



Multimodal Transportation

Prevent the risk of shifting

Loading road trailers and ISO maritime containers should imperatively be planned according to three basic logistic criteria.

- 1 **Protect:** parcels packaging (P)
- 2 **Optimize:** load units distribution and block stowage in vehicles (O)
- 3 **Secure:** lots lashing prior departure (S)

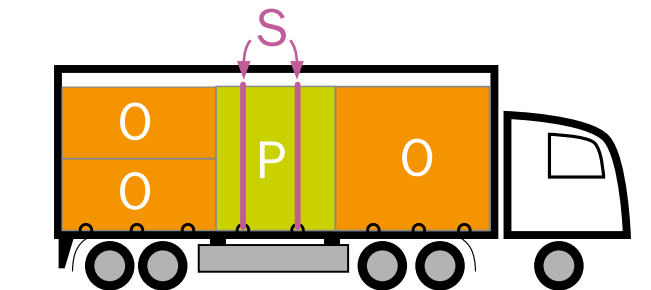
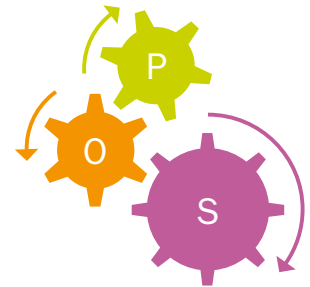
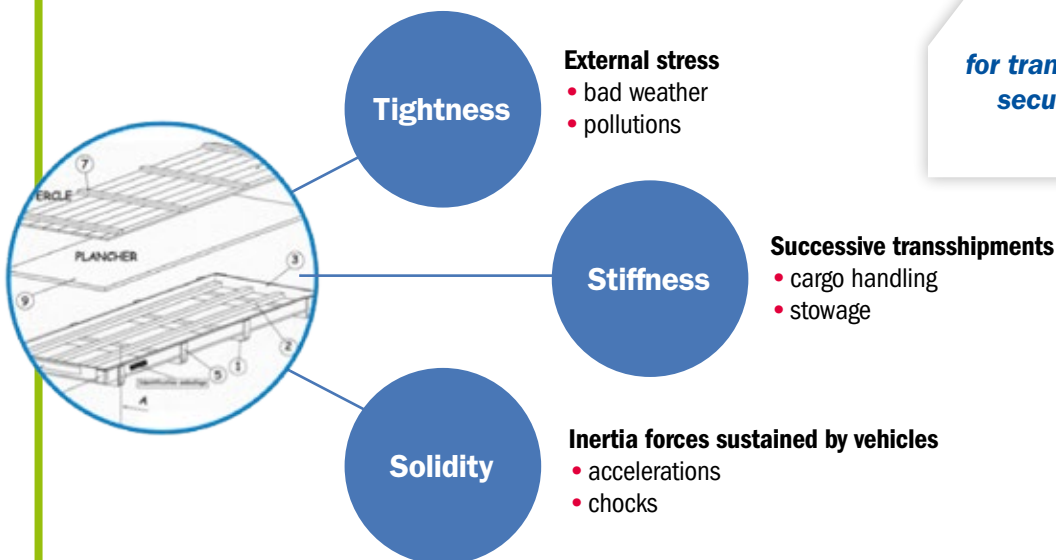


Fig.1 : Optimal loading

1 Protect: packaging

Packaging changes parcels to be sent into load units ready for transport. It should allow the cargo items to face specific hazard relating to this service. These hazards get into the scope of risks that can be controlled by shippers.

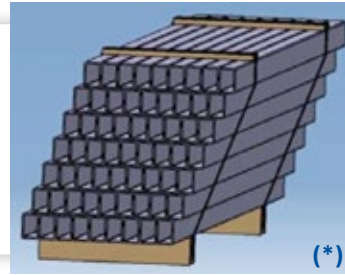


A packaging adapted for transport-related-hazards optimizes securing operations and improves shipping output

Fig.2 : Hazards entering shipper's scope of action

Important :

Polyester straps allow hooping to change products into a batch. However they do not guarantee the stiffness of the parcels in normal transport conditions (handlings, accelerations).



2 Optimize: the loading plan

Stowage consists of planning weight distribution in vehicle and is carried out during loading operations. For the best safety of products up to final place of delivery the stowage plan should combine and prioritize commercial, logistic and technical factors depending on accessible equipment.



Fig. 3 : Design of loading plan

- ✓ The stowage plan implements an optimal lashing plan
- ✓ The stowage plan requires information and approval from truck driver as carrier's representative. It should be subject to permanent monitoring by the shipper until departure.
- ✓ Stowage requires more or less complicated approaches depending on sales management.
- ✓ The heterogeneity of shipping batches makes a dedicated « truck preparation area » essential for building a block-load. The arrangement of load units should be consistent with vehicle loading sequences over its whole surface.
- ✓ A procedure replaces a stowage plan only for recurrent shipments when the constituents (vehicle, weights and dimensions of packages, lashing equipment, handling devices) are strictly the same.

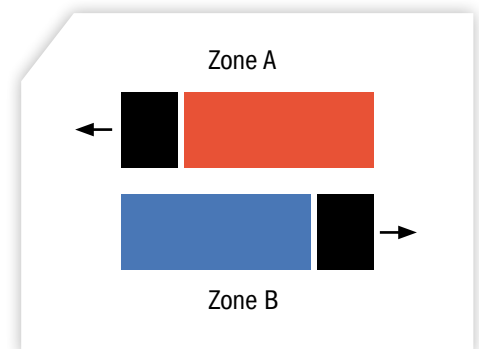


Fig. 4 : Loading area*

3 Secure: lashing

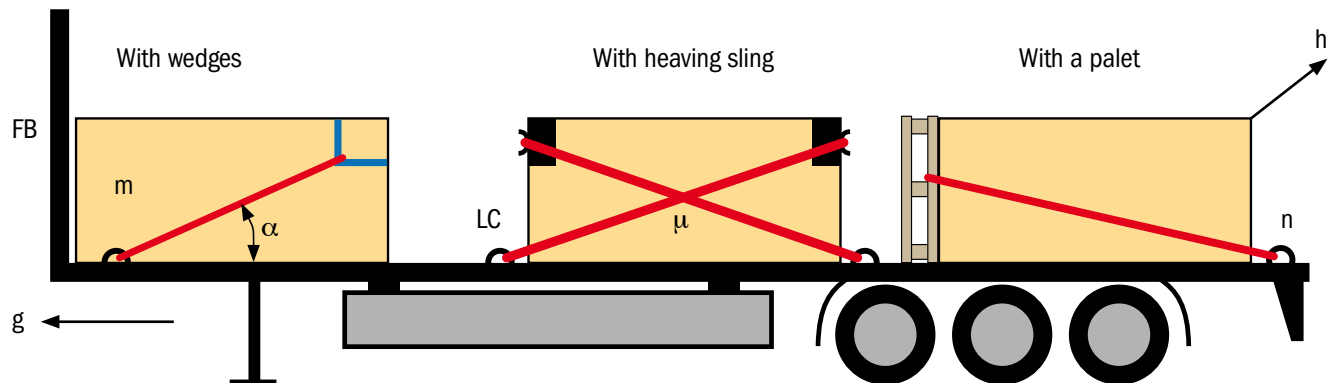
Each mode of transport transmits a specific impulse to load units. Ensued accelerations and inertia forces during transit are random and should be considered regardless the distance to be covered.



Fig. 5 : Accelerations in accordance with means of transport

* With agreement of FCE Arrimage

Stowage safety implies these forces to be calculated from the early stage of the plan's design. This calculation ascertains applicable lashing forces on each parcel. It takes into consideration factors relating to transport mode, packaging, accessible and required lashing equipment.



- Longitudinal accelerations (g)
- Transverse accelerations t (g)
- Weight of the parcels (m)
- Friction Coefficients (μ)
- Number of lashing lines (n)
- Lashing Lines Standard strength (STF)
- Lashing Lines capacity (LC)
- Vertical Angles
- Horizontal Angles
- Blocking forces (FB)

Fig. 6 : Different types of lashing*

During the voyage all implemented lashing forces should be greater than inertia forces whatever their direction. The inspection of lashing material wear and tear is fully part of shipment securing operation.

Important:

Lashing set-up must be subject to a visual inspection carried jointly out with truck driver prior departure

Regulations and procedures

The safety of loads within the frame of the international transport is subject to norms and regulations that lay responsibilities upon parts involved and assign factors and coefficient for applicable calculations.

- ✓ EN 1295-(1 à 4)
- ✓ EN 12640
- ✓ EN 12642
- ✓ European Best Practice Guidelines on Cargo Securing for Road Transport
- ✓ Code of Safe Practice for Cargo Stowage and Securing (CSS Code – 2003 Edition)
- ✓ International Convention for Safe Containers, 1972 (CSC – 1996 Edition)/IMO

Based on prevailing codes operators should draw up standard procedures to be used as reference tools when shipping cargo.

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Multimodal Transportation Prevent the risk of shifting

**BEST
PRACTICES**

Securing, a global approach

- **The detailed knowledge of prevailing regulations optimizes packaging**
- **The good control of applicable calculations reduces costs for blocking and lashing equipment**
- **Procedures are made easier thanks to the acquaintance with securing equipment and means of transport**
- The safety of shipments requires a plan
- Procedures do not replace stowage plans except for standard shipments
- The shipper is responsible for any accident due to shifting
- A well-secured transport means optimized load