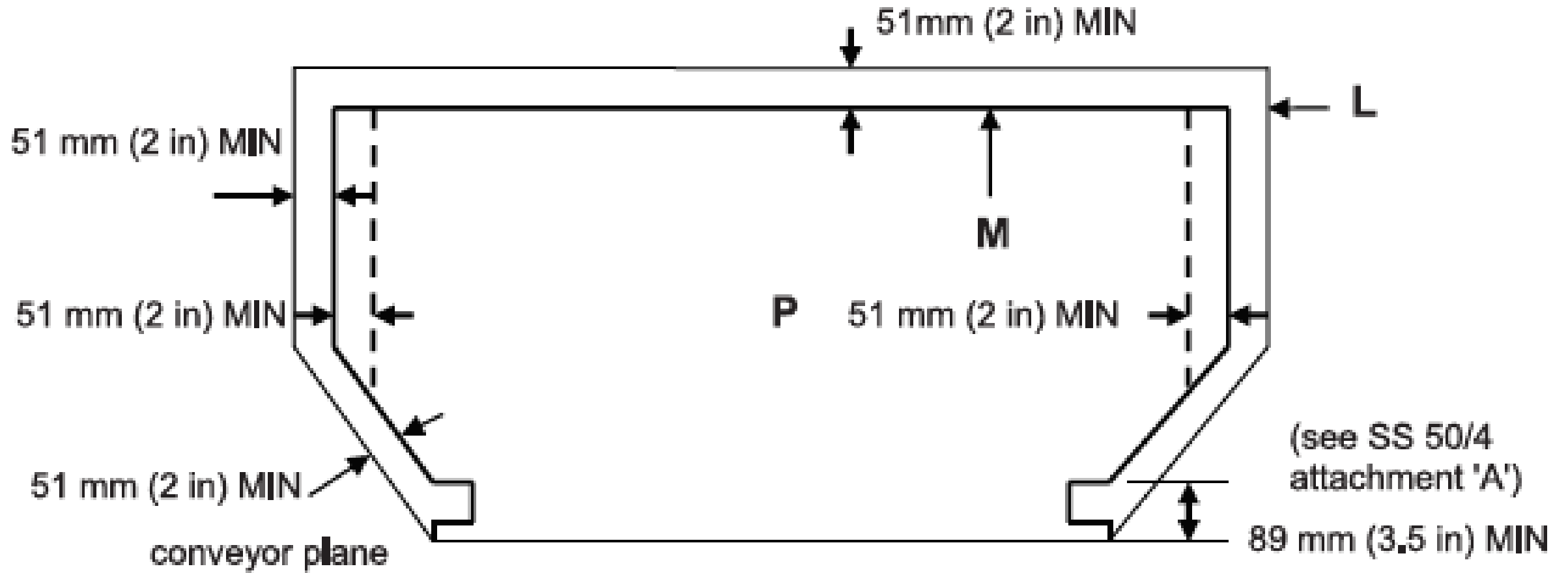
### Main / upper deck ULD contour





# ULD Operations Reality (Aircraft Damages)

## Lower deck ULD contour



# ULD Operations Reality (Aircraft Damages)



# Ground Damage Database (GDDDB)

## ULD Analysis

## GDDDB Analysis: ULD

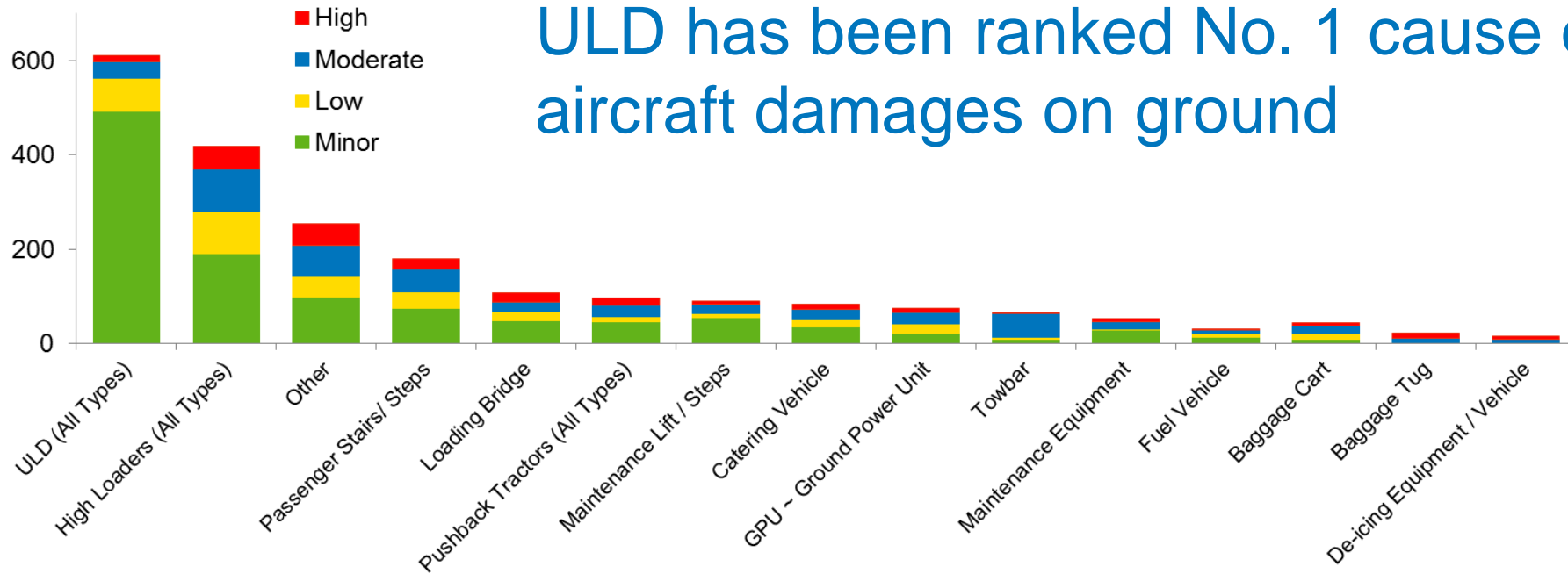
	<b>GDDDB Dataset (Q1 2015 to Q1 2016)</b>
<b>Number of reports in database</b>	5059
<b>Damage Rate</b>	6.96/10,000 flights 1 report /1,436 flights
<b>Number of ULD reports</b>	588
<b>Rate of ULD reports</b>	0.81/10,000 Flights 1 report / 12,358 flights

# GDDDB Analysis: Damage Caused by Equipment



Equipment

## Top 15 Involved Equipment



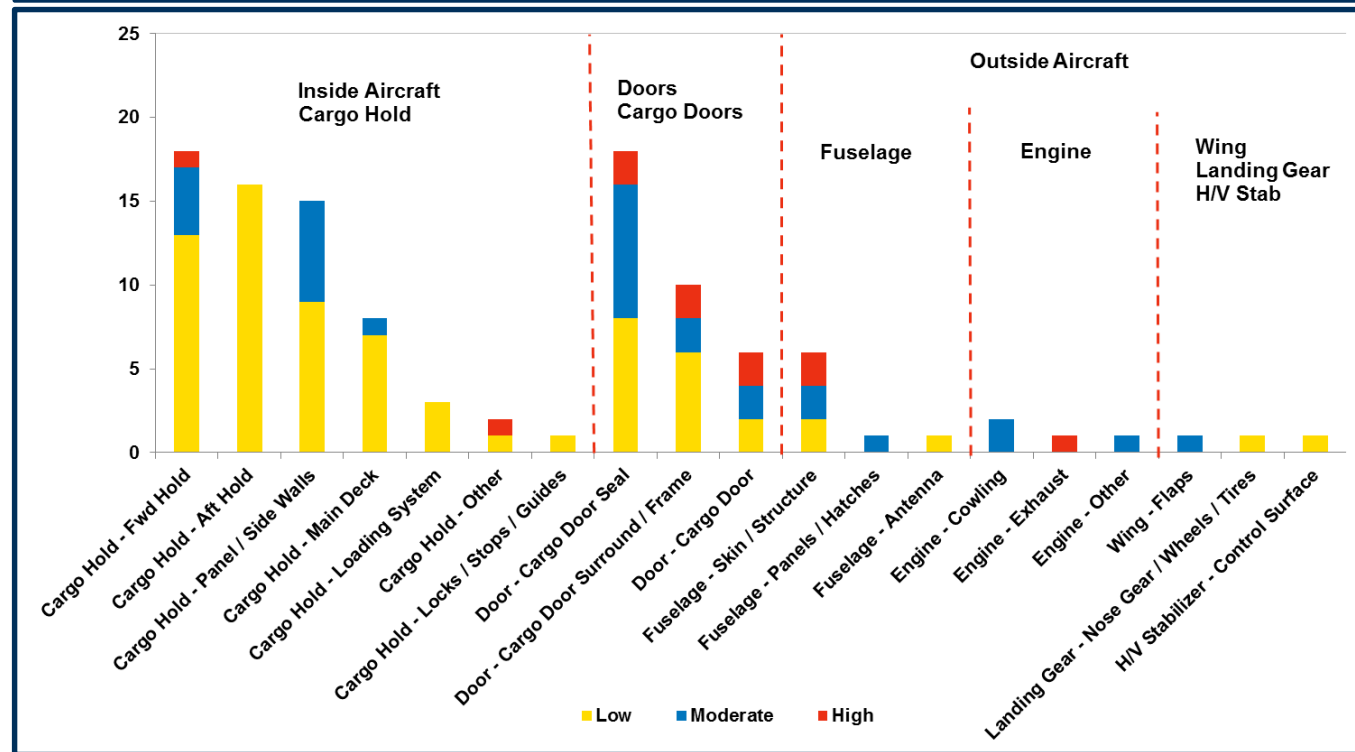
# Equipment caused damage



## ULD Damage – Location of Damage excluding minor severity

- 56% (63) of damage caused by ULDs excluding minor severity was occurred on Inside Aircraft (Cargo Hold), 31% (34) on Cargo Doors and 13% (15) on Outside Aircraft (Fuselage, Engine, Wings, Landing Gear and H/V Stab.).
- ‘Cargo Hold’ remained the top area of damage with mainly low severity, only 21% (13) of reports were ‘Moderate’ severity or above.

### Location of ULD damage



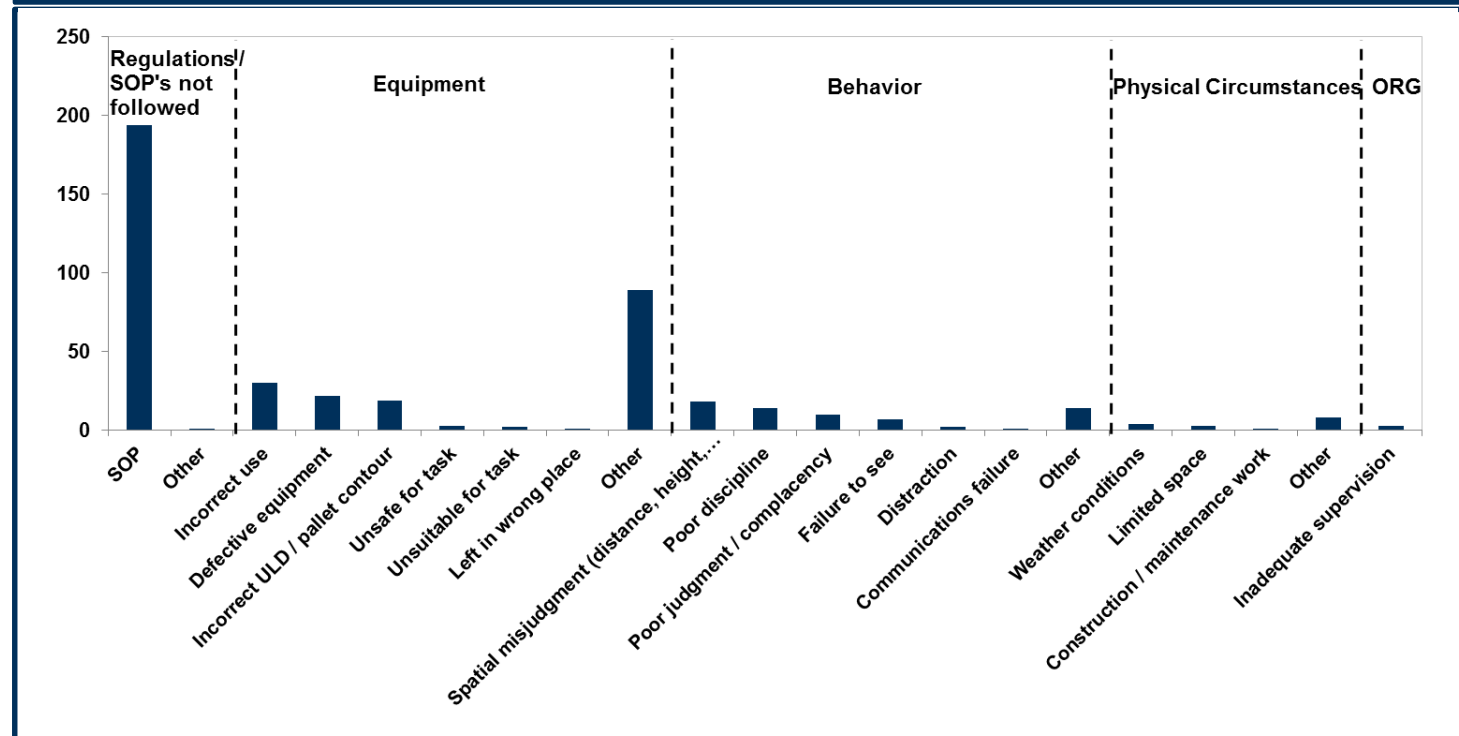
# Equipment caused damage

## ULD Damage – Causal Factors



446 causal factors were identified in the damage reports caused by ULD

High Level Causal Factors of ULD damage



# **ULD Operations Reality (Flight Safety Incident/ Accident)**



What happens if a ULD is incorrectly restrained or a non-airworthy ULD is loaded?





# Safety Trend Evaluation, Analysis & Data Exchange System (STEADES)

# Aircraft Loading Iceberg

**Accidents ...**

**2**

**Fine Air Flt 101**  
**National Flt 102**

**Serious Incidents... ~ 1 per week**

Aircraft Tip  
Aircraft Tail Scrape

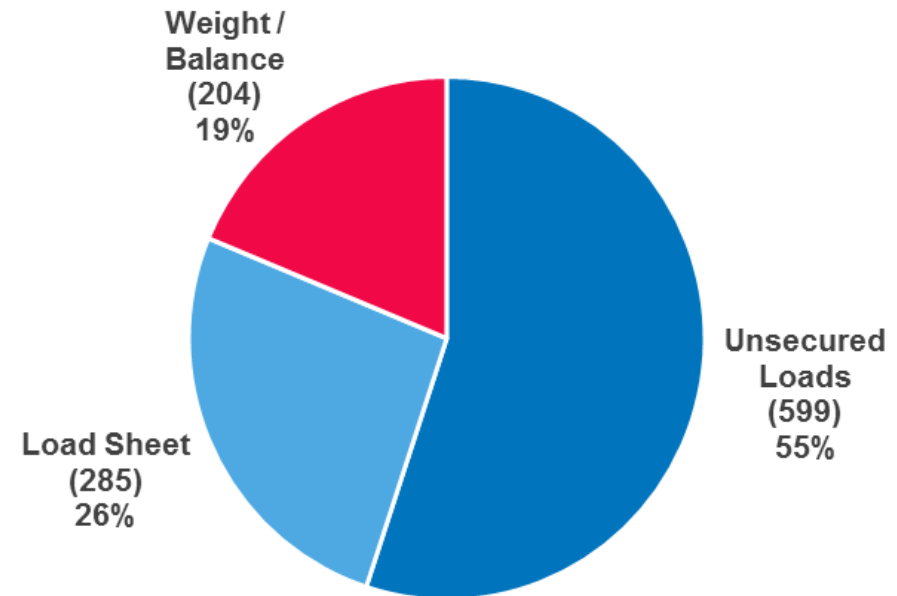
Load shifts  
Significant Loadsheet Error

**Daily Operations... ~ 16 per day**

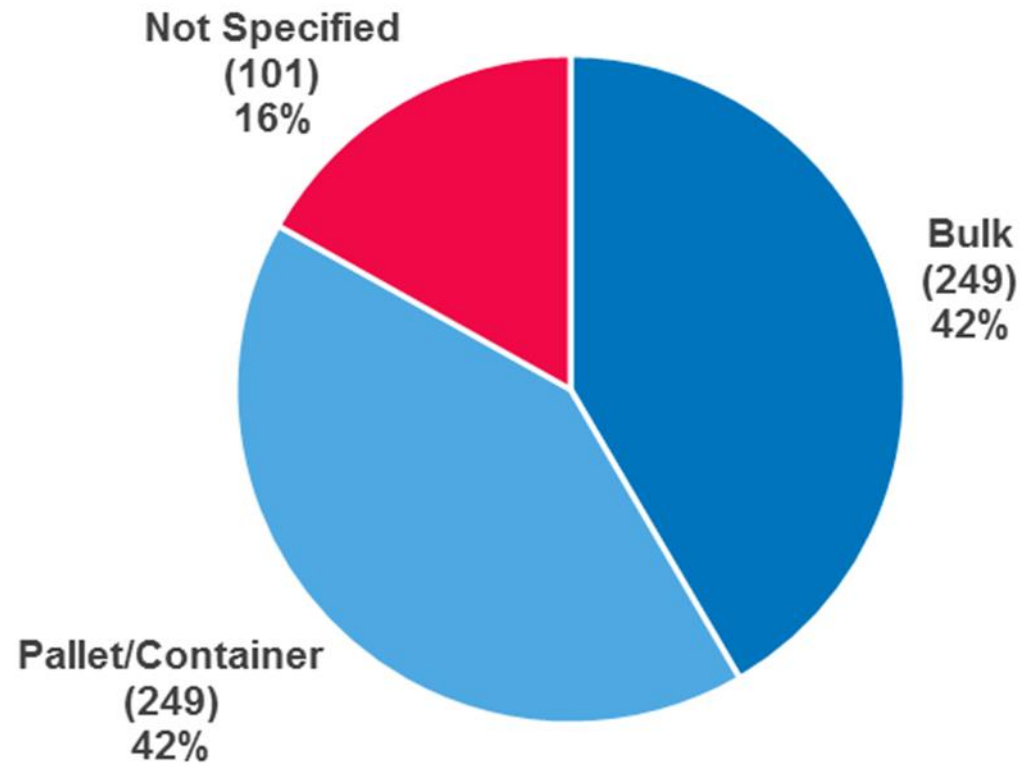
Locks Not Raised  
Nets Not Secure  
Incorrect Loading Position  
Incorrect Weights of Cargo / baggage  
ULDs badly built  
Load sheet errors

# So what goes wrong?

- A random data sample of 1088 reports was taken from **6414** Loading reports from 2010 to 2015
- The issues were broken down into 3 categories:
  - **Unsecured Loads:** The loads were not secured due to OPS handling, procedures not followed, or faulty equipment.
  - **Load Sheet:** Errors in the load sheet for departure due to load sheet preparation procedures not being followed.
  - **Weight / Balance:** Undesired change in weight / balance due to documentation errors.

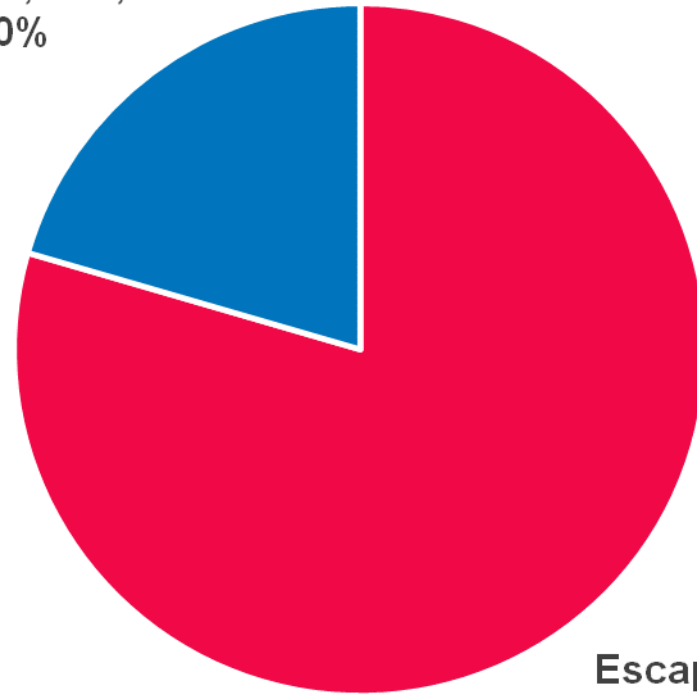


# What's moving?



## When are the issues being identified?

Found, 223,  
20%

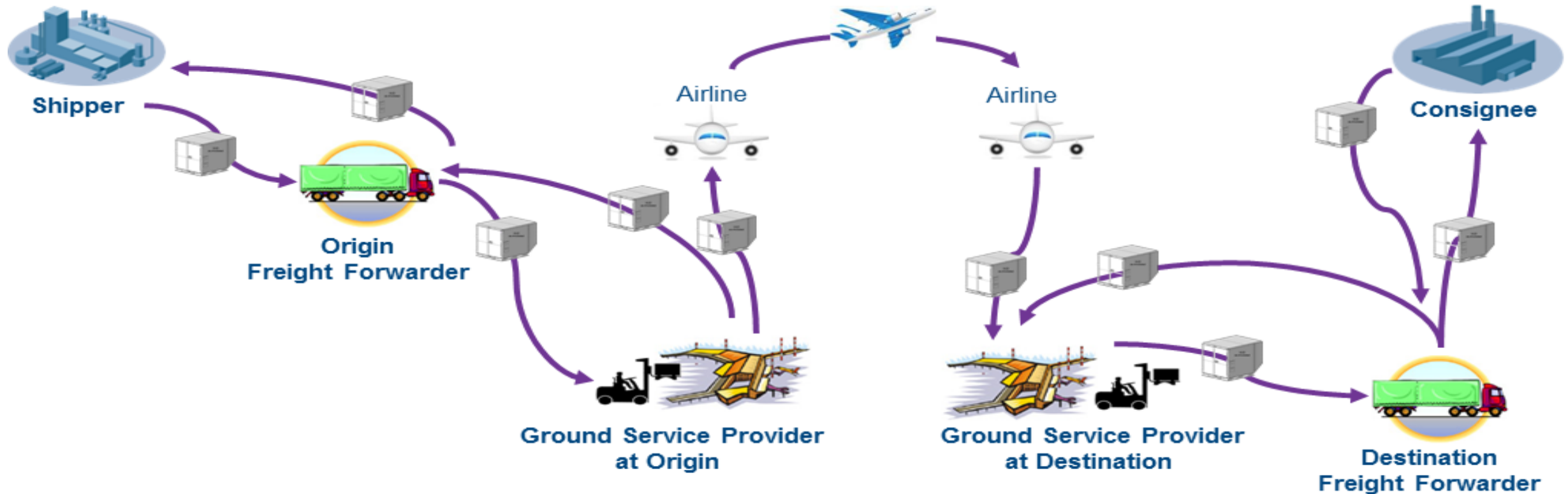


Escape (865)  
80%

- Found: Errors identified and rectified before the aircraft is pushed back.
- Escapes: Errors that are found after pushback, mainly on arrival by unloading staff.

# ULD and Flight Safety

## Typical ULD Operational Chain





# ULD and Flight Safety

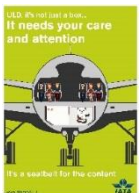


# ULD and Flight Safety



# The 5 Key Messages

1. ULDs are aircraft parts and are **CRITICAL** to flight safety
2. Correct ULD handling ensures safety
3. Safety is everybody's responsibility
4. Correct ULD handling reduces costs & improves efficiency
5. IATA ULD Regulations facilitate industry compliance



ULD, it's not just a box...  
It needs your attention and care

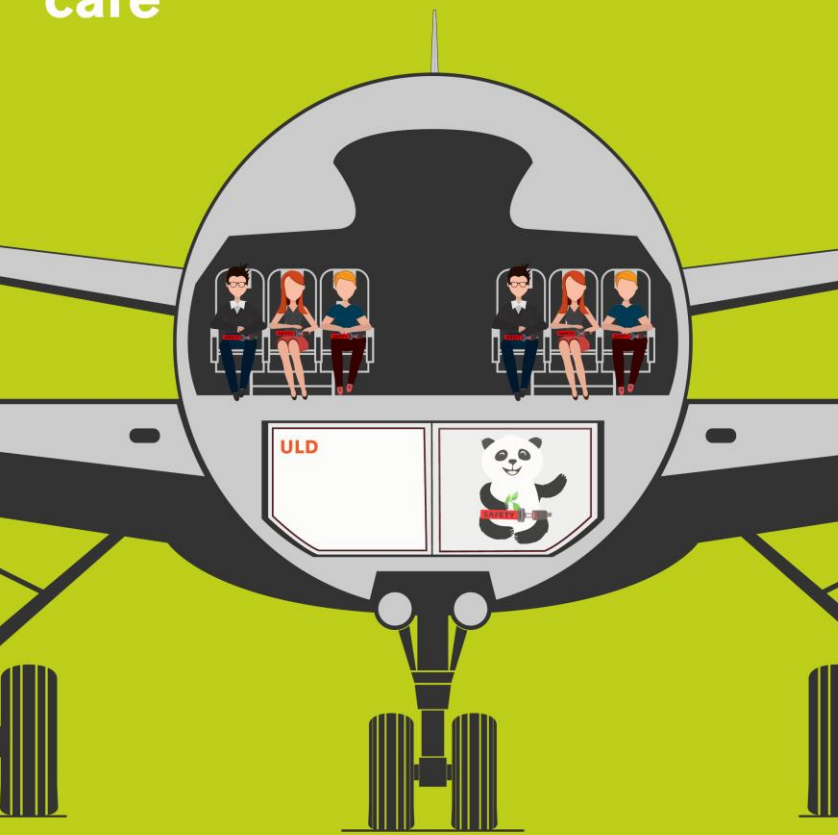


You can put the safety of passengers, crew and aircraft at risk

[www.iata.org/ULD](http://www.iata.org/ULD)



ULD, it's not just a box...  
It needs your attention and care



It's a seatbelt for the content

[www.iata.org/ULD](http://www.iata.org/ULD)



ULD, it's not just a box...  
Correct handling will save you millions

ULD repairs cost the industry **\$330** million / annum



ULD repair costs could be avoided if handled correctly



[www.iata.org/ULD](http://www.iata.org/ULD)



ULD, it's not just a box...  
It can damage your aircraft



ULD is the No. 1 cause of aircraft damage among all ground operations equipment

ULD, it's not just a box...  
It delivers your promise

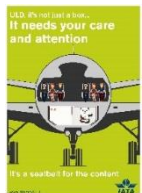


Incorrect ULD handling damages your profit and reputation

# ULD Safety Campaign

ULD, It's not just a box...  
it's YOUR responsibility

- Handle the ULD with care, it's an aircraft part
- Protect the lives of passengers, crew and aircraft by loading airworthy ULDs
- Inspect ULDs prior to use and at every transfer
- Ensure your employees and service providers are properly trained
- Remember ULD buildup is aircraft pre-loading and contributes to flight safety
- Don't damage ULDs
- Don't put the safety of passengers, crew and aircraft at risk
- Don't forget to inspect ULD for damage
- Don't handle ULDs if you are not properly trained
- Don't ignore the aircraft load limitations in ULD buildup



# ULD Regulations – Industry’s Solution

*“one means of compliance containing a single set of regulations for all parties involved conforming to all legally applicable and industry agreed regulations”*



## Questions to UPU

- Are Post Offices handling ULD (e.g. build-up, break-down, transport, storage, serviceability check)?
- Have Post Offices received handling instructions?
- Have the ULD handling staff been trained to handle ULD?
- Do you agree that everybody involved in ULD handling has safety responsibility?
- What are the pain points in your daily ULD handling and what are the challenges to fulfil your safety responsibility?

Thank you!

**LIAO, Zhi Yong** 廖志勇  
Manager, Business Process & Standards  
IATA APCS Cargo  
Tel: +41 22 770 2637  
[liaozy@iata.org](mailto:liaozy@iata.org) | [www.iata.org](http://www.iata.org)

