



New Cargo Securing Practice for Drums on Pallets



Basic design principles

- **Safe practice**
- **Direct securing instead of frictional top-over lashing**
- **In compliance with EN12195 - (2010)**
- **Minimum use of additional securing material**
- **Easy to apply**
- **Minimum man hours**

First idea



- **Effectiveness depends on the angle (< 60 degrees)**
- **Compliant with EN12195- 1 (2010) only when friction is > 0.4**
- **Lashing may fall down during transport.**

Final idea



- **Lashing rest on the pallet**
- **Effectiveness depends on the angle**
- **Compliant also with low friction values**

Not only effective, but also easy and safe to apply





Effectiveness calculation according EN12195 – 1 (2010)

Weight per four pallets = $4 \times 1000 \text{ daN} = 4000 \text{ daN}$

- **Force to the front = $(0.8 - 0.45 \times F_{\mu}) \times 4000 \text{ daN} = 1050 \text{ daN}$**
- **Force to the rear = $(0.5 - 0.45 \times F_{\mu}) \times 4000 \text{ daN} = 150 \text{ daN}$**
- **Force to the rear = $(0.5 - 0.45 \times F_{\mu}) \times 4000 \text{ daN} = 150 \text{ daN}$**

Required LC = $1050 \text{ daN} / 2 / \text{Cos}(\sim 0) = \underline{525 \text{ daN}}$



F_{μ} = conversion factor for direct lashings



Conclusions

- **In compliance with EN12195 -1 (2010)**
- **No additional securing material like edges and friction mats**
- **No climbing, minimal interaction driver / forklift**
- **Easy to apply, self explanatory practice**
- **Lashing angle almost zero.**
- **Independent on position of lashing eye**