



Source:
GDV



Source:
GDV

TRADITION IN
DYNAMIC INNOVATION

Load securing with chains





- All of our plants are among the most modern chain production sites, forges and machining centres on the planet. All are highly automated.
- The RUD Group has more than 50 locations and approximately 1,200 employees.

● Production Units
(with sales activity)

● Sales Units
(with manufacturing activity)

PRODUCT RANGE



Sling and Lashing Systems



Military Technology



Conveyor & Drives



Tyre Protection Chains



Non skid chains

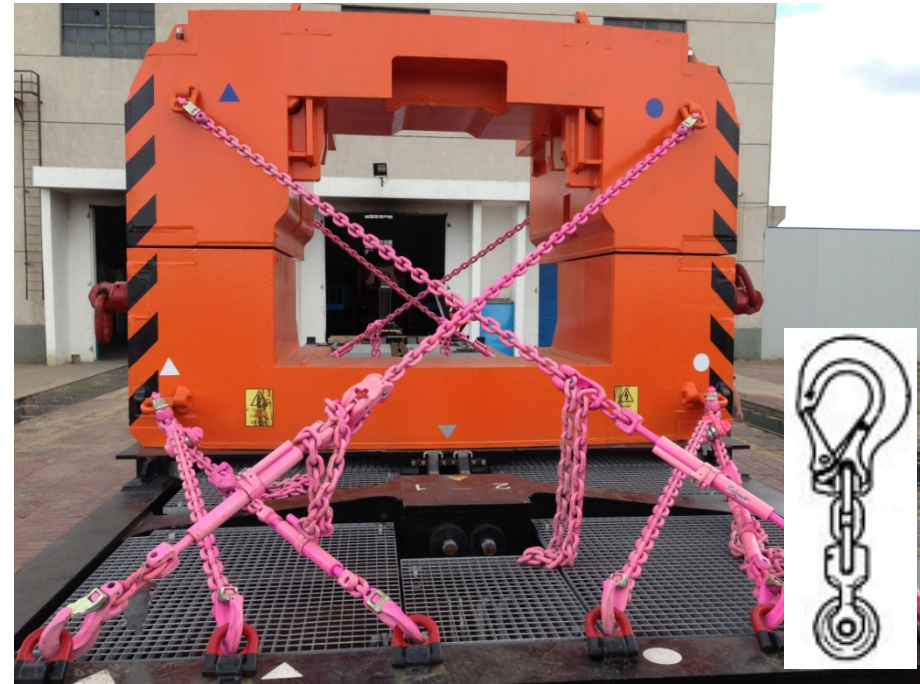


Object Equipment

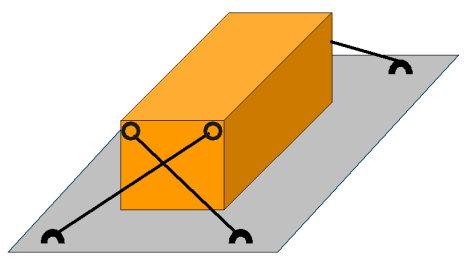
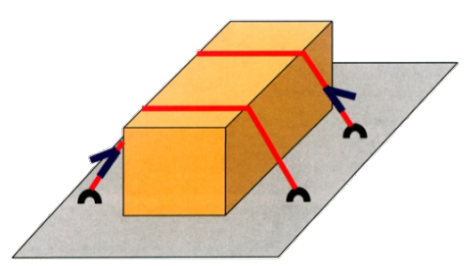


Barriertech

Lashing products

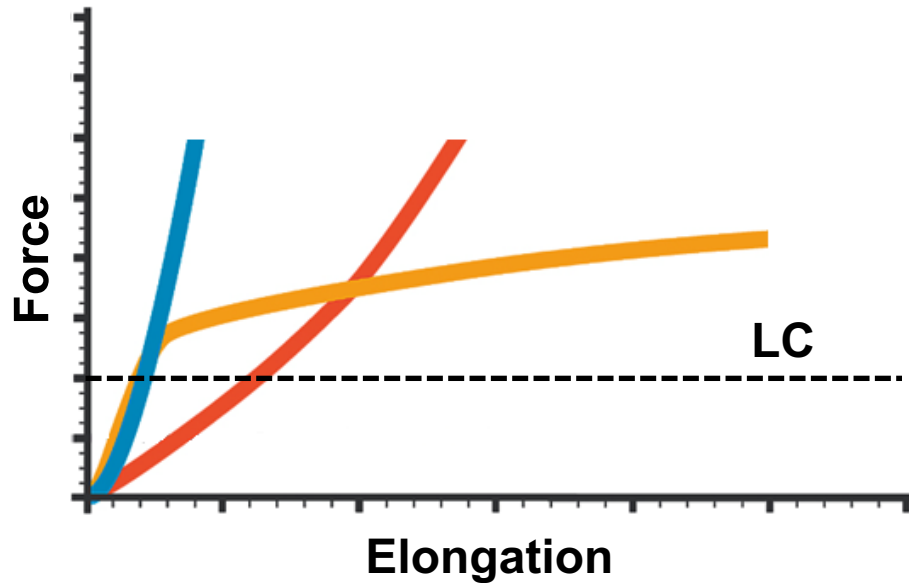


Right choice of lashing means

Lashing type	Chain	Belt
	++heavy loads++	++light loads++ !!! elongation!!! !!!edges!!!
	++ heavy loads ++ !!! elongation!!! !!! damaging!!!	++ light loads ++ !!!edges!!!

Lashing chains - Pro

- High forces
- Robust
- Long life
- Low elongation at LC
- High energy absorption



Basket chain





Assessment:

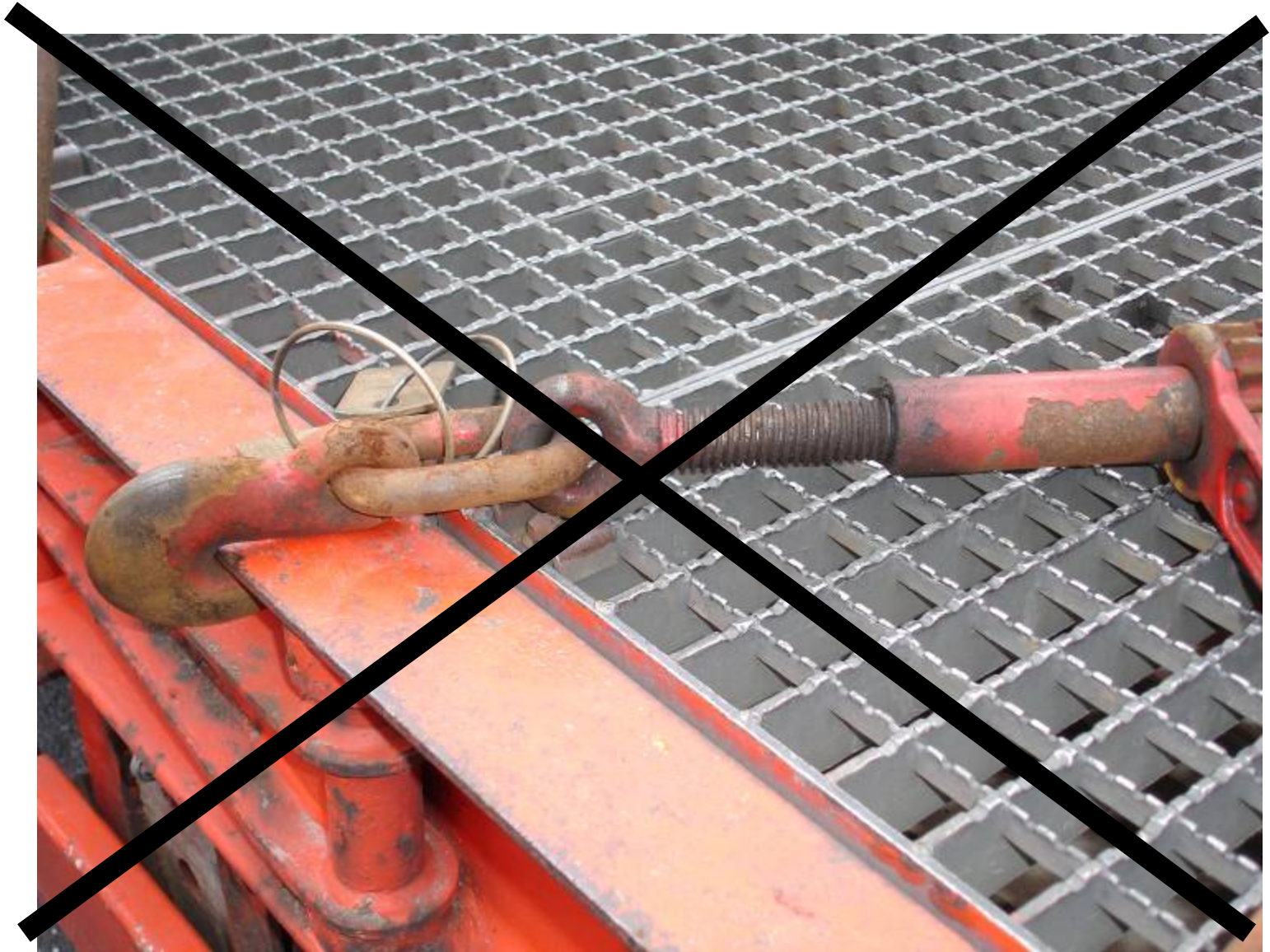
Hook load/ choke hitch/ sharp edge



Unsuitable “lashing points”

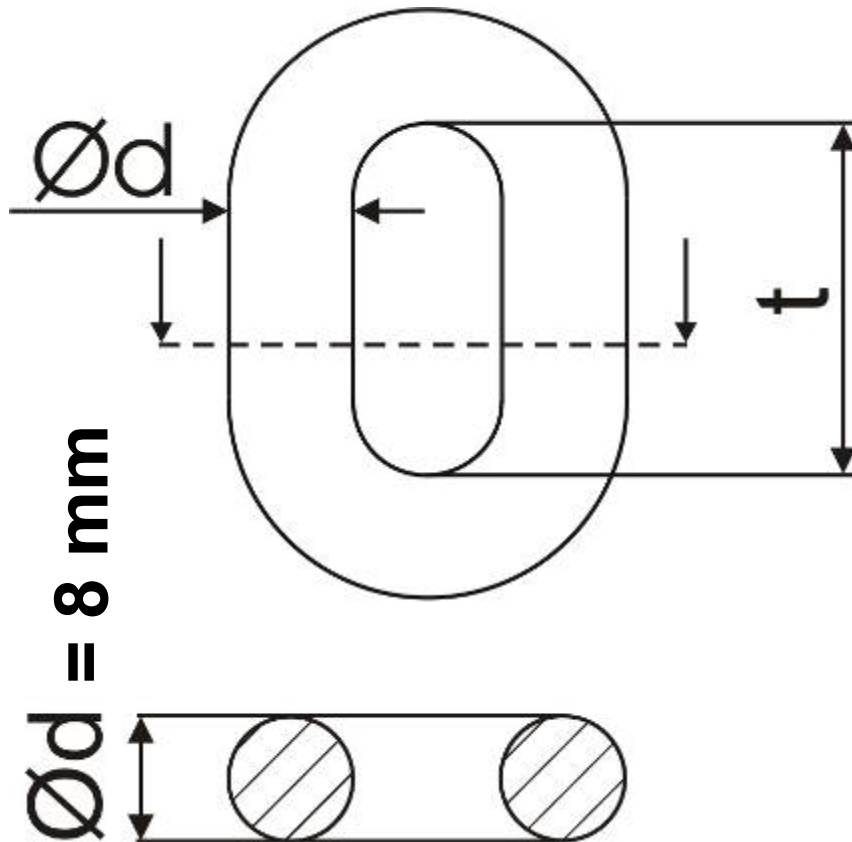


Unsuitable “lashing points”



Basics of chain technology:

What does grade mean?



$$\text{Area } A = \frac{d^2(\text{mm}) \times \pi}{4} \times 2$$

$$A = \frac{8 \times 8 \times 3,14}{4} \times 2 = 100 \text{ mm}^2$$

Example: breaking strength $80 \text{ kN} = 80.000 \text{ N}$

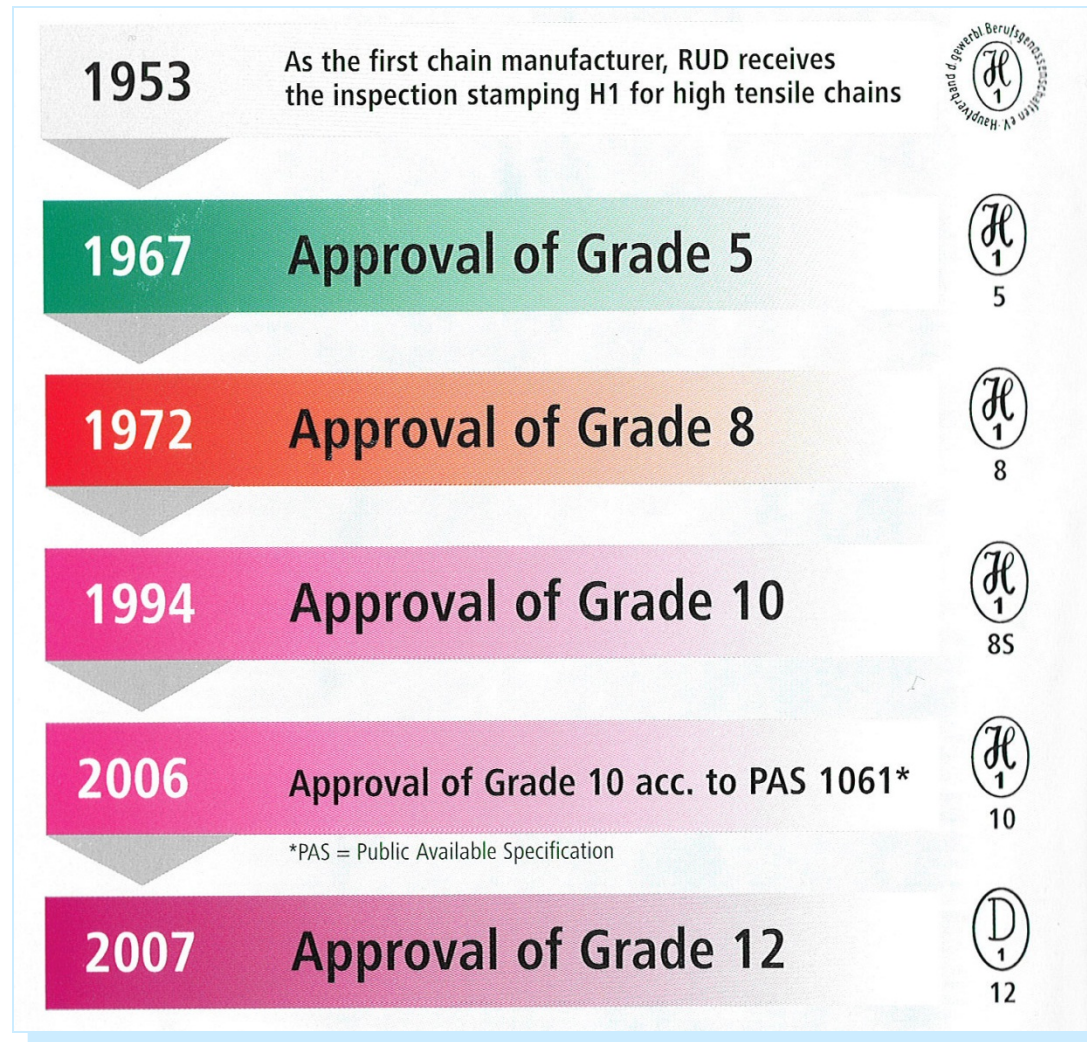
$$\sigma_B = \frac{F}{A} = \frac{80.000 \text{ N}}{100 \text{ mm}^2} = 800 \text{ N/mm}^2$$

(spec. min. breaking strength)

grade 8 or 80

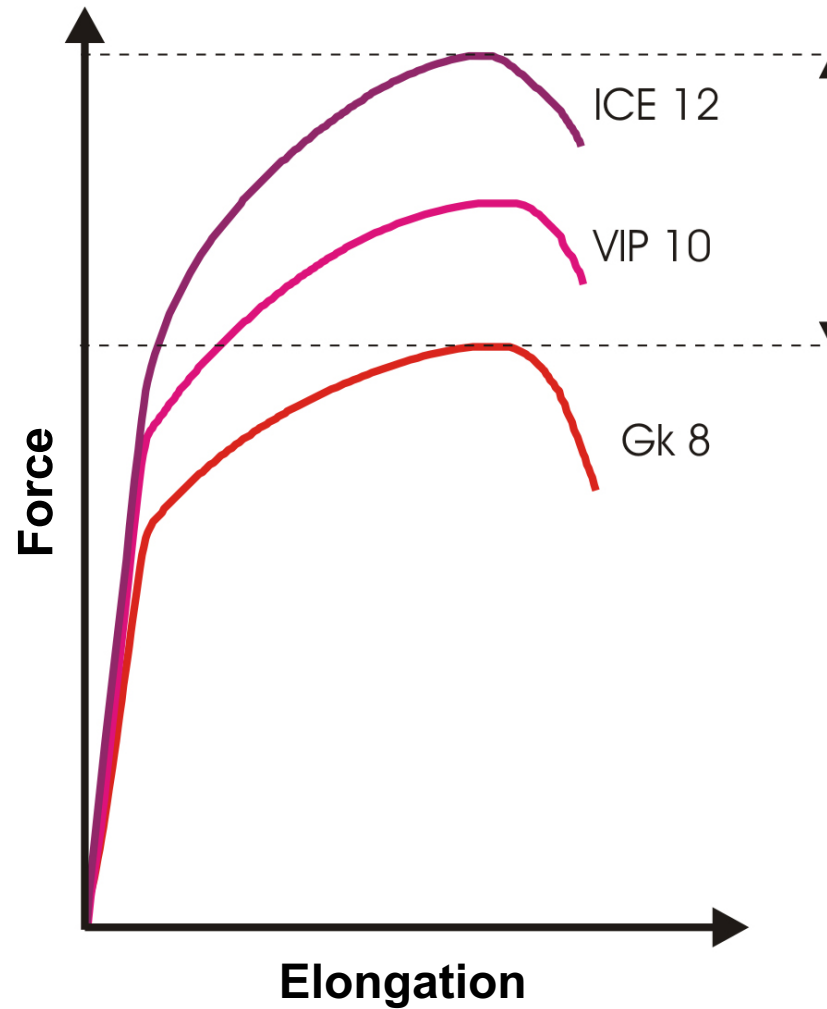
History of the chain technology:

Grades



History of the chain technology:

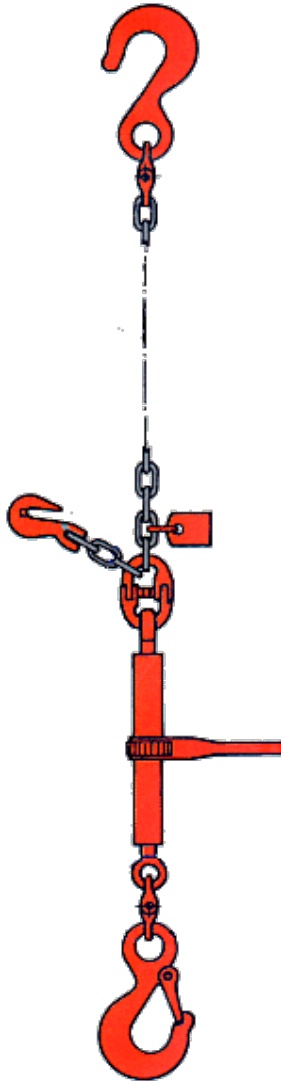
Grades



Lashing chains on trial

Norm conformity test – EN 12195-3

Prohibited



Lashing chains on trial

Norm conformity test – EN 12195-3



Prohibited

Connecting device
without safety latch (EN 1677-2)



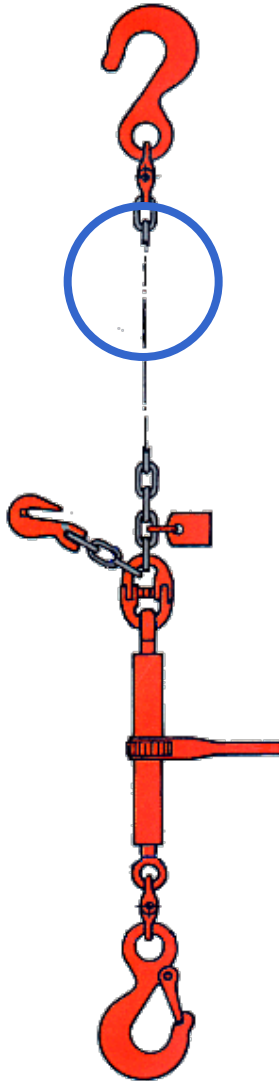
Lashing chains on trial

Norm conformity test – EN 12195-3

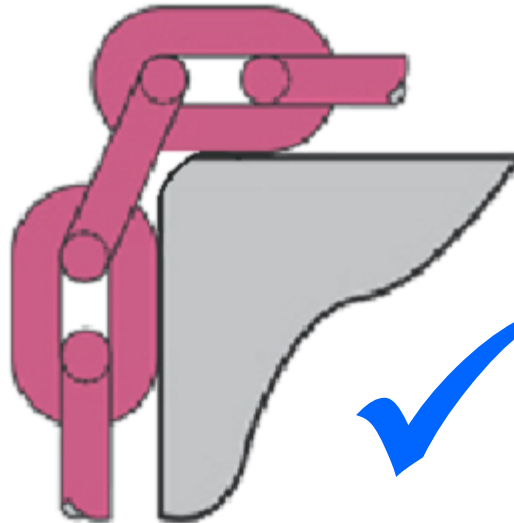
Prohibited

Chain:

- Lower than Grade 8
- No manufacturer's mark (EN 818-2)
- Long link chain



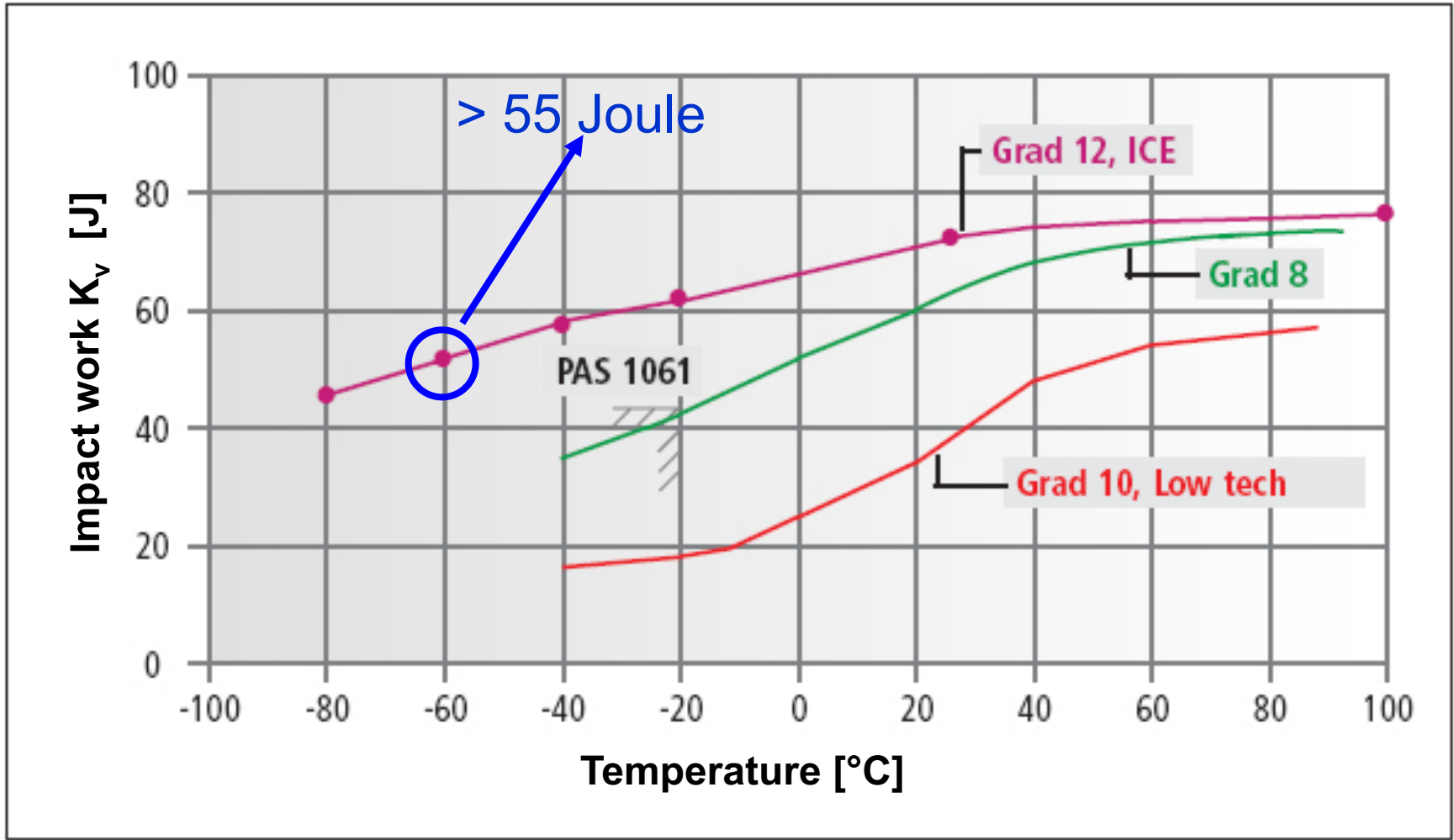
Application of round steel chains



Correct lashing chain ($t = 3 \times d$)

Diagram

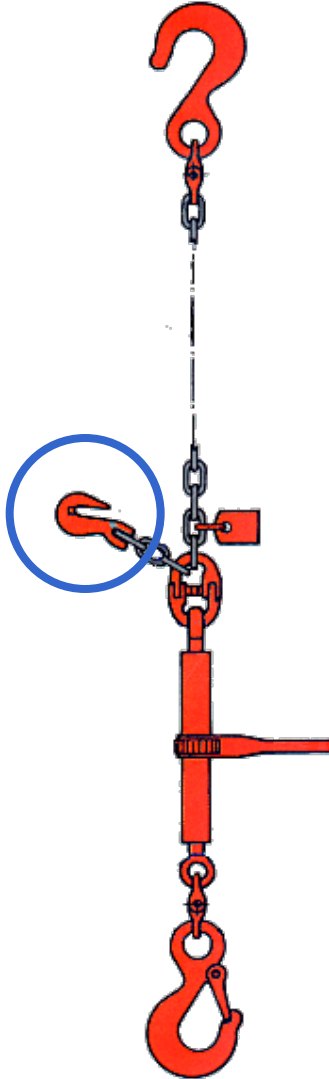
Notched bar impact work - Temperature - Curves



Lashing chains on trial

Norm conformity test – EN 12195-3

Prohibited

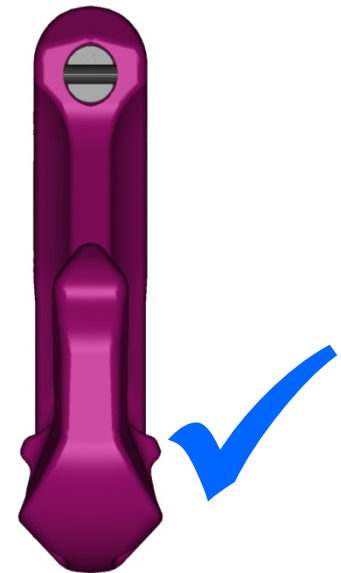


Shortening device:

- No locking device (DIN 5692)
- Breaking force reduction



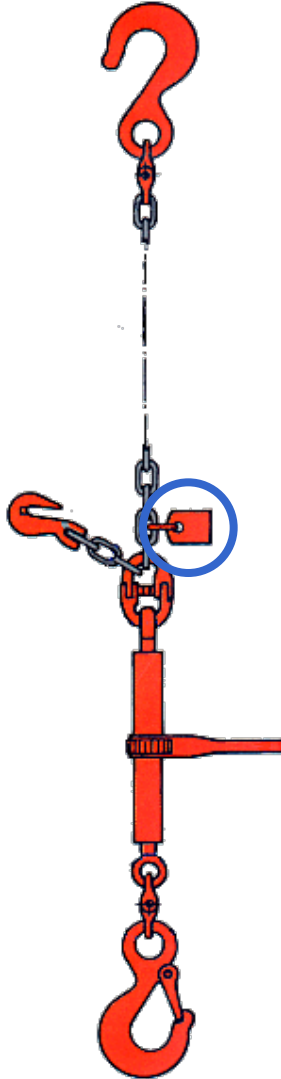
(groove depth $\geq 5 \times D$)



Lashing chains on trial

Norm conformity test – EN 12195-3

Prohibited



Identification tag :

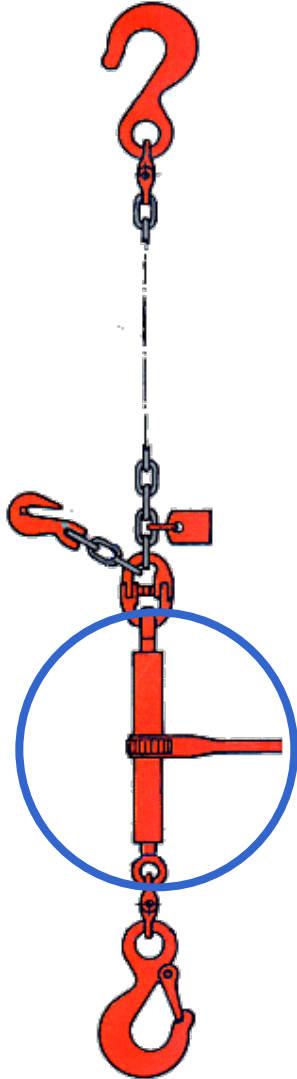
- Not according to EN 12195-3
- Missing



Lashing chains on trial

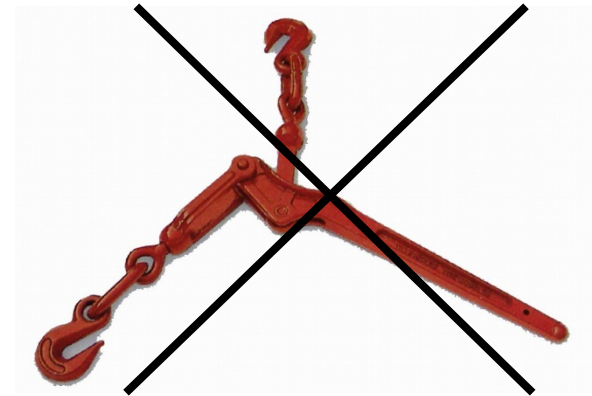
Norm conformity test – EN 12195-3

Prohibited

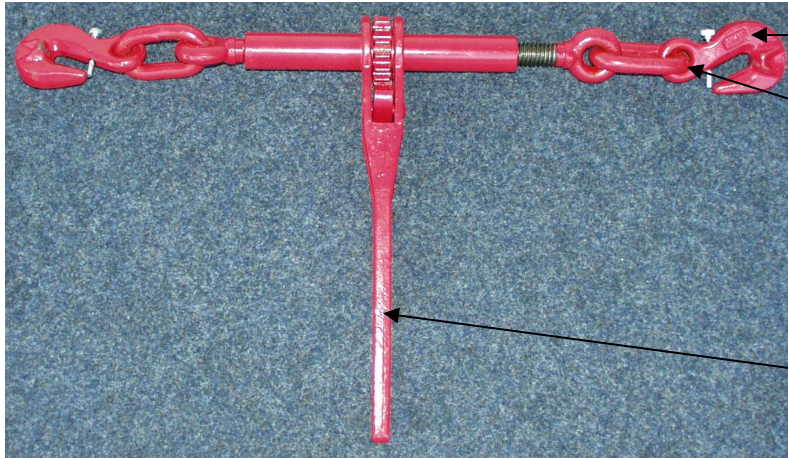


Tensioner:

- STF > 50% LC
- No manufacturer mark
- No take out securing
- Kickback > 150 mm



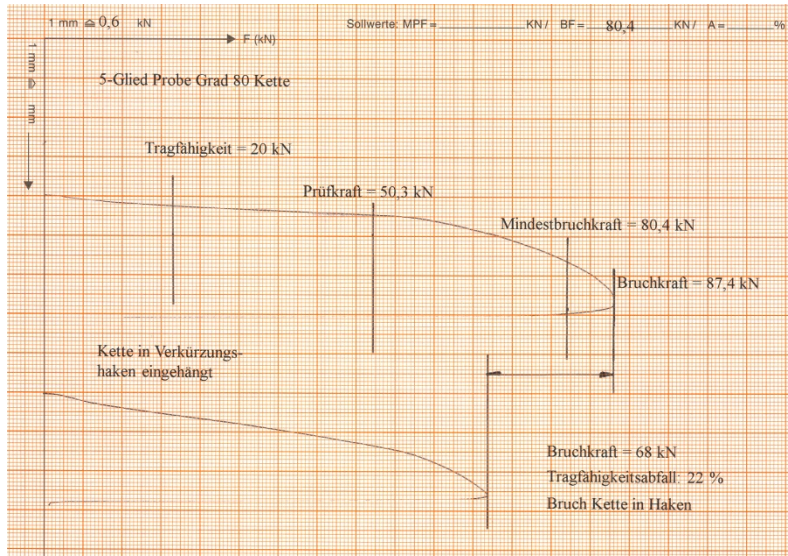
Investigation of a „cheap import“



No manufacturer mark

Breaking force reduction

Long ratchet lever



Test results:

- 22% breaking force reduction of the Grade 8-chain
- $STF = 0,93 \times LC$
- ➔ 86% over allowed max. level

The use of hoists for load securing



$$LC = WLL$$

Replacement criterias

according to DIN EN 12195-3

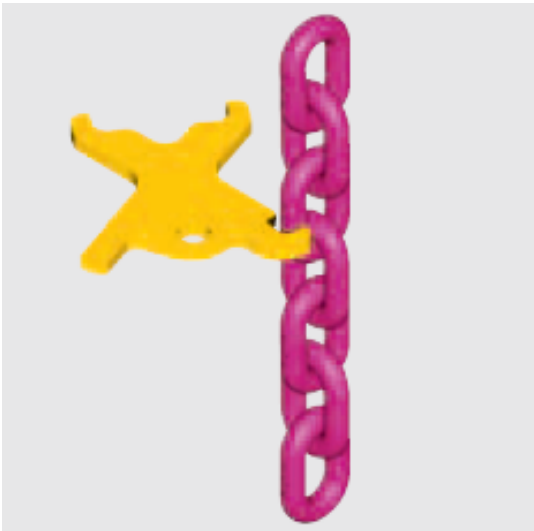
- Cracks on the surface, deformation of the link
- Extension more than 5 % of the pitch
- Wearout of a link more than 10 % of the nominal thickness
- Deformation, cracks, strong wearout or strong corrosion on the tensioner or connection devices



VDI 2700-3.1: annual inspection!



Testing gauge



Testing wear of nominal diameter

(10%)



Testing plastic elongation caused by overload

(5% of pitch = 3% of link length)



Testing elongation of pitch caused by wear of nominal diameter

Optimal load securing

Important information!

Optimal load securing...

...with VIP and ICE-Lashing means

Best load securing – a compulsory legal necessity!

Edition 21

L.G. = 10000 daN

Zur Winkelermittlung n. diese Kante an Kettenstrang anlegen!

Diagonallashing

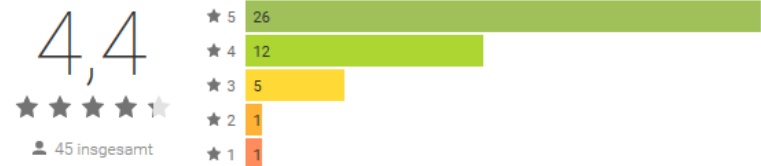
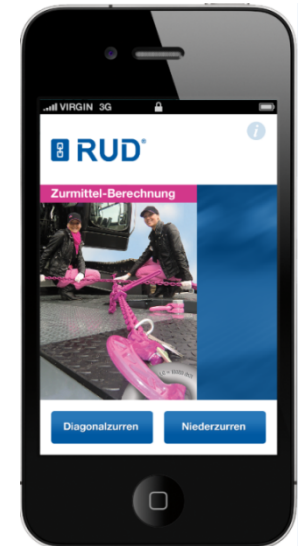
Lashen	L	Max. Ladungsgewicht (t) Einheitslasten (kN) 200°/45° 1. Diagonale Lashing		Kettensicherung (kN) 20°/45°	
		20°/45°	45°/45°	20°/45°	45°/45°
VP 100	1000	8,7	11,9	14,3	18,7
VP 150	1500	13,1	17,8	21,5	28,1
VP 200	2000	17,4	23,8	29,3	38,1
VP 300	3000	26,1	35,7	43,9	57,2
VP 400	4000	34,8	47,6	58,6	76,3
VP 500	5000	43,5	59,5	73,3	95,4
VP 600	6000	52,2	71,4	88,0	114,5
VP 700	7000	60,9	83,3	102,7	133,6
VP 800	8000	69,6	95,2	117,4	152,7
VP 900	9000	78,3	107,1	132,1	171,8
VP 1000	10000	87,0	119,0	146,8	190,9

Werte höherer Tabellen beziehen sich auf: standardisierte Ladung, Staßbelastung, keine kombinierte Ladungssicherung!

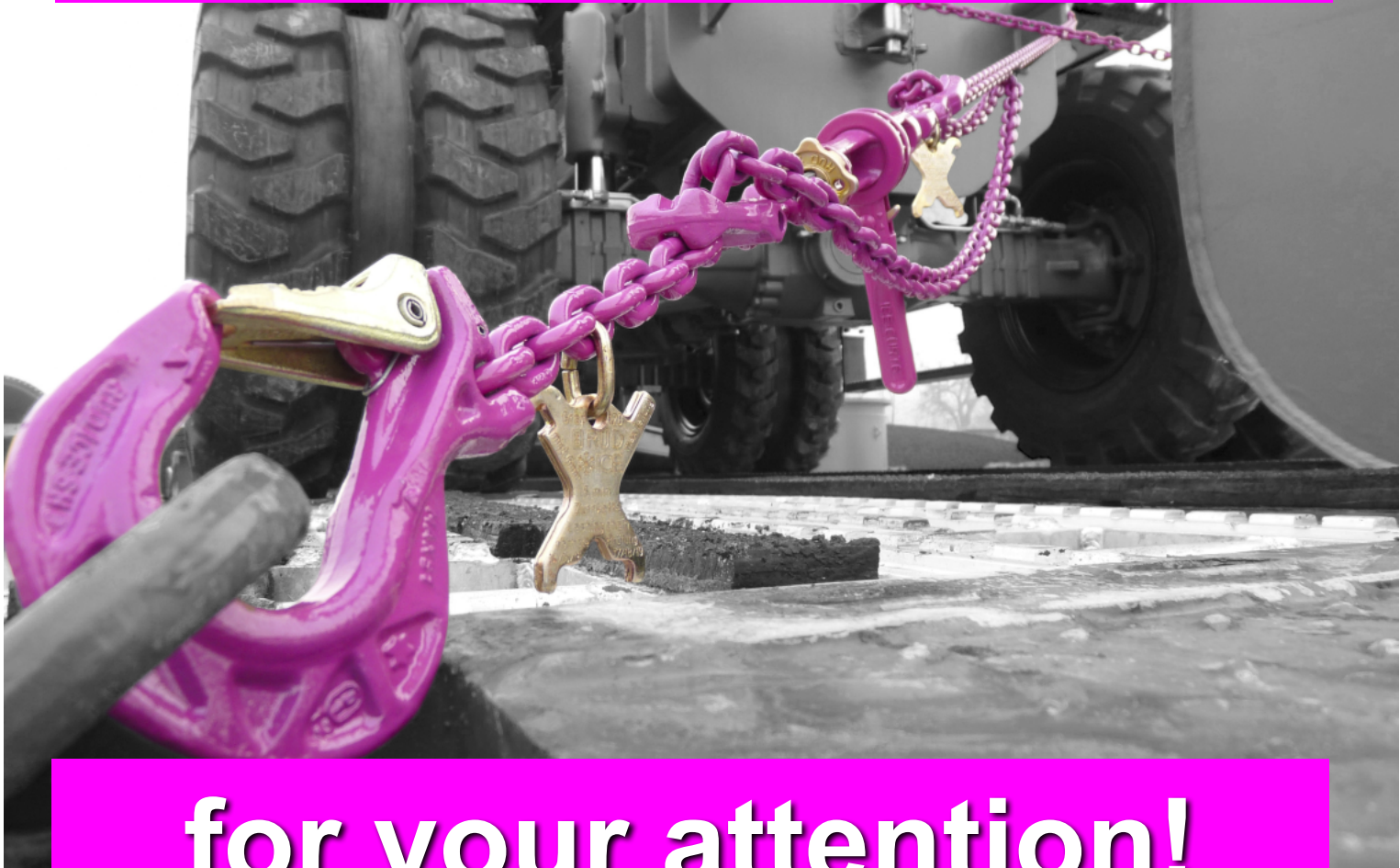
Lashing-Card

Ladungssicherung auf Straßenfahrzeugen nach DIN EN 12195-1

Download Fachheft "Optimale Ladungssicherung" unter: www.rud.com



Thank you



for your attention!