Instructions for Fastening of Cargo for Road Transport Slovalco, a.s.

Guide for Loading Personnel and Truck Drivers
(Updated on 31.1.2011)

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1 GENERAL INSTRUCTIONS FOR LOADING AND SECURING OF LOAD

1.1 APPLICABILITY OF THE INSTRUCTIONS

RESPONSIBILITY

According to the Act No. 8/2009 Coll. On Road Traffic:

„Cargo on a vehicle must be **properly placed, laid-out and fastened**, so as to avoid any threat to safety and flow of road traffic, pollution and/or damage of road and its surroundings, excessive noise, pollution to air; the cargo shall not cover headlights, any othe lights of the vehicle, reflectors, license plate and/or the label specifying highest allowd speed. **The cargo shall be properly secured to avoid its slipping, tipping over or falling down (i.e. to avoid any free movement) due to changed speed or direction of travel of the vehicle".**

Podľa nariadenia vlády SR č. 349/2009 Z. z.:

„Cargo on vehicle or truck-trailer combination must be evenly distributed and properly secured against movement by suitable technical equipment (e.g. STN EN 12195-2 Load restraint assemblies on road vehicles. Safety. Web lashing made from man-made fibres, STN EN 12195-3 Load restraint assemblies on road vehicles. Safety. Lashing chains, STN EN 12195-4 Load restraint assemblies on road vehicles. Safety. Lashing steel wire ropes.). If the cargo is fastened by a load restraint assembly, it must be in good technical condition.

Forwarding agent is responsible for safe transport withou any damage to cargo. These instructions represent minimum requirements for protection of our goods. They shall not relieve the forwarding agent from responsibility to take other measures he deems necessary (espacially in case of worsened climatic conditions - black ice, ice in cargo area, oil…).

APPLICABILITY

These instructions shall be applicable for allvehicles transporting extrusion ingots ∅ 152, ∅178, ∅ 203, ∅ 228, ∅ 254, ∅ 279 and PFA ingots BEFESA (*7+7, 11, 13, 15, 17, 19 layers*) and Gautschi (11, 13 layers) from the premises of SLOVALCO to customers.

INSPECTION

Inspection shall be carried out by loading supervisor in accordance with these instructions. Vehicles not meeting the minimum requirements will not be loaded. If it is discovered that driver failed to fasten cargo in accordance with the minimum requirements or used unsuitable load restrain assemblies, transport will be stopped. Person carrying out the inspection will decide if the situation can be remedied; if not, the vehicle will be unloaded and sleave SLOVALCO premises empty.

DRIVER BEHAVIOR

Driver must be dressed/equipped in accordance with the valid requirements and behave according to SLOVALCO HSE instructions.

Empty vehicle shall be weighed at entrance gate prior to loading! Forwarding agent (driver) shall be responsible for positioning the vehicle in specified area, opening/closing tarpaulin, all manipulation with sidewalls and fasteninf/securing of cargo. Driver shall continuously supervise how cargo is loaded on the truck.

1.2 VEHICLE REQUIREMENTS

END PLATE

The vehicle has to be equipped with an end plate between driver's cabin and cargo area for protection of occupants of the vehicle against movement of cargo in front direction. The end plate must be functional, without cracks of welds and/or damage. The end plate must be sufficiently strong for the loaded cargo leaning against this wall. Avoid concentrated point load of the plate! If the end wall is not strong enough, the cargo must be additionally secured.

Vehicle without lashing points with damaged end plate!

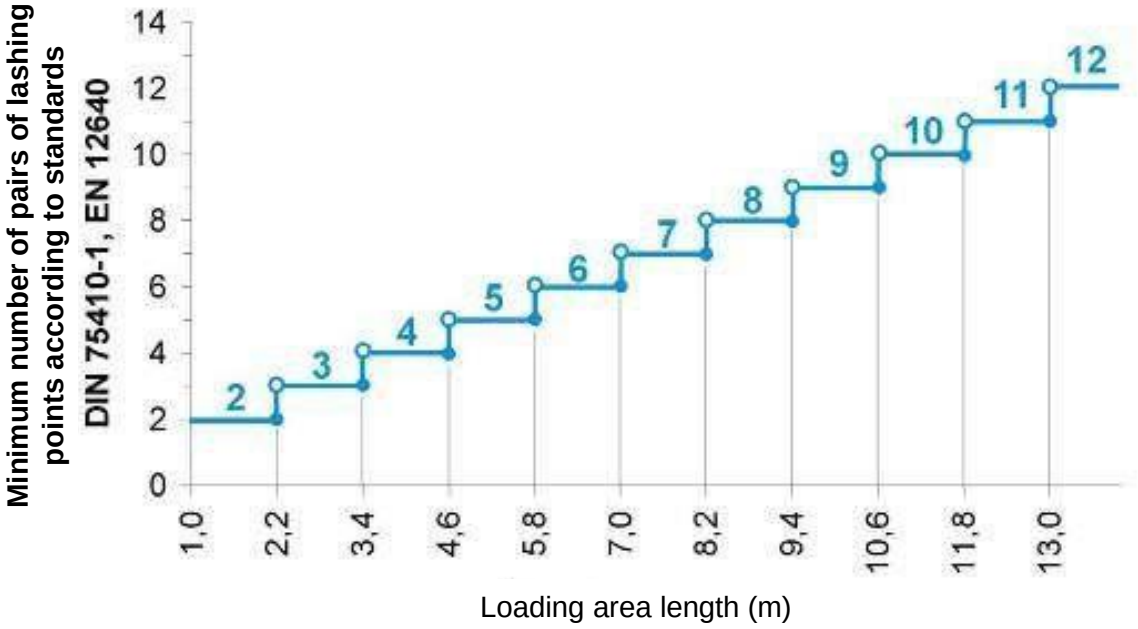
CARGO AREA

The floor must be even, intact and in good condition (no missing or broken boards). Cargo must not be wetted from the bottom. The cargo area must be dry and clean before loading.

Cargo area must have skid-proof surface (not metal surface)!

LASHING POINTS

The lashing points must be built in the vehicle structure. Standard semitrailer must be equipped with the minimum of 12 pairs of lashing points (24 lashing points) with the minimum safe work load of 2000 daN. **We recommend more lashing points in the middle of the semitrailer, especially for loading of 7-meter long extrusion ingots!**



Lashing lugs released/damaged due to movement of cargo (insufficient strength)!
MIN. STRENGTH 2000 daN (2 tons)!

Lashing points (lugs) must be in good condition!

1.3 LASHING STRAPS

Vehicle must be equipped with the sufficient number of undamaged lashing straps with clearly readable identification labels!

- At least **14** for semitrailer and trailer sets; **at least 20 straps for cargo consiting of short PFA ingots and short extrusion ingots**
- At least **6** for a truck with trailer load to 12 t, however, not less than required according to these instructions
- At least **4** for a truck with trailer load to 3.5 t, however, not less than required according to these instructions
- Sufficient number of strap protections (angle pieces, sleeves, rubbers…) against sharp edges
- Lashing straps must be approved according to EN 12195-2

- lashing **capacity LC = min. 2000 daN!** (we recommend 2500 daN) and **standard tensioning force STF = min. 400 daN**
- length of the lashing strap must be sufficient for the used fixation method
- the straps must be visually checked before each use
- end points of lashing straps must be suitable for the lashing points on the vehicle

CONDITIONS OF USE

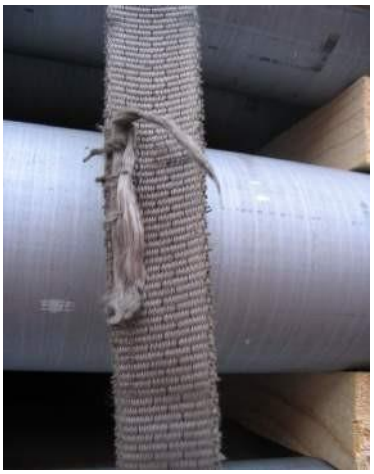
- use only undamaged lashing straps with clearly readable identification label stating lashing capacity (LC) and standard tensioning force (S_{TF})
- the labels must be protented from sharp edges and (if possible) from cargo itself
- the lashing straps must not be knotted
- the lashing straps must not be led through sharp edges or rough surfacea, unless adeqatelly protected

- the lashing straps must not be used for lifting
- the hooks must not be loaded up at the tip, unless using hooks specially designed for this purpose
- tensioning and connecting elements must not be leant against edges, not to be loaded up to bend
- the lashing straps must not be reused after breakage or deformation of fastening element or part of tensioning element
- driver is obliged to check during transport if no strap got loose, especially short after start of transport; if he/she is aware of any loosening, he/she shall inspect tensioning of the straps during the travel in regular intervals and tighten them if they are loose
- change of external temperature during transport may affect the forces in lashing strap; hence, it is necessary to check the tensioning force after entering warm territory
- driver is responsible for functional condition of lashing straps in the vehicle

These types of lashing straps shall not be used!!!








1.4 ANTI-SLIP MATS

- Made of rubber.
- Minimum thickness 8 mm.
- If required for securing/fixation of the cargo, the vehicle must have sufficient number of anti-slip mats.
- The cargo must be put on the anti-slip mats so they are bearing the whole cargo weight.

1.5 SAFETY AT WORK

Truck drivers must adhere to Slovalco HSE rules applicable in all premises.
Drivers shall be dressed and equipped in accordance with the instructions!

The vehicle crew is obliged to use the personal protective equioment (PPE) during the whole loading and/or unloading time. **Loading areas are monitored by cameras!**

1.6 LOADING OF CARGO ON ROAD TRUCKS

Vehicle must be weighed empty at the entrance gate before loading!

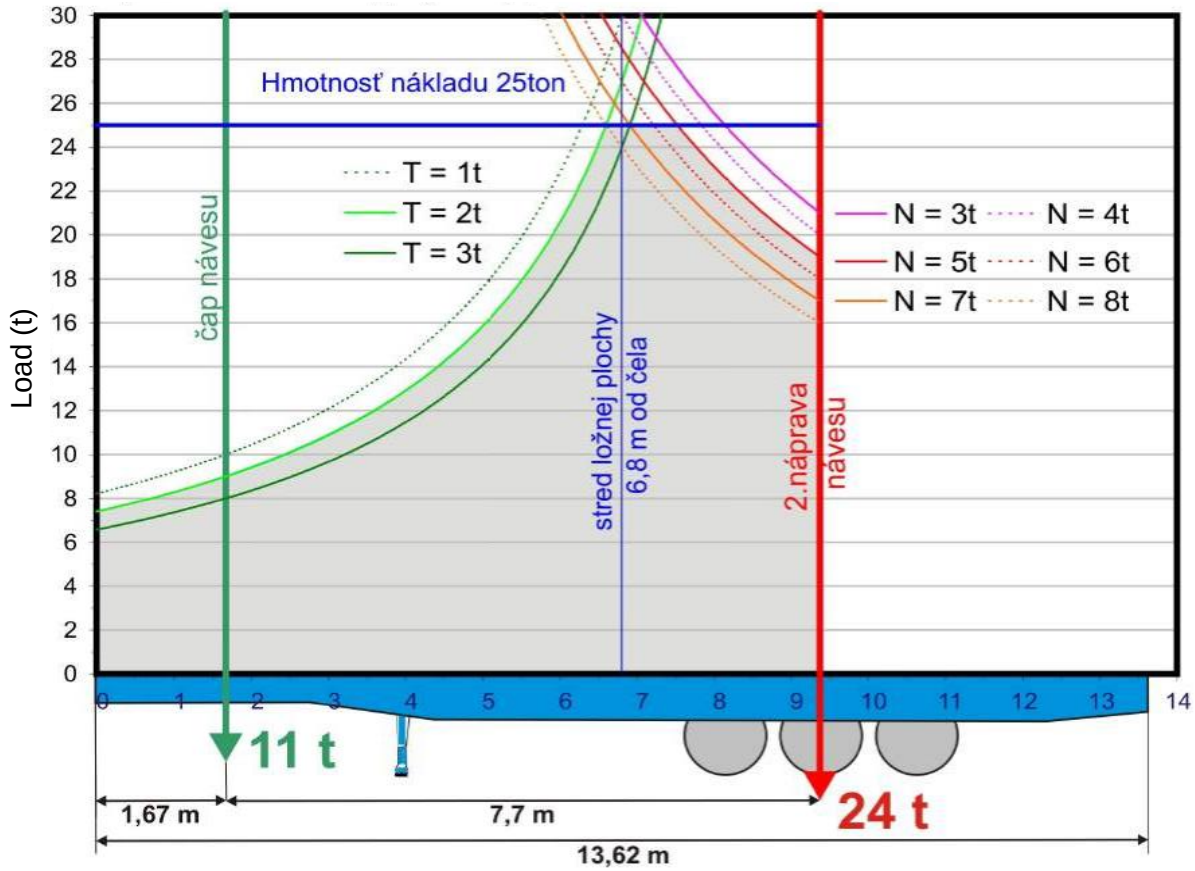
Cargo is loaded on road trucks by forklifts in the presence of truck driver who may give instructions regadring layout of the cargo.

The driver is obliged to check total weight of the cargo and load on axles. It can be helpful to check a drive axle load which is indicated on modern vehicles with air dumpers. If the system shows incorrect values, the driver will calibrate it comparing the indicated value with the value from certified axle scale.

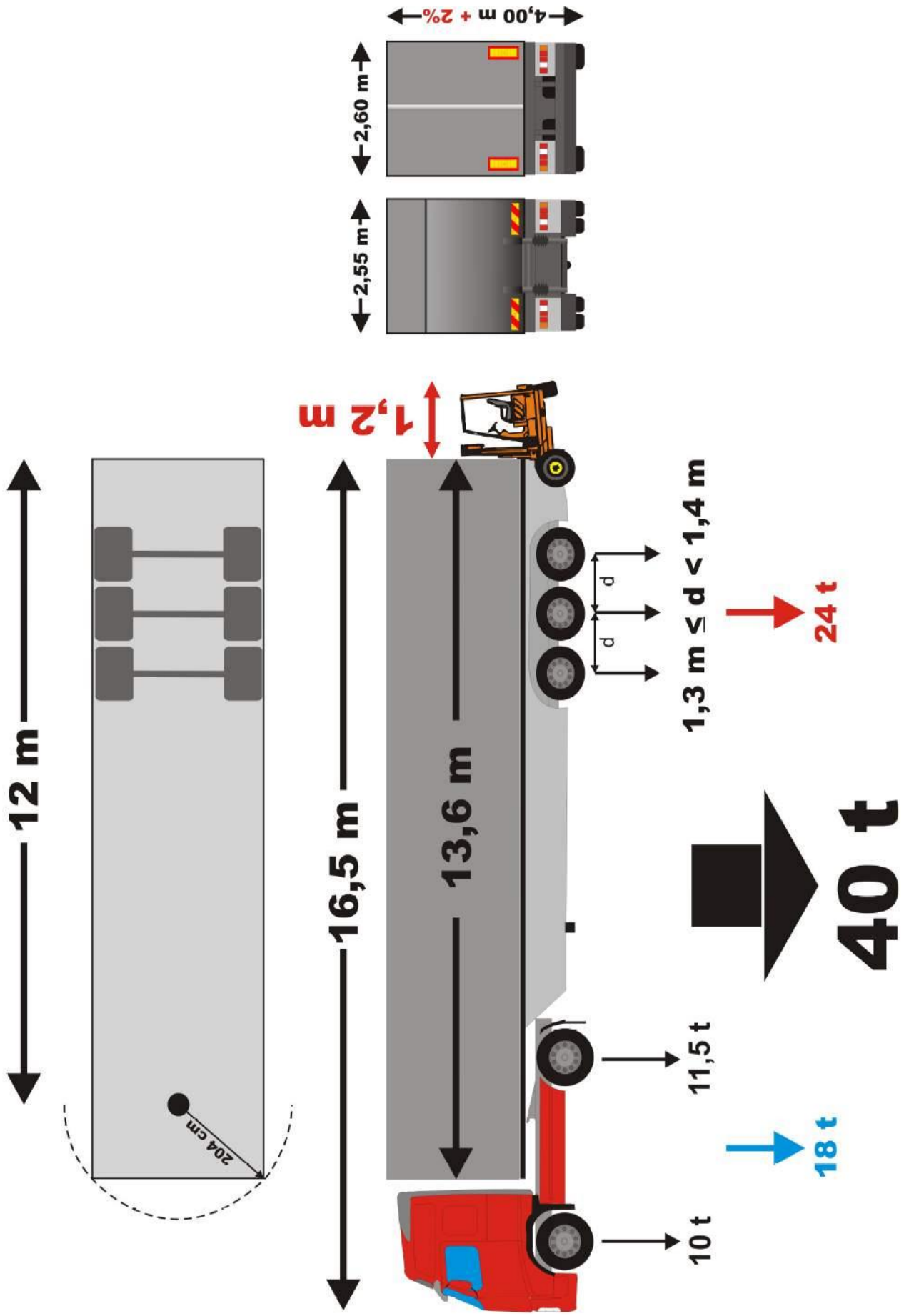
Truck axle load indication
Mercedes - Benz ACTROS

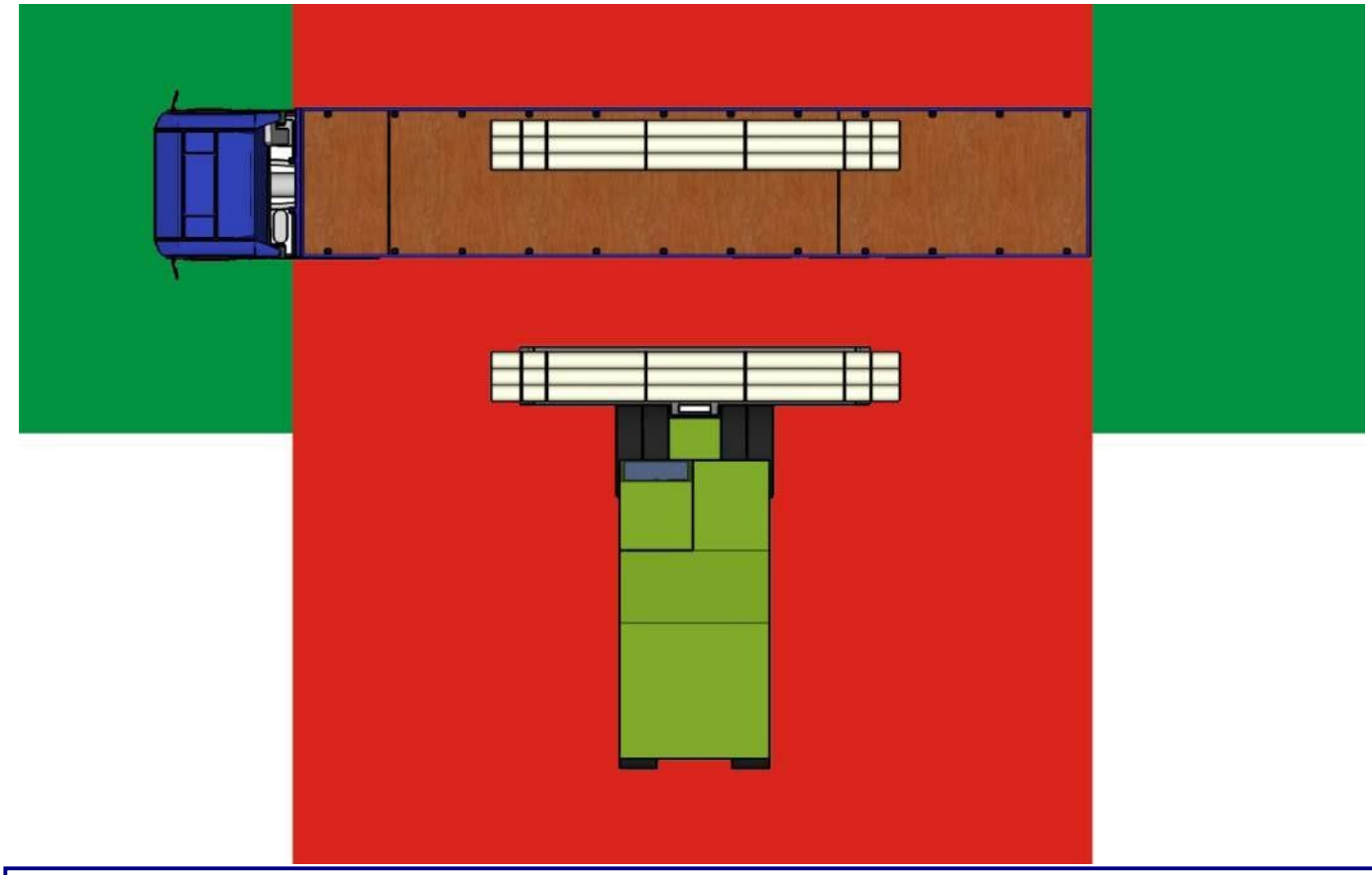
Spreading of load on a typical semitrailer

T = curb weight of semitrailer on steering turn-plate
N = curb weight of semitrailer on triple axle



WEIGHTS AND DIMENSIONS OF STANDARD SEMITRAILER UNIT





Driver shall prepare the truck for loading; he/she may give instructions regarding positioning/layout of cargo before the loading starts. It is recommended to stay in the area marked by green color or inside the cabin during loading. In any case, the driver shall be at minimum 2 m from moving objects.

1.7 BASIC RULES FOR FASTENING OF CARGO IN SLOVALCO

1. Never transport unfastened cargo, not even on short distances!

2. Cargo must be always feastened in forward direction!

Cargo of extrusion ingots (25 tons) not fatened in forward direction!

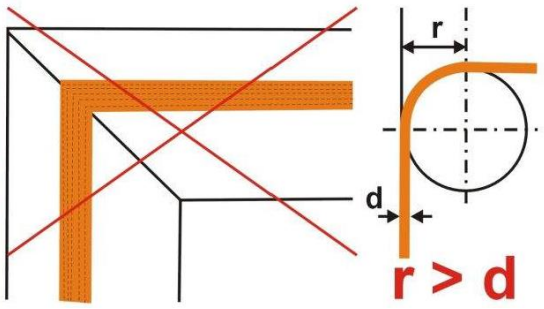
3. **Use straps with the minimum stregth of LC = 2000 daN, standard tensioning force S_{TF} = 400 daN and sufficient quantity! We recommend use of long-handle tumbuckles (S_{TF} = 500 daN).**

4. **Primarily use the lashing points intended for fastening of cargo. If not possible due to layout/positioning of cargo, fasten to the frame of superstructure or vehicle (extrusion ingots, ingots)**

5. **Vehicles used for loading of cargo from Slovalco must have sufficient number lashing points with appropriate strength!**

   Standard semitrailer shall have min. 12 pairs of lashing points with the strength of 2000 daN. It is not possible to securely and effciently facten cargo on vehicles without lashing points!

6. **Beware of sharp edges (end of extrusion ingots) which can cut the straps; use protective elements (angle pieces, sleeves,…)!**



7. **Never load lashing points in one direction!**

The maximum number of lashing straps per single lashing point is 3, each with different load direction; hence, only 1 strap will transmit force to a lashing point at a time (e.g. in case of braking).

If 2 straps are fastened in 1 lug in the same direction, the fastened weight of cargo shall be reduced to half!

8. Anti-slip mats reduce the quantity of additional fastening equipment!

Always ensure efficient use of the mats. If used, they must suport the cargo in a way avoiding its contact with loading surface, i.e. the whole weight must be transmitted through the anri-slip mats. In case of loading of 7-meters long extrusion ingots in the middle of the semitrailer, the anti-slip mats must be placed between the wooden runners and the floor!

2 SLOVALCO PRODUCT MIX WITH A REFERENCE TO FASTENING OF CARGO ACCORDING TO THESE INSTRUCTION

Types of SLOVALCO products with a reference to loading and fastening of cargo on road trucks

EXTRUSION INGOTS

Ø152, Ø178, Ø203
Ø228, Ø254, Ø279

Long EI
(7000, 6500, 6000, 3500 mm)
Packed in one layer

Short EI
400 - 1500 mm
Packed in several layers

PFA INGOTS

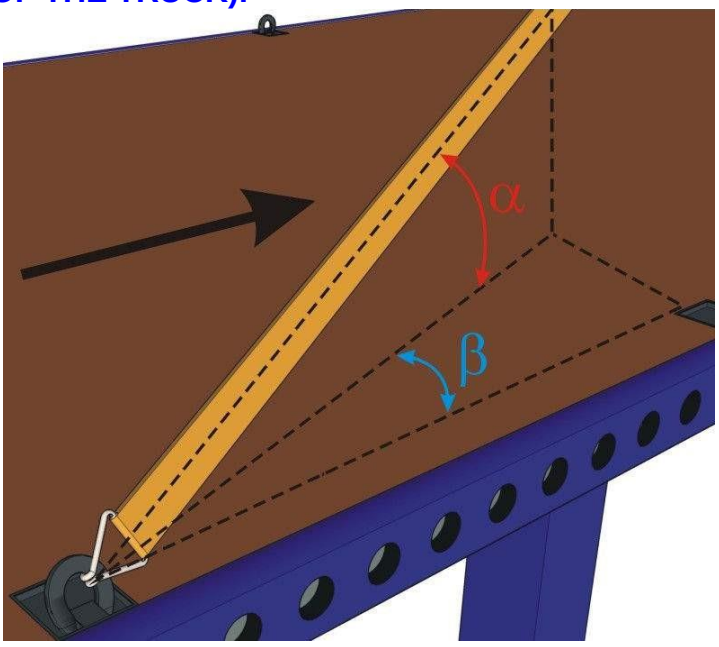
Befesa

19 layers
17 layers
15 layers
13 layers
11 layers
7+7 layers

Gautschi

13 layers
11 layers

THE ARROW INDICATES FORWARD DRIVING DIRECTION (I.E. DIRECTING TOWARDS FRONT END PLATE OF THE TRUCK).



FASTENING ANGLES α, β

3 EXTRUSION INGOTS

3.1 Loading

Packages shall be placed longitudinally, without gaps, leaning against front end wall, if necessary for spreading of load and due to dimensions of the packages - use e.g. palettes in the front, stanchion or front lashing, or divide the cargo into two parts. One part will be leant against front end wall and the other one placed in the back part of the loading surface. This reduces the quantity of necessary lashing equipment.

Considering spacing of lashing points on the vehicle loading surface and layout of cargo, it is practical to put the packages in several groups, each fastened independently, in the front, in the middle and in the back. If there are gaps between individual units, it is necessary to fasten each unit separately in the front direction (practical experience: German inspection authorities ordered filling of individual gaps).

7-meters long packages must be put in the middle of the semitrailer and they have to be fastened in the forward direction, either by blocking or front lashing.

Extrusion ingots with the length less than one half of the loading area must be laid in two sections; extrusion ingots with the length less than one third of the loading area must be laid in three sections etc. If the extrusion ingots are laid in several sections, its is necessary to avoid gaps; if it si not possible, the cargo must be fastened in the forward direction.

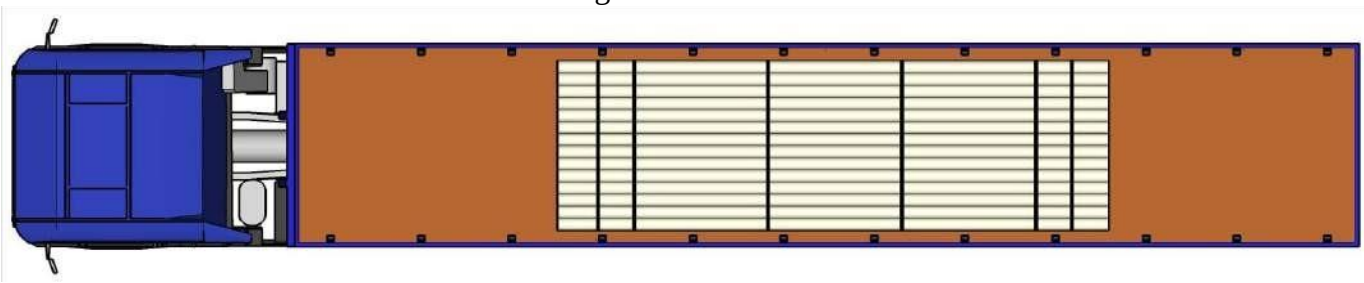
Loading of 6 m extrusion ingots - 2 sections - the first one blocked by the front end wall

Loading of extrusion ingots ∅178 mm - length 7 m - posledná vrstva neúplná

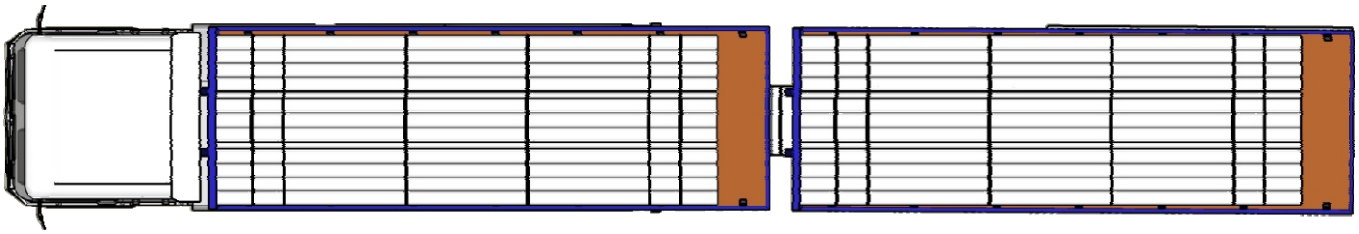
Nakládka čapov - dĺžka 7 m - 1 section in the middle of the semitrailer - 6 layers

3.2 Fastening 7 m long extrusion ingots for road transport

Package of 7 m extrusion ingots (weight to 25 t) is loaded in one section in the middle of the semitrailer, which makes it critical to fasten/secure the cargo in the forward direction.



7 m extrusion ingots loaded on semitrailer



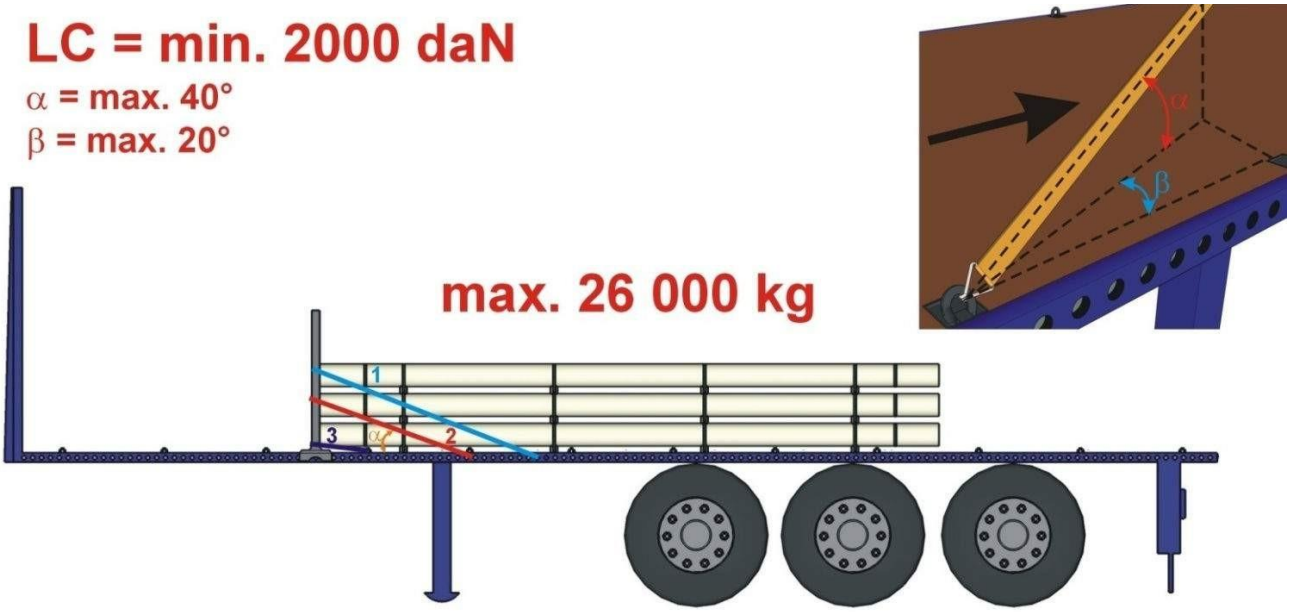
7 m extrusion ingots loaded on trailer set

Securing in forward direction on a semitrailer

This cargo, if not blocked, must be secured by lashing in forward direction. This forward direction lashing can be in combination with lashing net, KRONE MULTIWALL semitrailer system, palettes or other suitable protection. **If the cargo is not secured against forward movement, it can lead to the situation depicted below.**

7-meter extrusion ingots moved forward during braking and broke/crashed in the semitrailer front end wall

3.2.1 Forward direction securing by KRONE MULTIWALL system

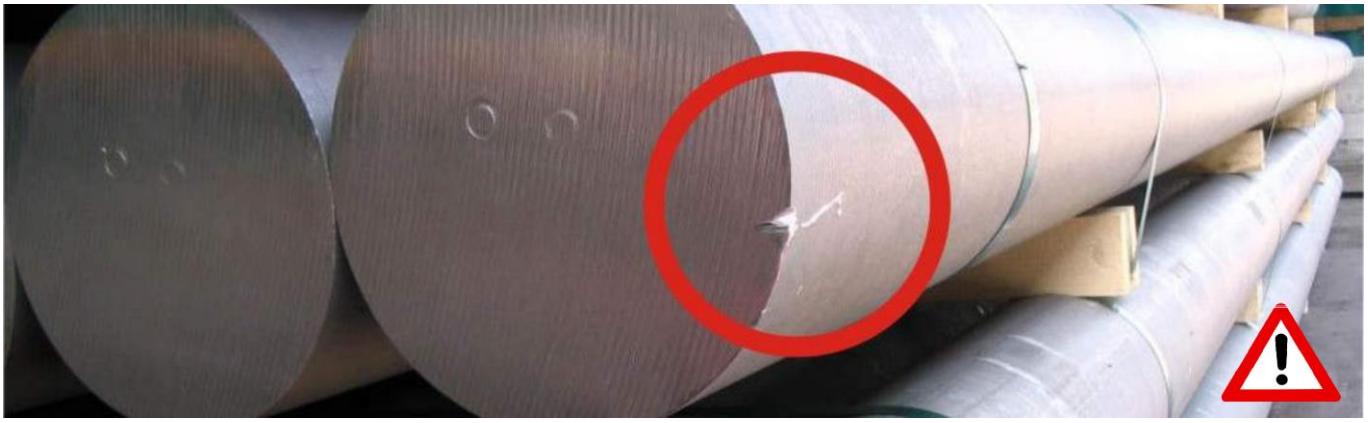


Suggested securing of extrusion ingots against forward movement by effective Multiwall system - 3 straps (6 branches)

After securing of cargo by MULTIWALL system consider use of plywood between extrusion ingots and the MULTIWALL, to avoid contact of ingots with the wall and possible pressure marks! If the system is not secured at the bottom in lashing points (e.g. due to damaged locks), always use 4 lashings to 26 tons!

Straps are turned once around crossbars (except the bottom one) so as not to slip off during transport

Use RUBBER ANTI-SLIP MATS (min. thickness 8 mm) between the cargo (bottom wooden runners) and the floor!



Pressure mark from fixation wall on extrusion ingot!!!

3.2.2 Forward direction securing by fastening net

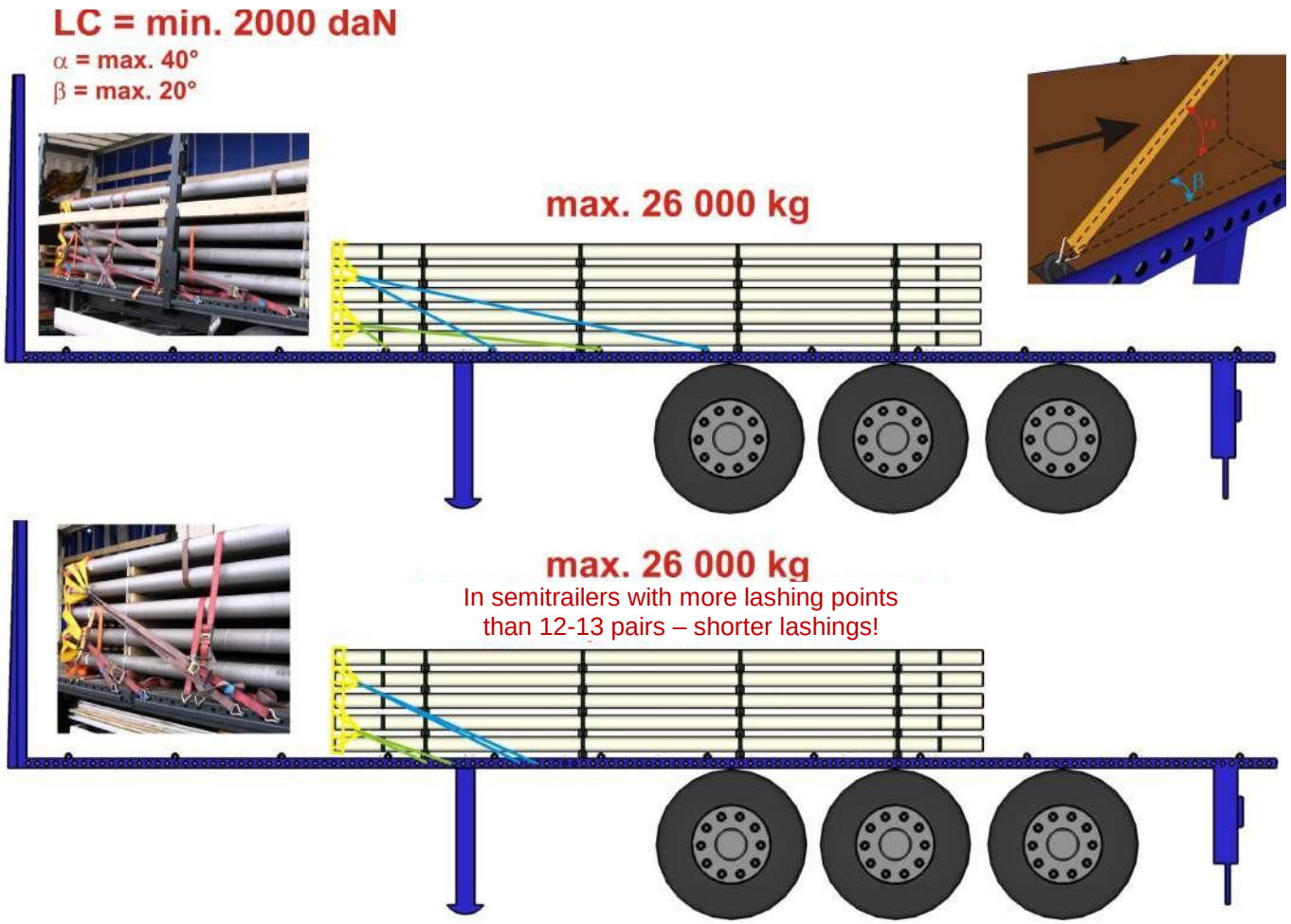
Securing extrusion ingots against forward movement by lashing in combination with a net

Securing of cargo by front lashing with 4 straps (8 branches) and a net - sufficient fastening

Fastening net and securing of load against movement by front lashing with 4 straps (8 branches) and a net

Incorrectly fastened net; the strap is secured only in one fastening point with the strength of 2000 daN!!!

Incorrectly fastened net; the strap is secured only in two fastening points!!!



Minimum strength of lashing points 2000 daN!!!

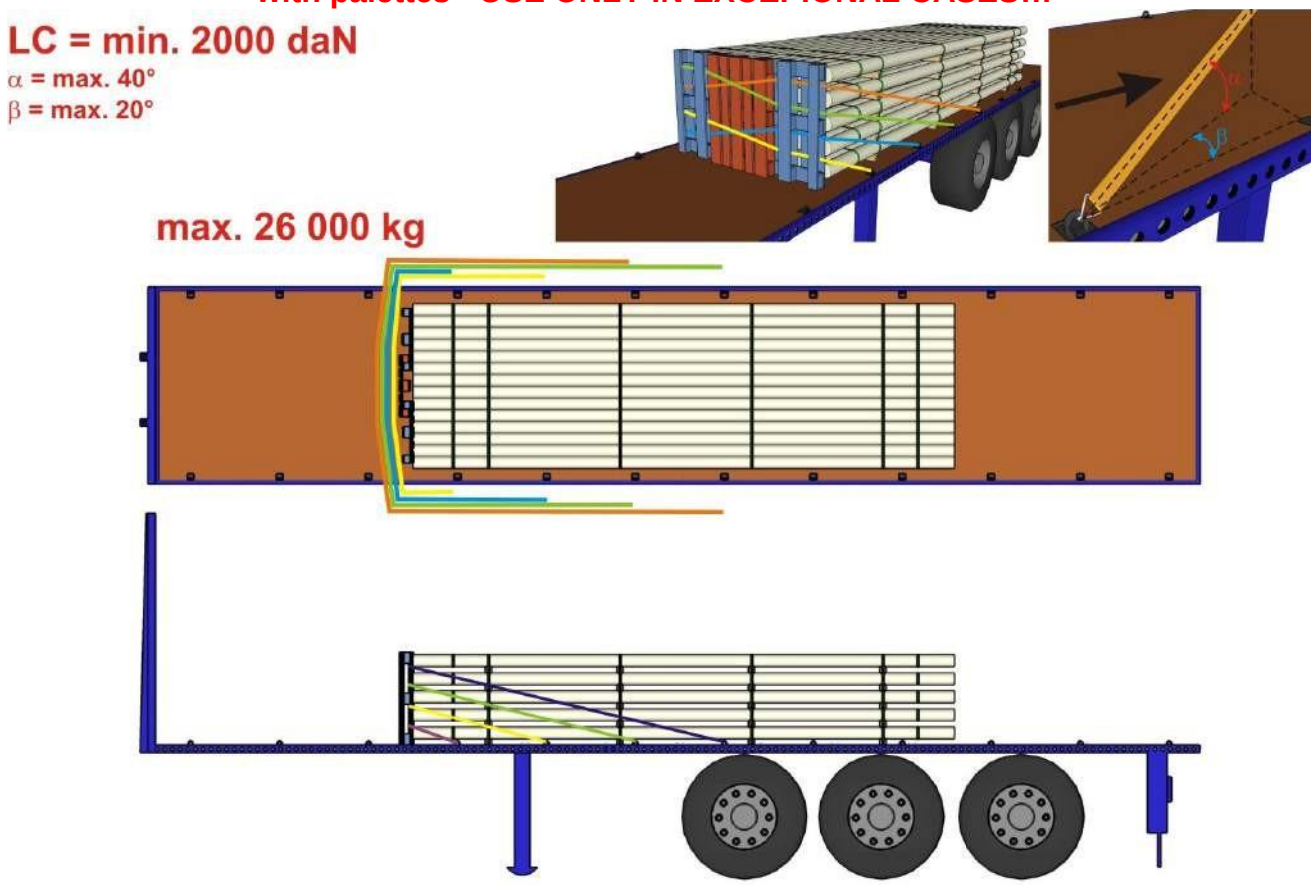
Suggested securing of cargo by lashing net and 4 straps (8 branches) up to 26 t

Use RUBBER ANTI-SLIP MATS (min. thickness 8 mm)
between the cargo (bottom wooden runners) and the floor!

Front lashing branches shall be attached to
8 lashing points!!!
Ensure correct tensioning of the net!!!

3.2.3 Fastening in forward direction using front lashing in combination with palettes - use only in excepional cases

Fastening of extrusion ingots against forward movement by front lashing in combination with palettes - USE ONLY IN EXCEPIONAL CASES!!!



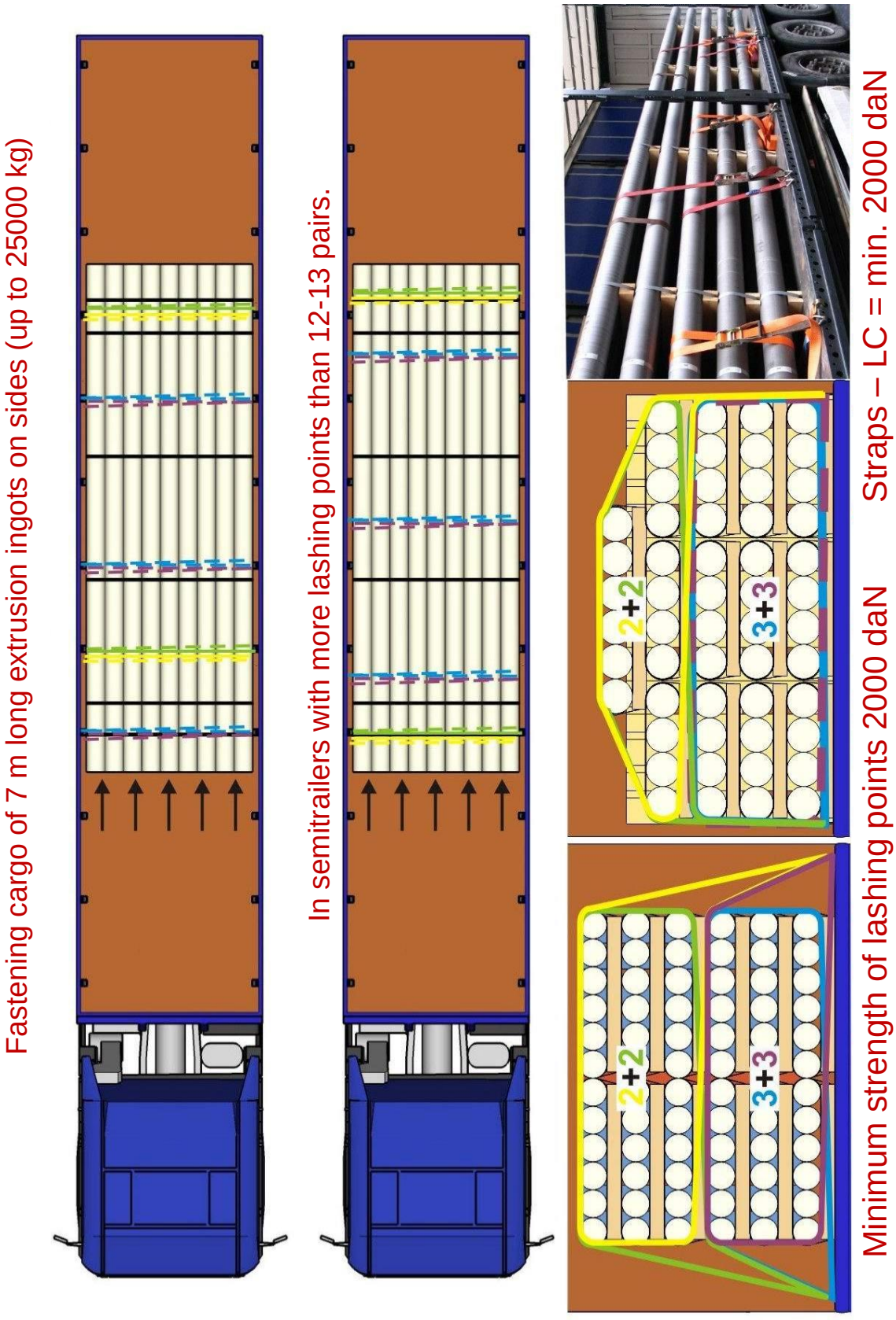
Use suitable euro-palettes in good condition without cracks and decay.

Put RUBBER ANTI-SLIP MATS (min. thickness 8 mm) between the cargo (bottom wooden runners) and the floor!

Fastening EXTRUSION INGOTS IN THE FRONT ONLY BY CROSSERS IS NOT SUFFICIENT!!!

Fastening extrusion ingots by plywood with a single lashing near floor and condition of crrosser after movement of cargo in another truck!!! Blocking capacity of the crosser is 800 - 1000 daN!!!

3.2.4 Fastening 7-meters long extrusion ingots on sides



(the arrows show required securing against forward movement)

Use RUBBER ANTI-SLIP MATS (min. thickness 8 mm) between the cargo (bottom wooden runners) and the floor!!!

For complete fastening of 25-ton cargo on sides, it is necessary to use 5 pairs of sling lashings - 3 pairs for fastening of bottom heavier (or the same weight) group and 2 pairs for fastening of to lighter (or the same weight) group. The same procedure shall be used for all diameters of 7 m long extrusion ingots, even if the top layer is not complete. **It is necessary to use 5 sling lashings (10 straps) for complete fastening of 7 m long extrusion ingots.**

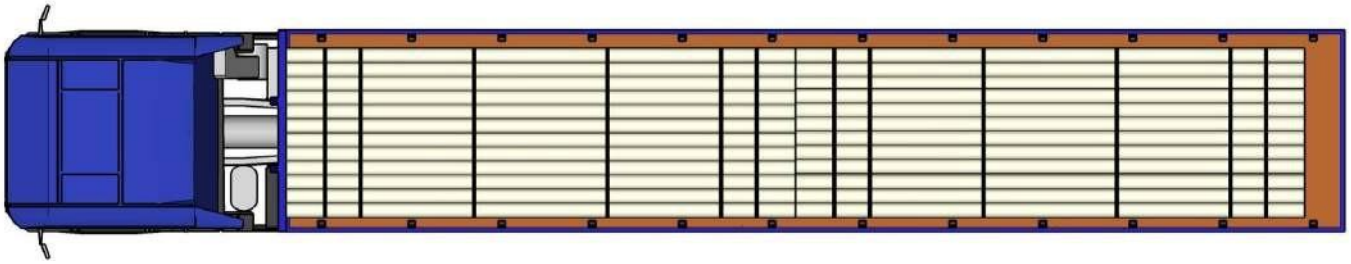
3.3 Fastening of extrusion ingots (laid longitudinally in several sections) for road transport

Loading

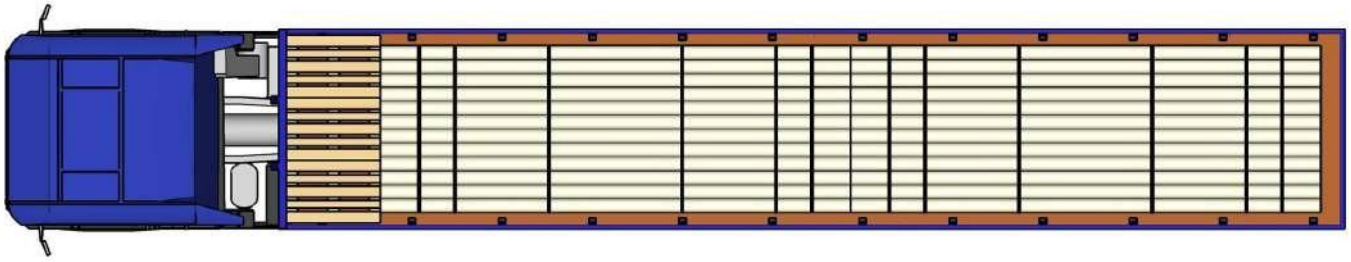
Packages shall be placed longitudinally, without gaps, leaning against front end wall, if necessary for spreading of load - use e.g. palettes in the front or front lashing in combination with palettes, net, Multiwall system...

3.3.1 Front fastening

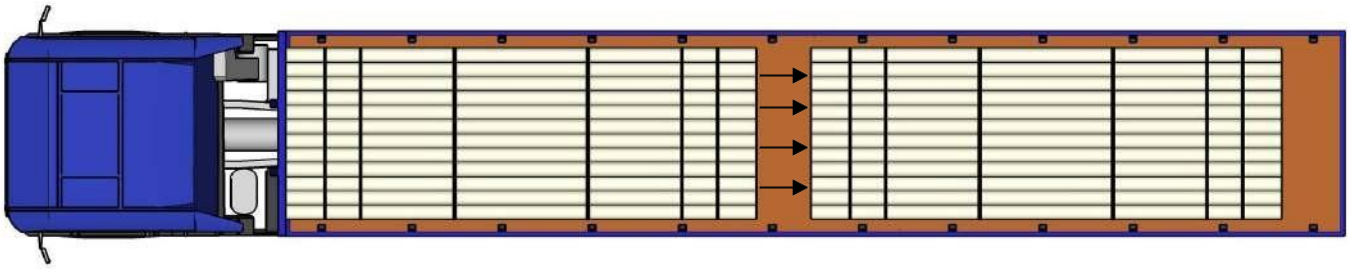
1. Leaning against fron end wall or other blocking elementes (e.g. front stanchion) of suffiecient strength and layout without gaps (e.g. packages of 6.5 m - 6.8 m).



2. Filling the gap between the first section and the front end wall by palettes with the dimension of 1200 mm (load spreading layout); placing second section right after the first one (e.g. packages of 6 m).

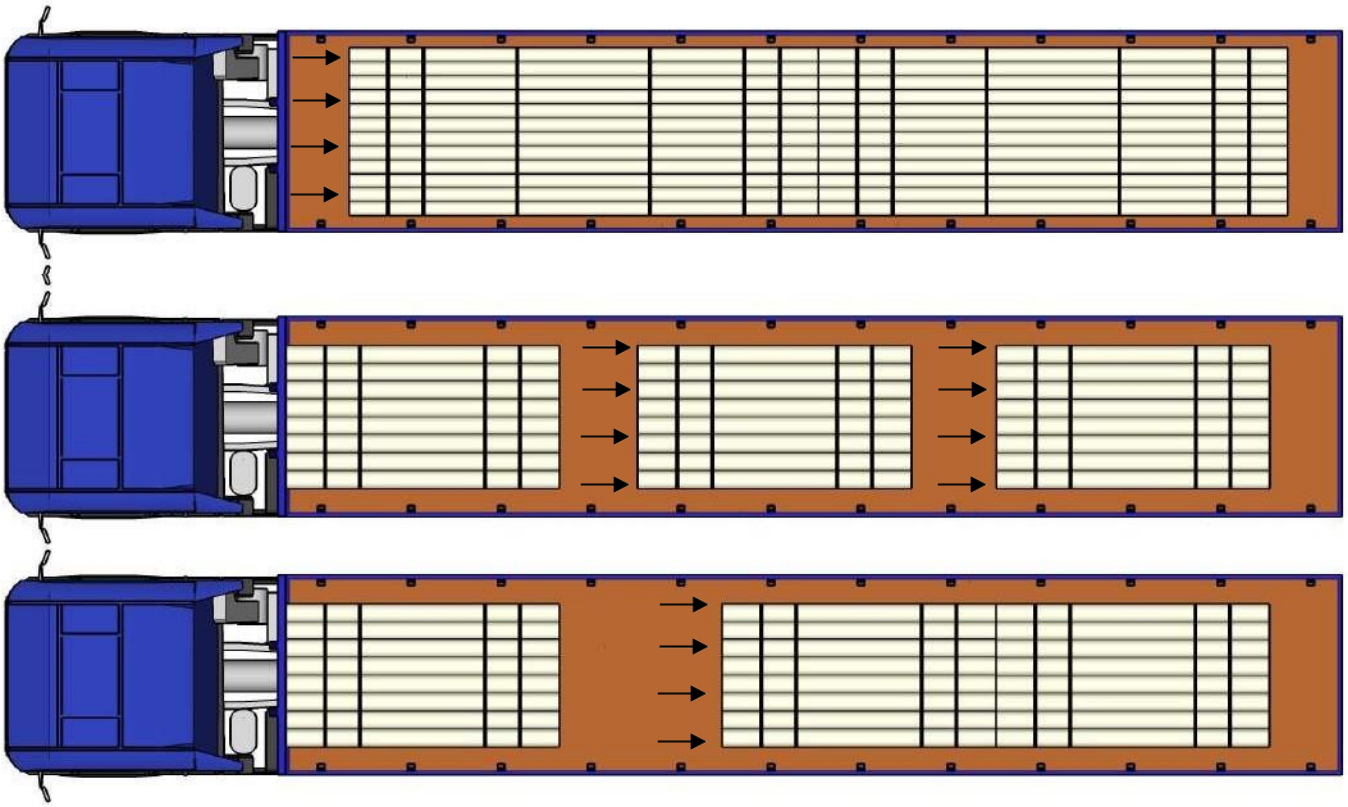


3. Part of cargo leaning against the front end wall, the other part in the back of the loading area. The gap between the two sections must be filled or front lashing has to be used. As part of the cargo is leaning against the front end wall, there can be reduced number of lashing elelents for fastening against forward movement because only the back part is secured like this (e.g. packages of 6 m).



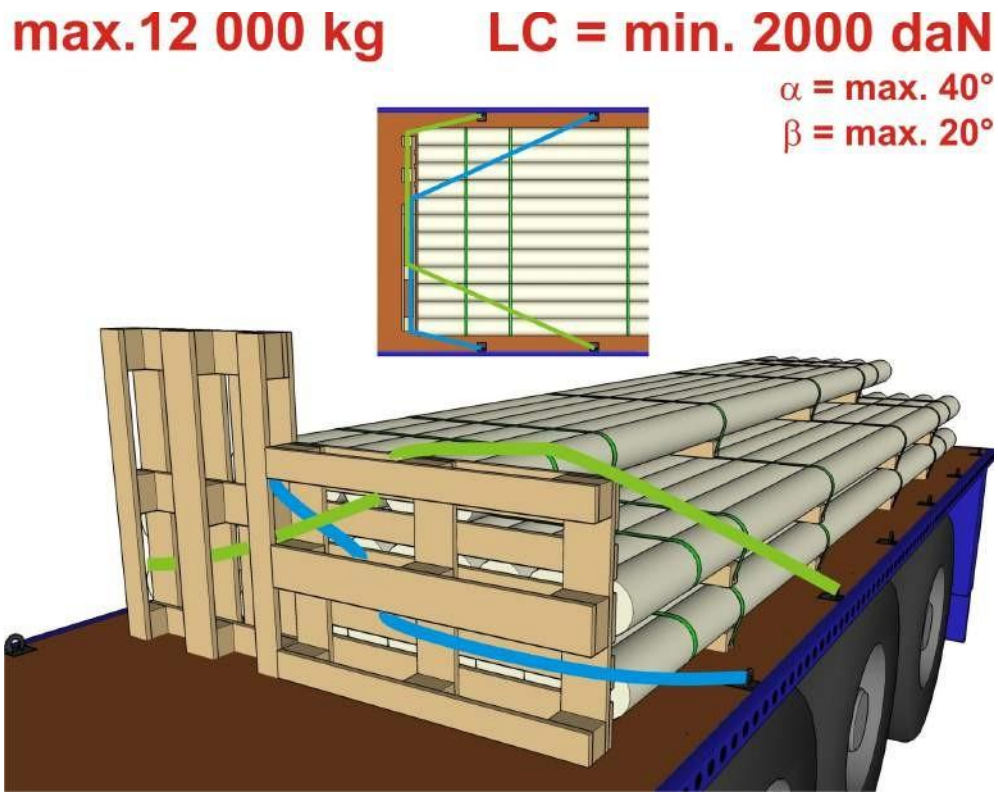
(the arrows show required securing against forward movement)

4. Front lashing of cargo in forward direction - palettes, net, KRONE multiwall, plywood... (6 m packages, 3.5m packages...) - cargo shall be fastened with more straps than as if split into two parts.



(the arrows show required securing against forward movement)

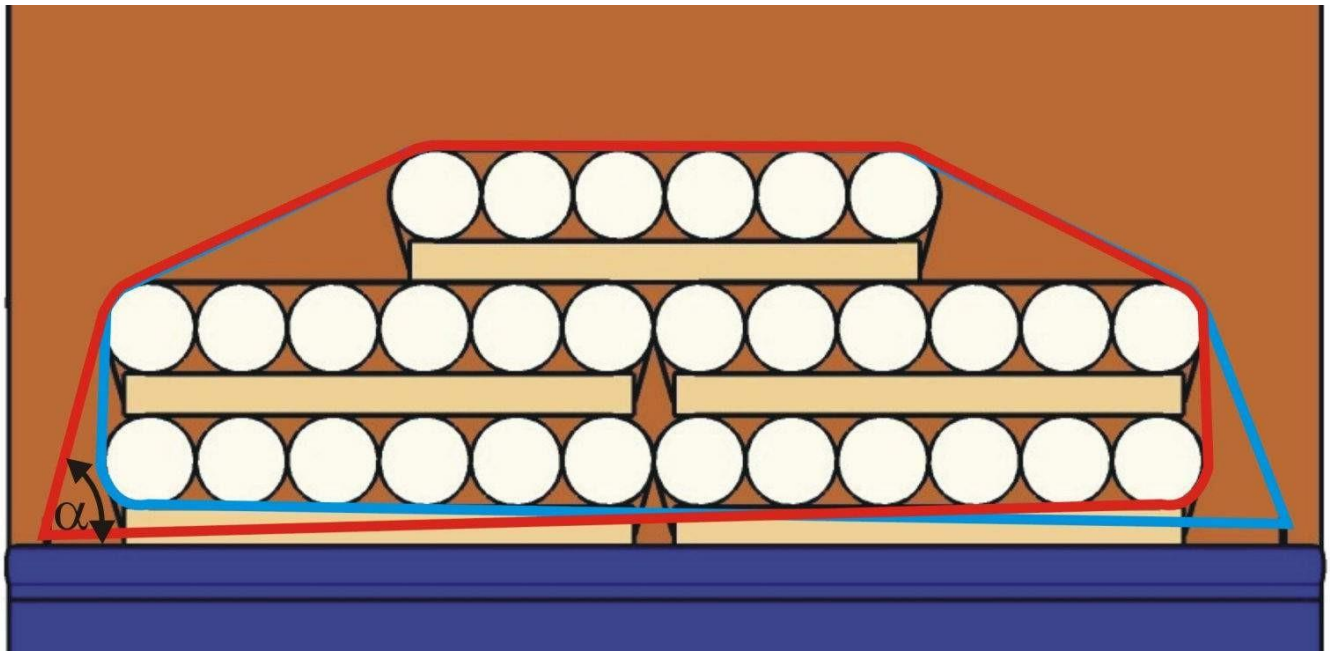
1 FRONT LASHING – 6 TONS OF CARGO IN FORWARD DIRECTION



Example of front fastening of unblocked part of cargo up to 12 tons

3.3.2 Side fastening

SLING LASHING for side fastening of cargo
4 STRAPS – LC = MIN. 2000 daN TO 14 TONS



2 sling lashings (4 straps) for fastening of extrusion ingots up to 14 tons LC = min. 2000 daN

3.4 Fastening of short extrusion ingots for road transport

3.4.1 Loading

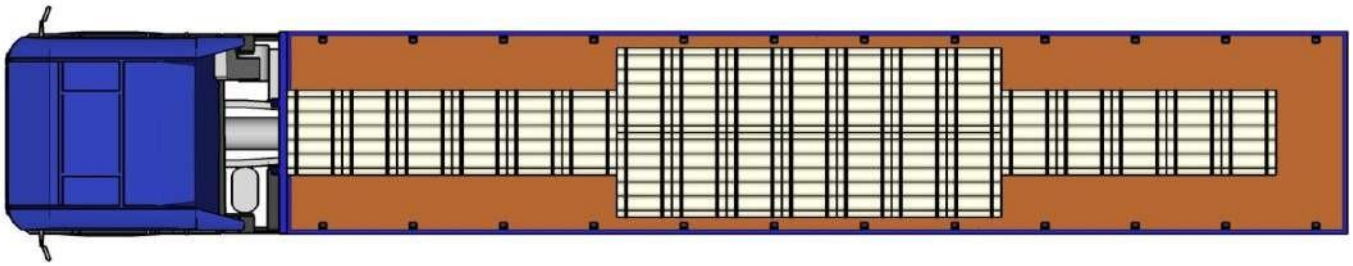
Packages shall be placed longitudinally, with minimum gaps, leaning against front end wall, if necessary for spreading of load and due to dimensions of the packages - use e.g. palettes in the front, stanchion or front lashing, or divide the cargo into two parts. One part will be leant against front end wall and the other one placed in the back part of the loading surface. This reduces the quantity of necessary lashing equipment (compared with the layout of two or more indepenedent groups). If the cargo is blocked in the forward direction, it still has to be fastened on sides and in the backward direction.

Placement of short extrusion ingots and the gap between the packages - minimize the gaps!

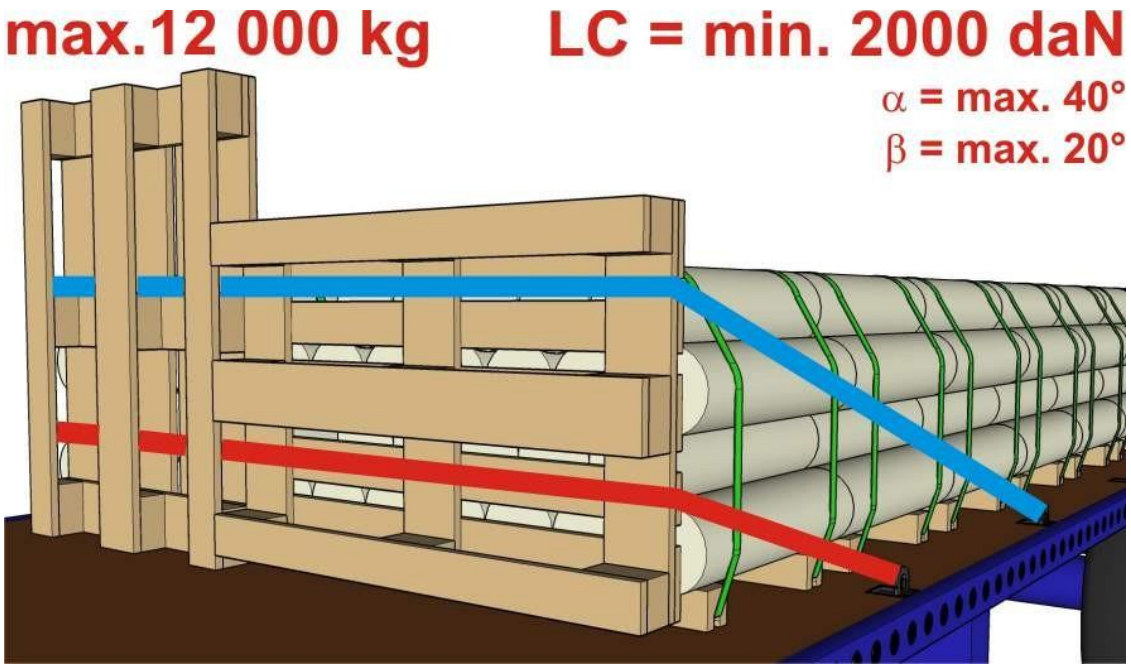
Packages of short extrusion ingots loaded in semitrailer; the compact layout ensures blocking

3.4.2 Forward direction fastening

Forward direction fastening of short extrusion ingots depends on the layout/method of loading. If the extrusion ingots are placed longitudinally and the front end wall is suffiecinetly strong, the cargo is blocked in the forward direction just by leaning against the end wall. If such layout is not possible, it is good to place the extrusion ingots in groups and to fasten the groups by front lashing in combination with a net, palettes, boards, …



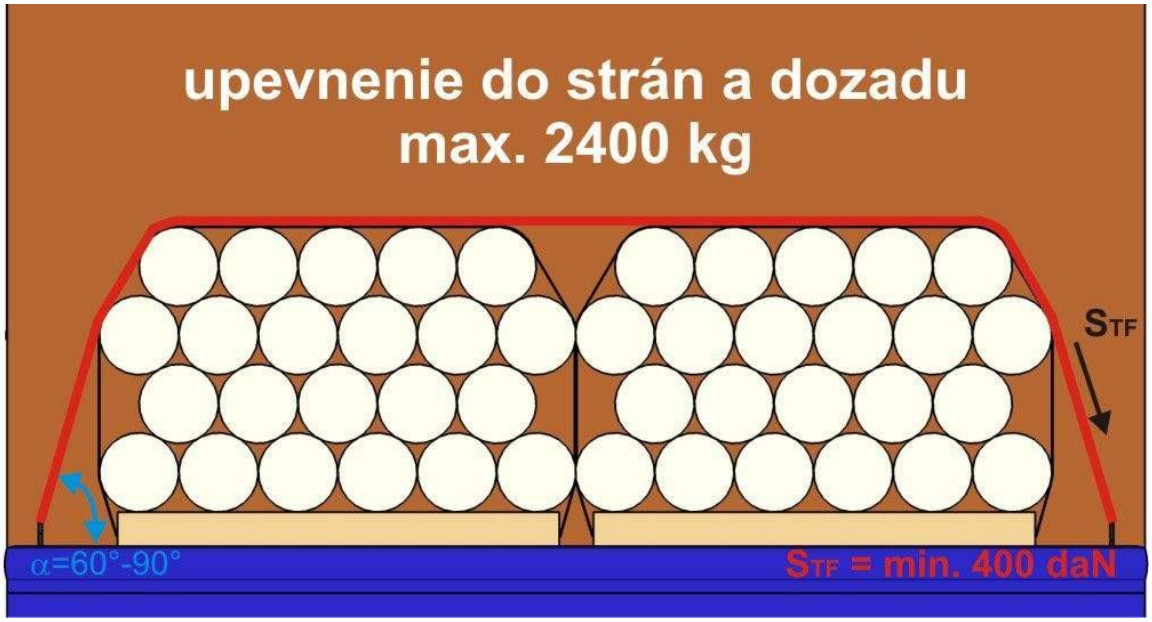
1 FRONT FASTENING – 6 T OF CARGO IN FORWARD DIRECTION



Example of front fastening of unblocked part of cargo up to 12 tons

3.4.3 Side and backward direction fastening

TOP LASHING with the minimum tensioning force **STF = 400 daN**
- 1 STRAP – 2,4 TONS TO THE SIDES AND TO THE BACK (α = **60° - 90°**)



4 PFA INGOTS

4.1 Fastening of PFA ingots for road transport

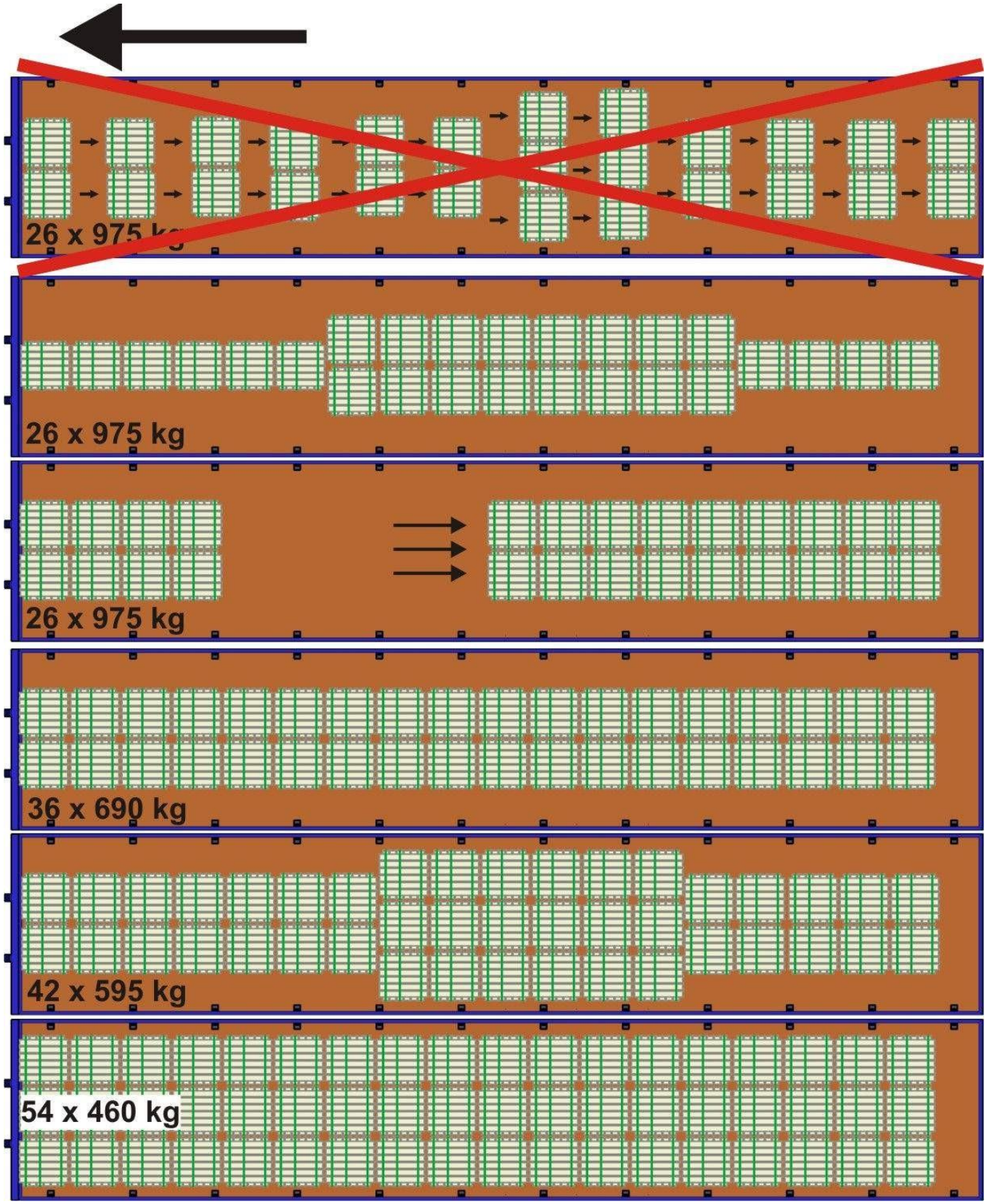
4.1.1 Loading

The packages of PFA infots must be placed lingitudinally, without gaps, to avoid unwanted movement in the forward direction. The method of placement depends on the type of packaging, however, in principle the packages have to be spread evenly over the whole loading surface of the truck without gaps. If it is not possible due to spread of load, it is practical to divide the cargo into two groups, one leaning against the front end wall of the truck and the other one with filled-in gap or fron lashing using palettes or a net. It is necessary to avoid dividing PFA ingots into several sections with gaps among them as it is shown on the picture below. Even though the PFA ingots were placed taking into consideration spacing of lashing points of the semitrailer, the used top lashing serves more for side fastening of cargo and it is not sufficient for secring the cargo in the forward direction, so all packages can move during braking.

Improper placement of ingots on the truck due to possible forward movement!!!

PFA ingots must be placed on the truck in a compact way, as it is shown in the next picture. In this case, the top lashing serves only for sideways (and partially backward) fastening of cargo. Front blocking of cargo is provided by sufficiently strong front end wall. If the front end wall does not have a sufficient strength, the cargo has to be split at least in two parts and the back one must be secured against forward movement.

PFA ingots placed in a compact way (42 units) - each section fastened by top lashing - cargo blocked against sufficiently strong front end wall



Examples of layout of BEFESA ingots (the arrows show required front fastening)

If the cargo is blocked by front end wall, it has to be sufficiently strong!

4.1.2 Front fastening

PFA ingots which are not blocked shall be secured by front lashing in combination with a net, palettes or other suitable blocking equipment.

Front lashing - 1 strap (2 branches) - 5 tons
Fastening by net - 4 straps (8 branches) - 20 tons

Straps LC = min. 2000 daN, α = max. 40°, β = max. 30°, each strap branch fastened in separate lashing point.

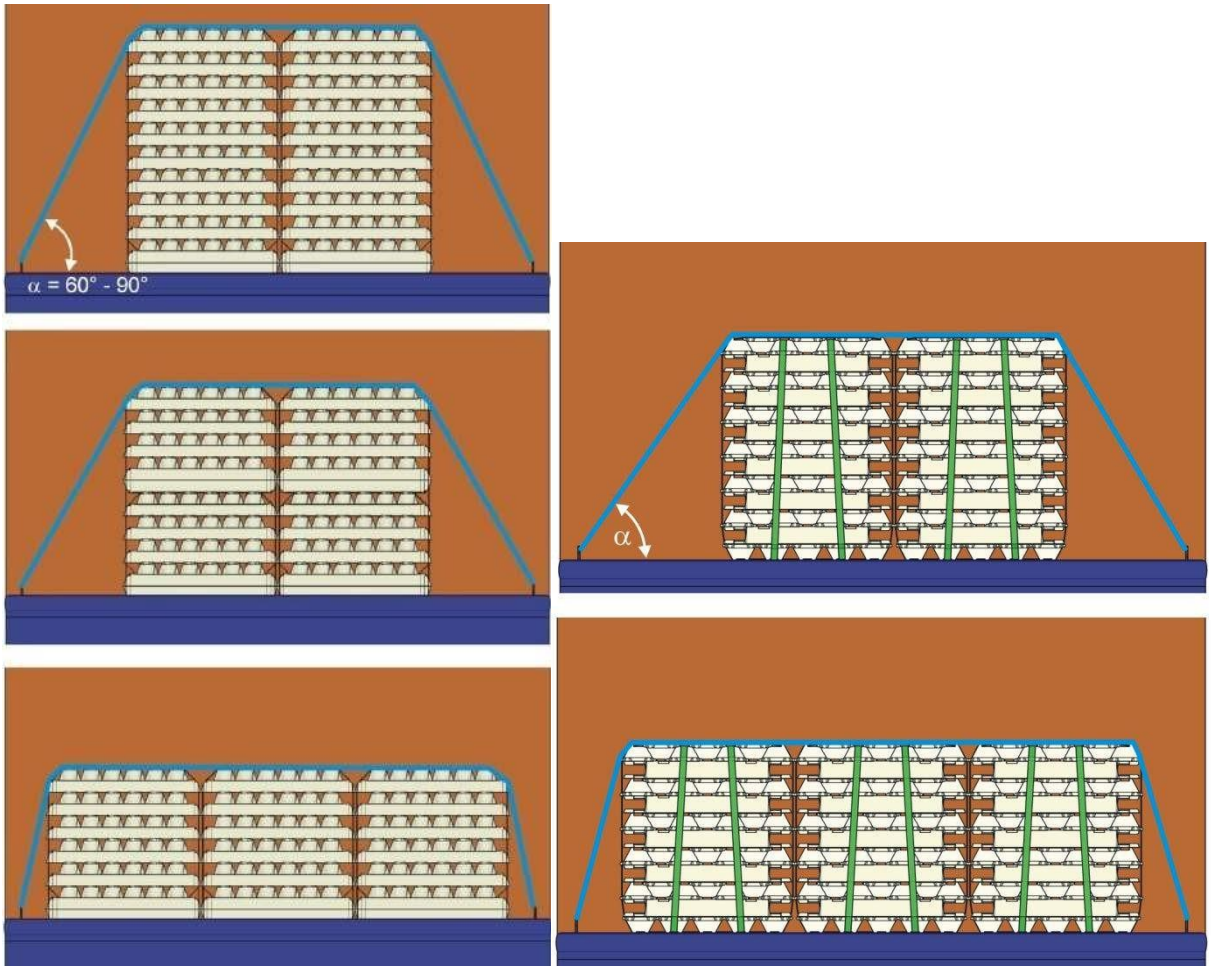
Front fastening of PFA ingots by a net - 4 front double lashings up to 20 tons

Front, back and sideways fastening of PFA ingots - 3 front lashings up to 15 tons

Europalettes must be in god condition, sufficiently strong, without cracks and decay.

4.1.3 Side fastening

TOP LASHING with the minimum tensioning force **STF = 400 daN**
1 STRAP - 2 TONS SIDEWAYS (α = **60° - 90°**)



4.1.4 Back fastening

PFA ingots which are not blocked shall be secured in the back by head lashing. In this case, the head lashing in combination with a palette is a suitable solution.

Head lashing - 1 strap (2 branches) – up to 12 tons

Straps LC = min. 2000 daN, α = max. 40°, β = max. 30°, each strap branch fastened in separate lashing point.