

Network Airside Europe/O. Tamm



Aircraft Load Securing

Leipzig, 20th November 2013



Agenda

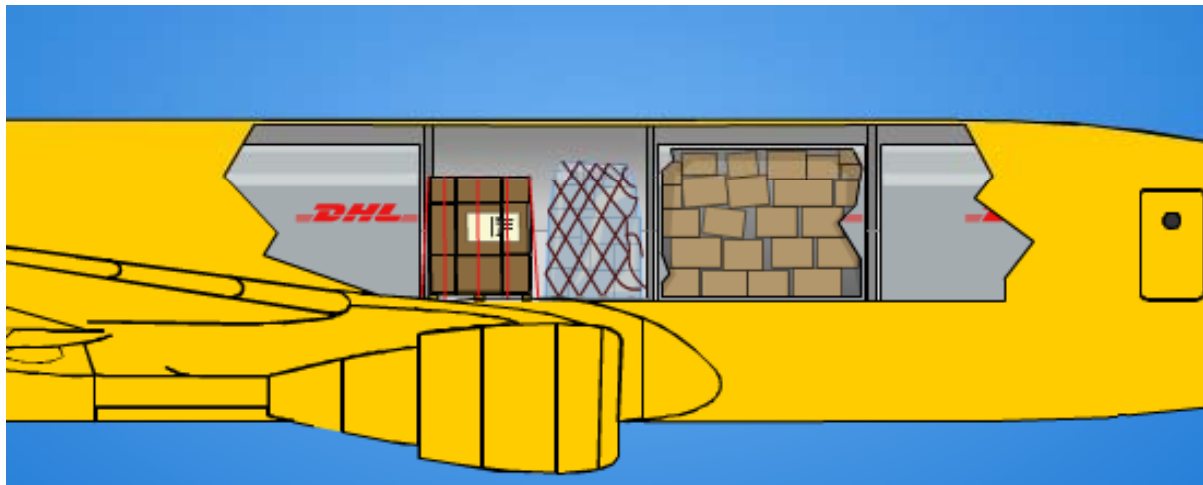
- ▶ Chapter 1: Forces in Flight
- Chapter 2: Aircraft Structure and ULDS
- Chapter 3: Build Up Material
- Chapter 4: Build Up of Containers, Pallets, and Special Loads
- Chapter 5: Build Up of Dangerous Goods

Forces during Flight

All loads, no matter what size or shape, must be restrained ...

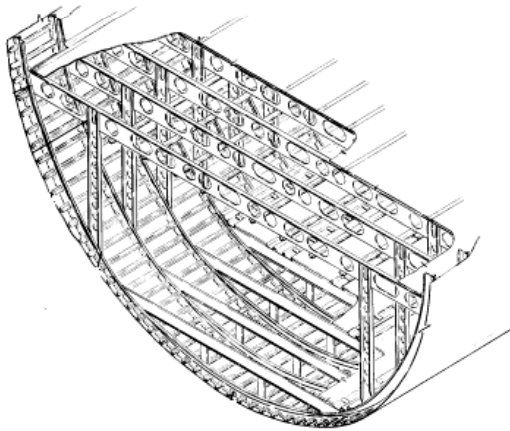
- ... either by filling the belly, net-section, or ULD **volumetrically full**.
- ... or by **lashing/tie-down**.

A load must never move in-flight in any direction!!!



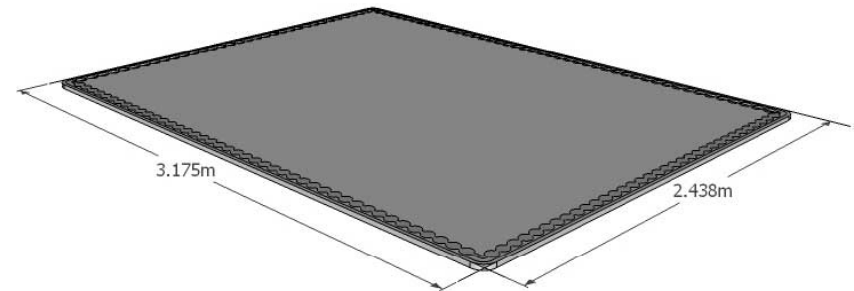
Aircraft Structure

Aircraft internal structure and main deck:

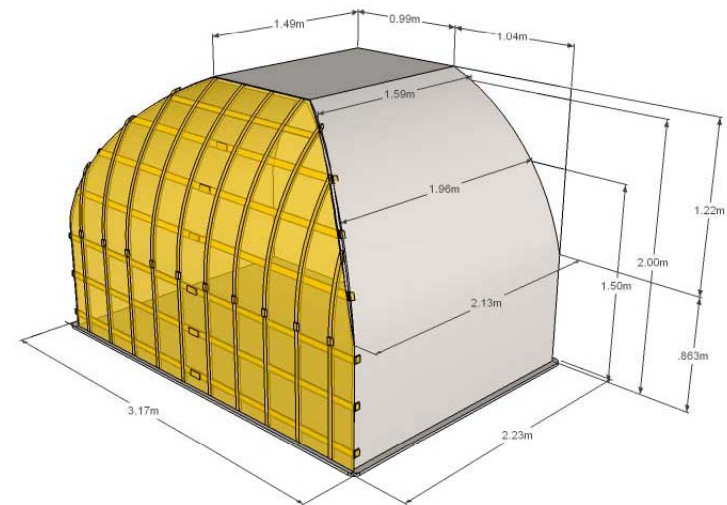


Examples of Unit Load Devices

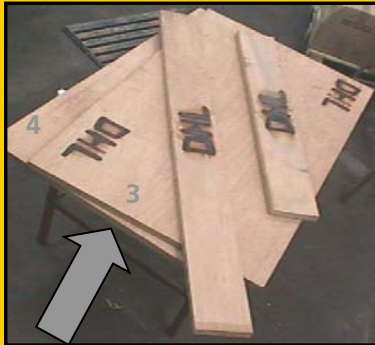
Pallet: 6804 KG max gross weight



Container: 6804 KG max gross weight



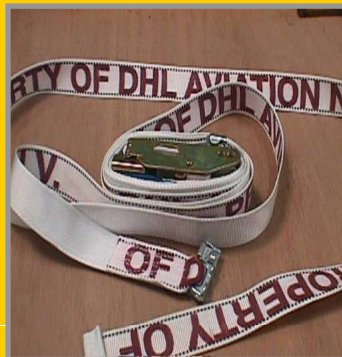
Build Up Material



Boards used under shipments exceeding 2000kg/m² floorload

	Length	Width	Thickness	Contact Area	Tare Weight	Max Weight	
						in bulk belly	in ULD
SB ³	125cm	75cm	2.7cm	0.9375m ²	12kg	650kg	1875kg
LB ⁴	200cm	75cm	2.7cm	1.5m ²	20kg	1000kg	3000kg

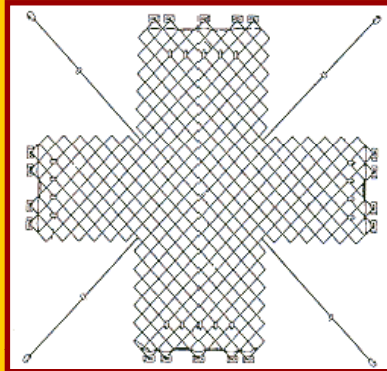
Tie-down straps for shipments above 150kg



Capacity:	upward	1125Kg / 2500lbs
	fwd/aft	2250Kg / 5000lbs

- A double stud attached on each end.

Build Up Material 2



Pallet net

- max. capacity = max. gross weight of pallet



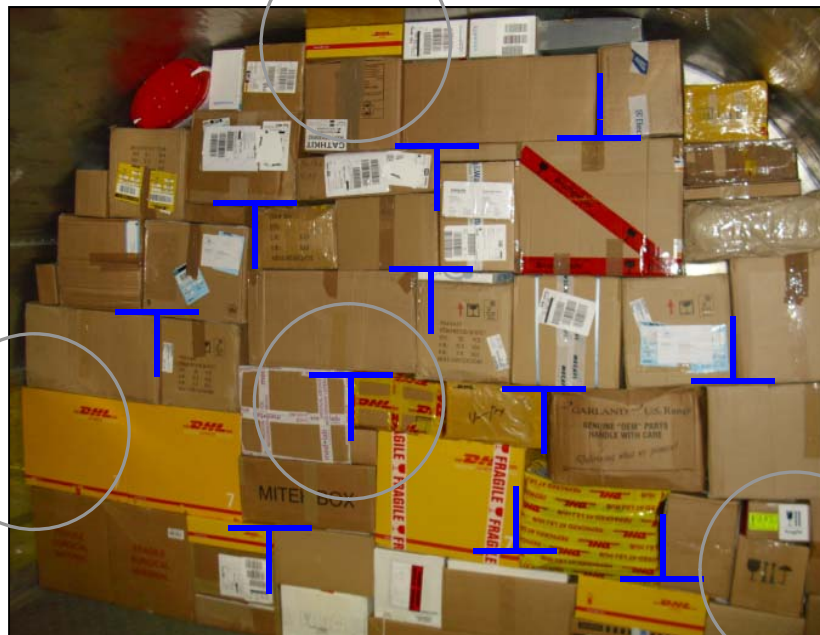
Spider Net for piercing cargo

- Tare Weight: **3 kgs**
- Minimum **2** straps used per spider net, however, straps may be shared between multiple spider nets if being used to restrain against a shared force.
- Capacity -
 - o fwd/aft: **6000kgs**
 - o upward: **3000kgs**
 - o 9G: **1000kgs**

Build Up Principles conveyable material

Small shipments to be loaded in containers

Secure to sides with small shipments



Build one row up before starting next, incase ULD not full level out with flat surface

Observe handling labels



T-stacking Method to secure shipments and to prevent pressure by column stacking to lower boxes

Build Up Principles non-conveyable material

Large pieces to be loaded on pallets

Cargo fully secured by net

Use straps to stabilize

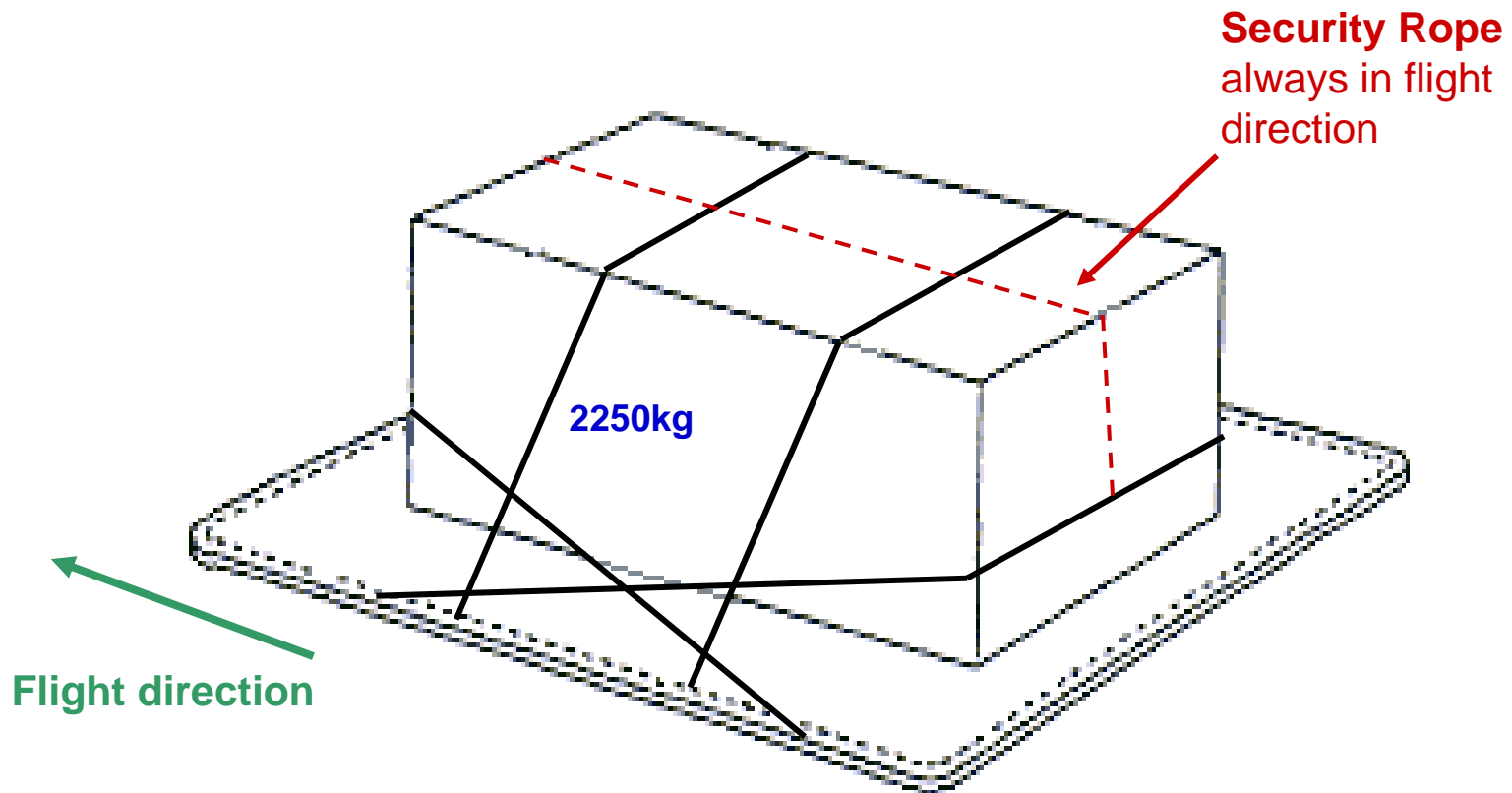


Boards used for heavy shipments



General lashing large and heavy shipments

General lashing of a normal shaped load with minimum 4 straps:



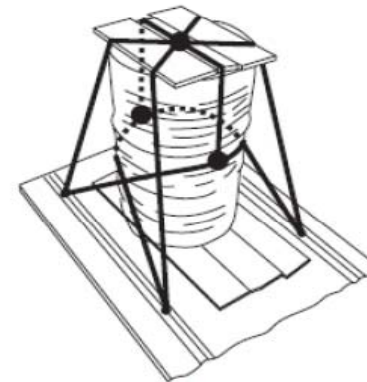
Additional straps required according to weight when above 2250kg

Securing of Special Loads

Piercing cargo: Secured with a spidernet and minimum 2 straps

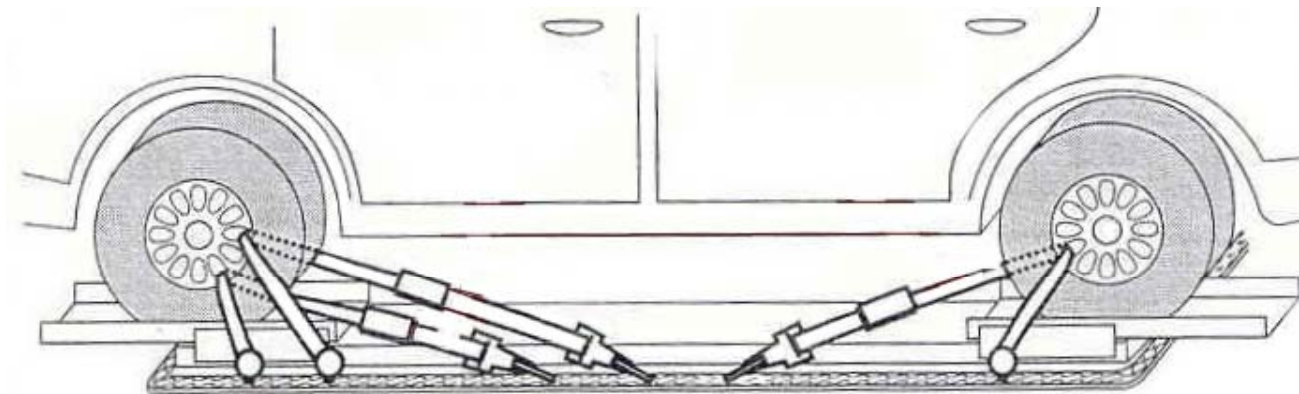


Barrels: Secured with boards and minimum 4 straps



Example of Barrel Lashing

Cars: Secured with minimum 4 straps with end facing same direction



Dangerous Goods: Legal Requirement

IATA Dangerous Goods Regulations 2013: The operator must secure dangerous goods in the aircraft in a manner that will prevent any movement. (Chapter 9.3.5, General Loading and Securing Requirements)

- Always load DG in such a way that **no movement is possible** at all times.
- Strictly **follow the ULD build-up principles** and methods.
- **Respect handling labels** at all times, this includes all 'This way up' and 'Do not stack' labels.
- **Below 100% loaded ULDs DG must always be tied down.**

Securing Dangerous Goods 1

1. DG loaded in containers

The container / bulk compartment must be filled completely with other material, that the DG shipments are stabilized and cannot move horizontally or vertically. **The container has to be completely (100%) physically full to avoid extra tie down.**



2. DG loaded on pallets

On pallets shipments must be secured by the use of a pallet net. A pallet net is only able to withstand G loads when fully extended, or if the pallet net has been shortened using the certified hooks attached to the net.



Securing Dangerous Goods 2

3. **DG shipments inside a container which is not 100% volumetrically full must be restrained to prevent any movement:**

for DG shipments use straps fitted to the attachment points within the container

- use spreader boards and straps to bundle DG shipments to secure them together sideward or upward.



Securing Dangerous Goods 3

4. for **Cylindrical DG shipments** use **straps or lashing ropes with single studs** fitted to the attachment points within the container depending on weight:
- use spreader boards and straps to bundle barrels to secure them together sideward or upward.

