



Cargo securing to prevent cargo damages on road, sea, rail and air

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Cargo Securing at Air Transport

General

Transport system needs air transport services in places where cargo is transported long distances and fast
Cargo is typically small and include expensive products



Photos: Arne Fischer

Cargo Securing at Air Transport

General

In transport chain, where air transport is involved, the transport is a coordinated multimodal service.

Cargo is always moved from other modes into the air transport mode and then vice versa. Then loading and unloading are necessary operations in this mode.



Cargo Securing at Air Transport

Typical Factors for Air Transport

- Highly specialized transport mode
- Airfreight cargo securing requirements and methods exceed the securing requirements of road transport significantly.
- Airfreight's cargo unit is called "Unit Load Device" (ULD)
- ULD and other innovative cargo units have made it possible to increase airfreight
- ULD can also be transported by truck (truck with rollerbed system)
- Airfreight's cargo is typically small



Cargo Securing at Air Transport

Consequences of Insufficient Cargo Securing

The issue has two aspects:

Consequences

1) in flight

2) in other parts of the transport chain

Insufficient cargo securing in the latter part, normally for truck can create dramatic consequences like

- Loss of cargo
- Damages to other vehicles on the road
- Damages to environment

and in worst case

- Loss of vehicles
- Loss of lives



Photo: Arne Fischer

Consequences in flight are
always dramatic!

Cargo Securing at Air transport

Cargo transport units and their cargoes in airfreight

Aircraft Loading – Boeing MD11F



Aircraft Loading – Airbus A319



Cargo Transport Units are cargo aircrafts and aircrafts with lower deck compartments, such as:

- Boeing MD11F
- Airbus A300

Goods are transported in special kind of containers or on any kind of pallets

- General cargo
- Small machines
- Food
- Different kinds of vehicles
- Spare parts



Air freight container

Cargo Securing at Air transport

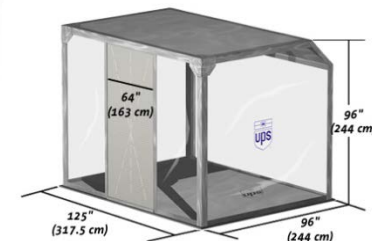
Cargo Transport Units – Unit Load Devices (ULD)

IATA has developed a standard of equipment and devices to facilitate the material handling in loading, transport and unloading phases.

The different types of devices are called ULD (Unit Load Devices)



Pallet



Container



Special pallet for transport of cars



Special container for transport of horses

Cargo Securing at Air transport

Lashing Equipment

There are mainly two different type of lashing equipment to secure the cargo to the ULD or directly to the aircraft:

- net or
- straps

The lashing equipment shall be manufactured and marked according standard ISO 16049.

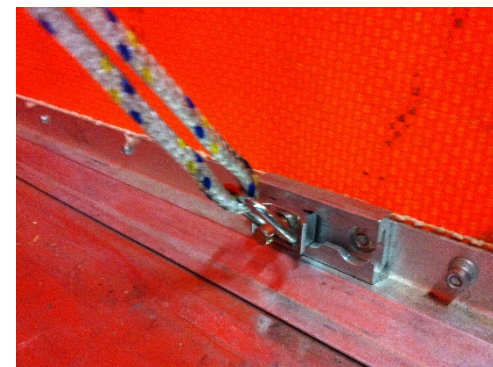


Photo: Arne Fischer



Cargo Securing at Air transport

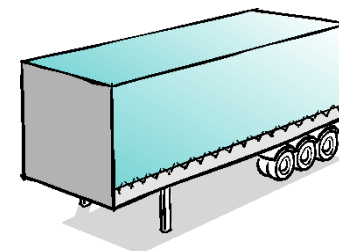
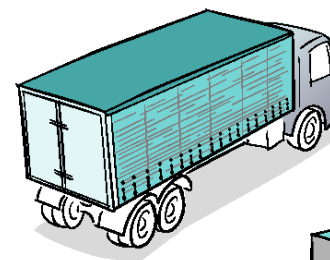
Cargo Transport Units and their Cargoes in road-air transport system

In the road-air transport system cargo transport units are:

Vehicles and trailers

and their cargoes are:

- Air freight containers
- Cargo on pallets



Air freight containers in a road vehicle



Air freight container

Cargo Securing at Air transport

Terminal Operation - to airplane and to truck

- To aeroplane



Source:
<http://mediabase.lufthansa.com/mediabase>



Source:
<http://mediabase.lufthansa.com/mediabase>

- To truck



Photo: DB/Ralf Braum



Photo: Arne Fischer

Cargo Securing at Air Transport

Liabilities - general

International Air Transport Association (IATA) represent and serve the airline industry, which includes 240 airlines and covers 84 % of total air traffic.



IATA

Safety standards for airfreight

Unit Load Device (ULD) regulations

Airport Handling Manual

ICAO

Air cargo security standards



Cargo Securing at Air Transport

Liabilities in air freight

The load that is arriving in a truck at airfreight terminal, is unloaded totally and then repacked into air transport's specific equipment called Unit Load Device (ULD).

The airport terminal personnel is responsible for the cargo securing for flight.



Photo: Esko Vainio



Photo: Arne Fischer

Cargo Securing at Air transport

Liabilities in road-air transport

- The airfreight terminal operator is responsible for cargo securing of the truck, when ULDs and Road Feeder Service system are in question.
- When cargo is unpacked from ULD and then repacked onto pallet in airport's terminal, then normally the driver will load the road vehicle and is therefore responsible for the cargo securing.



Source: <http://mediabase.lufthansa.com/mediabase>



Photo:
Arne Fischer

Cargo Securing at Air transport

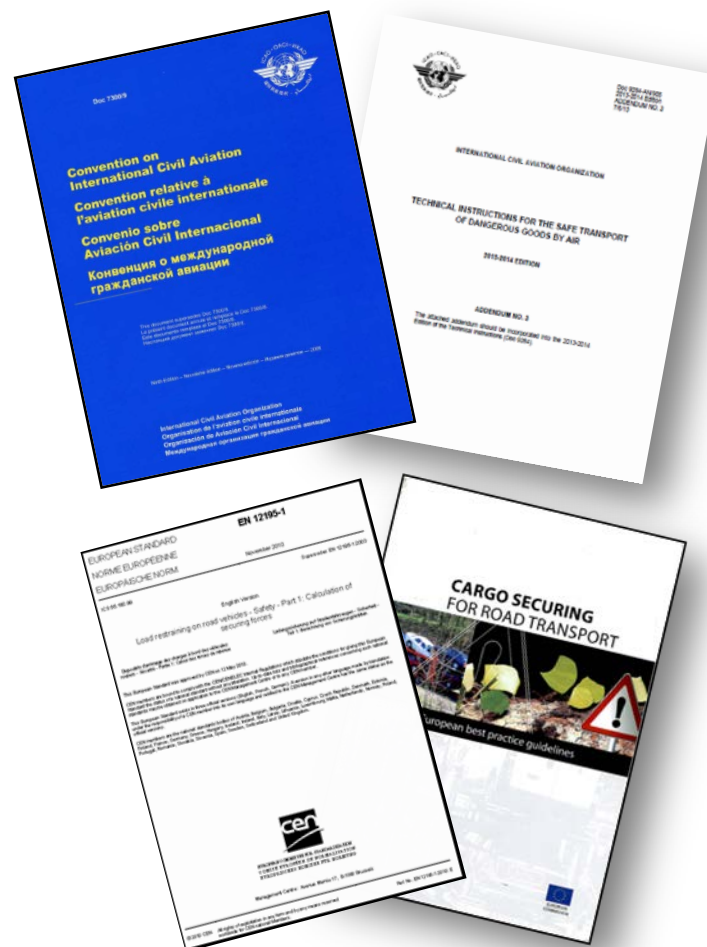
Regulations, standards, guidelines

Air freight related:

- National Aviation Acts and safety agencies' aviation regulations
- ICAO-TI
- Unit Load Device (ULD) regulations
- Airport Handling Manual
- European Unions Commission Regulation (EC) No 859/2008 (EU-OPS 1)
- DGR

Road freight related:

- EN 12195-1:2010
- ADR
- National laws
- European Best Practice Guidelines on Cargo Securing for Road Transport



Cargo Securing at Air transport

Acting forces in the air transport

During take-off, flight and landing forward, backward, sideways as well as upward forces occur and act cargo

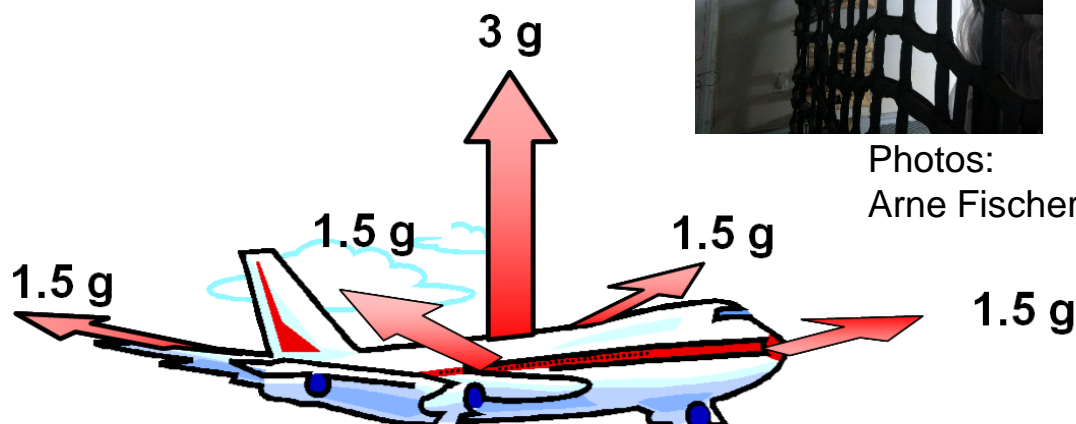
These forces are:

- acceleration
- deceleration
- yawing
- lift

The first three are considered with 1.5 g, the last with 3 g.



Photos:
Arne Fischer

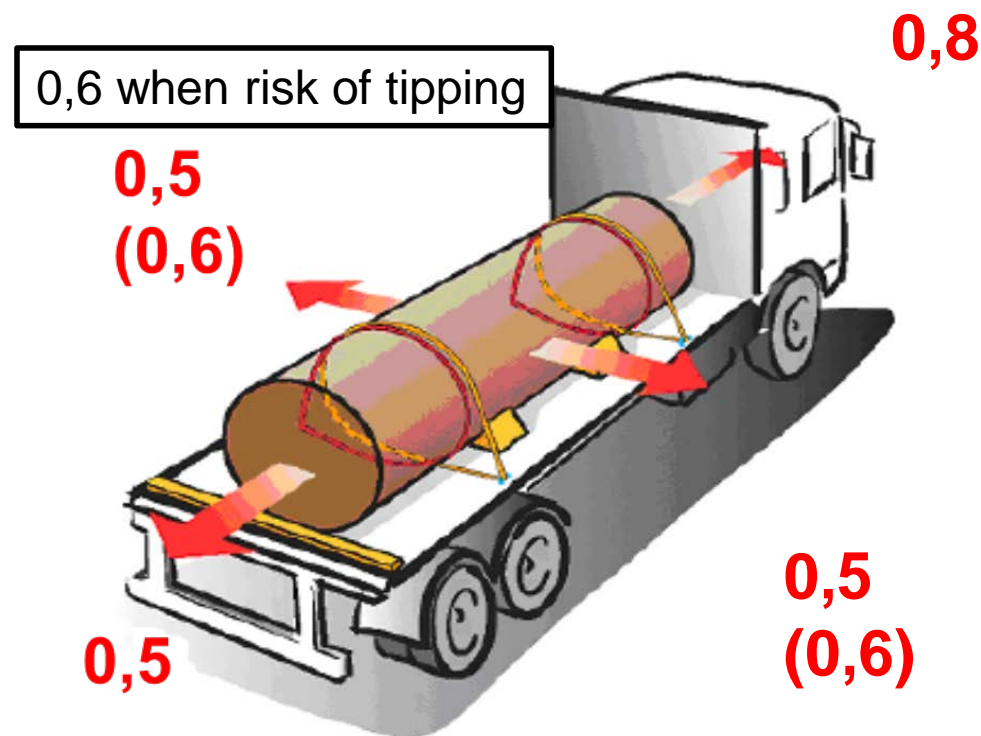


Cargo Securing at Air transport

Acting forces in the road-air transport system

During road transport the forces are:

- acceleration
- deceleration
- gravity
- vibration



Cargo Securing at Air transport

Securing principles and methods in the air transport

Cargo securing principles:

- tightness
- stability
- different covers
- specifically designed containers

Securing methods:

- blocking
- lashing

Note! Securing methods follow air transport's own standards and are therefore stricter than in road transport or rail transport



Photo: Arne Fischer



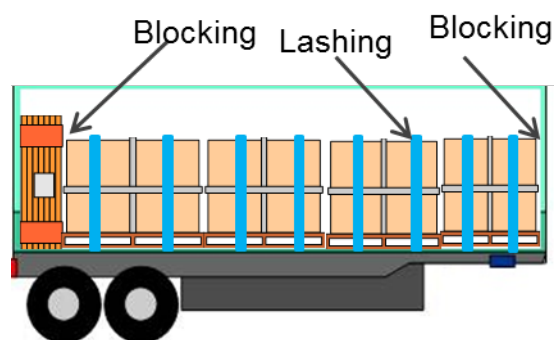
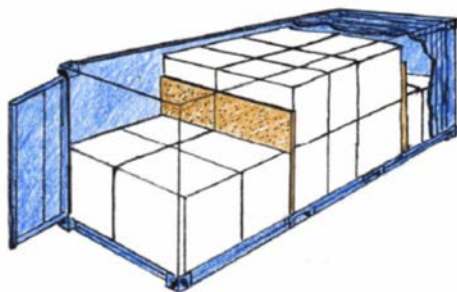
Photo: Esko Vainio

Cargo Securing at Air transport

Securing methods in the road-air transport system

Securing methods:

- blocking
- locking
- lashing
 - Top-over lashing
 - Loop lashing
 - Spring lashing
 - Straight/Cross lashing



Photos: Arne Fischer

Cargo Securing at Air transport

Securing principles and methods in the air transport

Examples of securing cargo for air transport

