

## Standard 3.2 Mechanical and vertical transport (Fab-in)

### 1. General information

**Vertical transport** - it is the performance of all related transport works with lifting and moving devices, machines and materials from one level to another using stationary cranes, mobile cranes or telescopic lifts and the use of other auxiliary devices for this purpose (motorized trolleys, manual winches, and manual transport trolleys and rollers).

**The handling and transport** of a specific load (machine, device, material) is based on the coordinated work of the crane operator, rigger-man, banksman and other employees involved in the work.

**Tasks of the involved:**

- a) **Operator (crane, lift)** - performs activities related to the operation of the machine, is responsible for a safe and correct setting. In the event of a dangerous situation, improper handling of the load carried by a rigger-man or banksman or unfavorable weather conditions (storm, wind with a speed exceeding 10 m/s), the operator is obliged to stop machine's work.
- b) **Banksman** - determines the route of the cargo being moved, observes the cargo during transport and gives appropriate commands, and in case of a dangerous situation, he stops transport work and warns against the threat.
- c) **Rigger-man** - is responsible for familiarizing yourself with the load, determining its mass, location of the center of gravity, location of lashing points. He is responsible for the use of appropriate slings and for holding the hooked load during its movement (only and exclusively with the use of appropriate measures enabling the load to be given the correct direction).

**IT IS NOT PERMITTED TO PERFORM ALL THE DUTIES OF BOTH OPERATOR, RIGGER-MAN AND BANKSMAN BY ONE EMPLOYEE.**

**COMMUNICATION BETWEEN ABOVE EMPLOYEES MUST TAKE PLACE BY RADIO IN LANGUAGES THEY CAN UNDERSTAND !!!**

### 2. General rules for vertical transport

1. Stationary crane, mobile crane, telescopic loader (e.g. Manitou) and trolleys with motor drive are subject to the Technical Inspection. It is not allowed to perform work with the use of a device that does not have a valid approval for use issued by the Office of Technical Inspection (UDT).
2. The operator of a crane, hoist, forklift truck is an employee with appropriate health predispositions, confirmed by an appropriate medical certificate and the relevant UDT qualifications related to the approval to operate a specific machine (crane, hoist, trolley).
3. Banksman and is an employee with appropriate health predispositions, confirmed by a relevant medical certificate allowing him to work in a specific position, and having the appropriate knowledge and skills required to perform his tasks.
4. Intermediate devices for transporting machines, devices and materials - designed to connect the above-mentioned with the crane structure - slings are subject to the requirements specified in the relevant standards. Only the employee who performs the function of the rigger-man and the employee who directly executes the rigger-man commands under his supervision are entitled to their proper use.

#### REMEMBER!

When performing vertical transport tasks is required from all involved employees having appropriate personal protective equipment:

- a) a helmet for work at height, with a fastened chin strap,
- b) footwear and work clothes,
- c) a warning vest,
- d) depending on the type of work - other adequate PPE.



The banksman and the rigger-man operator are used while working items of clothing or equipment, which are visible from the crane's cab and which distinguish them from other workers.



The UDT certificate in the form of a sticker should be placed on the crane cabin (crane, hoist, forklift) or in any other visible place. Documentation confirming the UDT certification should be located in the cabin of the crane or in the basket of the lift.

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5. The following types of slings are allowed for use on the premises of LG ESWA:

- a) **slings** (synthetic, textile) - in accordance with EN 1492 (1,2)
- b) **chain** - in accordance with EN 818 (3)
- c) **rope** - in accordance with EN 13414 (4)



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6. Sling accessories approved for use:

- a) **shackles** - according to EN 13889 (5)
- b) **thimbles** - according to EN 13411 (6)
- c) **elements of slings** - according to EN 1677 (7)

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7. The condition of admitting slings for use is their proper technical condition and marking - in the case of web slings - the manufacturer's label specifying the Working Load Limit, in the case of chain slings - a stamp (nameplate) specifying the WLL, in the case of rope slings and accessories for slings - factory marking (punching) of WLL on the slings.

8. It is not allowed to use slings which:

- a) have visible damage, are incomplete, worn,
- b) are devoid of manufacturer's labels or stamped 'stamp',
- c) have traces of user interference (painting, welding, grinding),
- d) do not have the required documentation.



### REMEMBER!

The duty of the rigger-man is to check the technical condition of the slings each time before starting work with their use. Damage caused during the works will disqualify the slings or their elements from use.

Damaged slings should be properly marked and removed from the place of vertical transport.

The contractor should keep a register of slings, and the work related to their service (e.g. replacement of pins in hooks) is performed only by an employee with appropriate permissions in this regard.



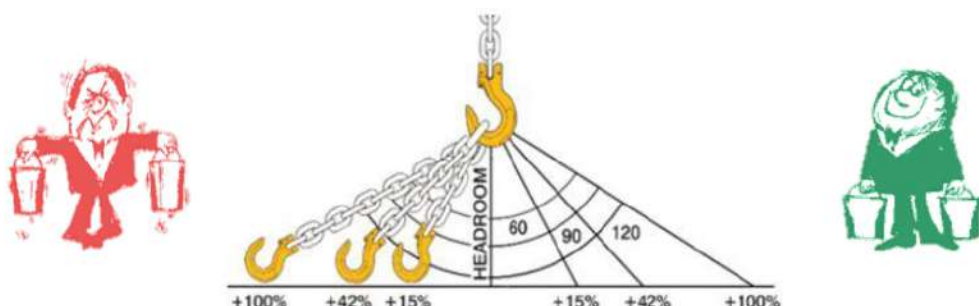
The label of the web sling should be legible and complete. If its damage, illegibility or lack - disqualify the sling from use



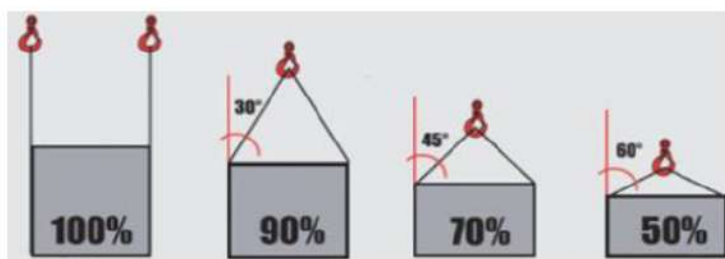
### 9. Rules for the use of transport slings and accessories for slings:

#### a) the influence of the opening angle of the slings on their load capacity:

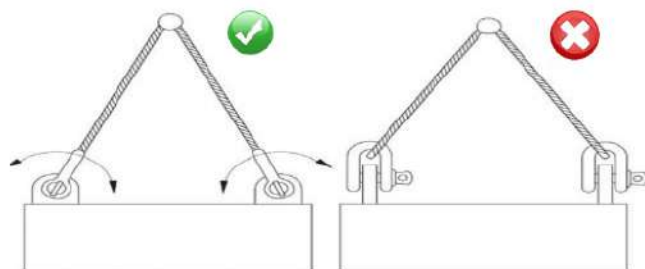
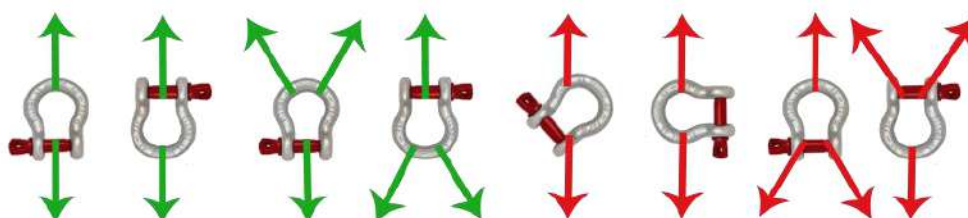
- with an increase in the opening angle between the slings their rated load capacity (WWL) drops



- To lift the load with a greater opening angle between the slings, use slings with a higher WLL or reduce the weight of the load



#### b) correct and incorrect use of shackles:



### REMEMBER!

The feature of the sling (nameplate) determines the WLL of the chain slings and the influence of the engagement angle on their load capacity. Slings without features are not approved for use.

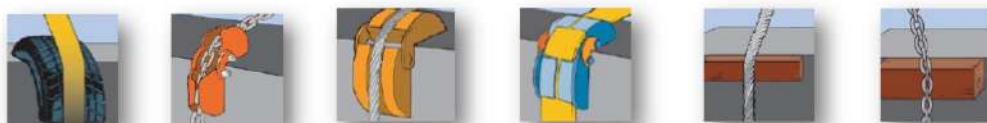


WLL (Work Load Limit) - this is the maximum load that can be lifted using a sling. Data on WLL is included in the label (webbing slings) or the feature (nameplate) of the chain sling. In the case of hooks, shackles, rope slings - WLL data are factory stamped on the elements of these accessories.

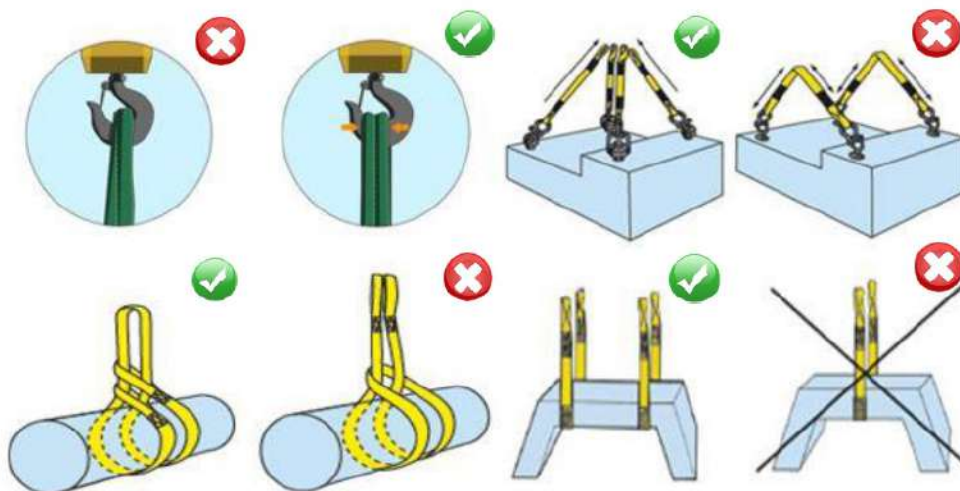
Correct selection of slings in relation to the load and determination of their load capacity depending on how the load is hooked - it's a rigger-man job.

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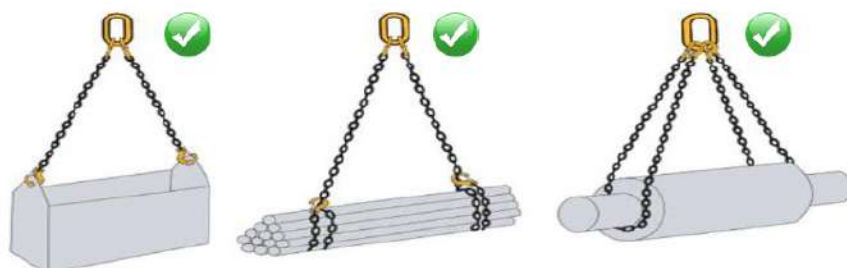
c) **correct** methods of securing the slings against damage:



d) **correct** and **incorrect** ways to use webbing slings:



e) **correct** ways to use chain slings:



e) **correct** and **incorrect** ways to use rope slings:



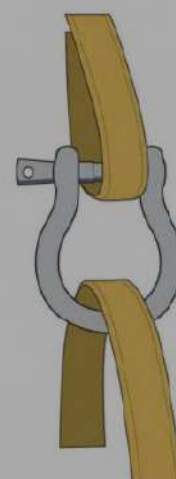
Depending on the type of load, its shape, size and location of the center of gravity, the task of the rigger-man is to properly adjust the slings for safe transport.

### REMEMBER!

The slings are inspected by an authorized employee before their use. Slings shall be periodically inspected at least once during the year or based on the DTR.



It is forbidden to connect the webbing slings by tying, reeling, etc. The connection is allowed only with the use of appropriate accessories, e.g. shackles.



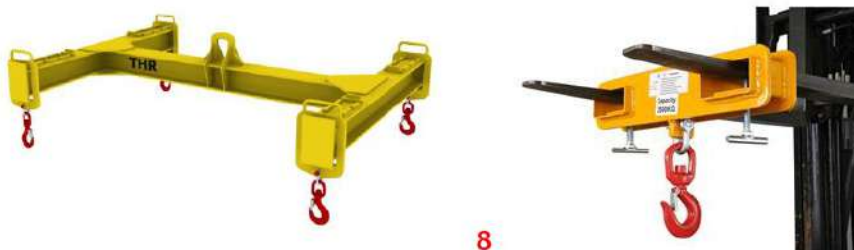
If possible - it is recommended to use uniform slings of appropriate length instead of connecting shorter slings to each other.



10. For handling and lifting loads and materials, it is also allowed to use:

- transport traverse - in accordance with EN 13155 (8),
- transport platforms (outriggers) (9),
- manual chain winches in accordance with EN 13157 (10),
- hand operated trolleys and transport rollers.

11. **Transport traverses** (traverse beams) - these are universal devices for transporting loads of various lengths and base areas, used then when it is not possible to safely use other types of slings or when their technical capabilities are not sufficient or the transport conditions do not allow to use other methods.



12. **Transport platforms** (outriggers, gondolas) - devices for vertical transport of large-size loads (machines, devices, materials).



13. **Manual chain hoists** - they can be used as auxiliary equipment in the work related to the transport of materials to a specific height (e.g. pipes for later welding them). The use of hoists in the form of slings for lifting loads using a mobile crane or crane and in a manner other than that provided for in the manufacturer's documentation is prohibited.



Devices of this type are subject to technical inspection:

- hoists with a maximum lifting capacity of **up to 2 tons** - simplified technical inspection by the Office of Technical Inspection
- hoists with a maximum lifting capacity of **> 2t** - full technical supervision of the Office of Technical Inspection

**THE USE OF HOISTS WITHOUT A CURRENT UDT APPROVAL IS PROHIBITED**

### REMEMBER!

The rules of safe use of transport traverses and transport platforms (outriggers) are specified in the Operation and Maintenance Documentation of the device (DTR). If the devices do not have such documentation - working with them is prohibited.

It is forbidden to transport people on the gondolas. The transported loads must be attached to the platform by means of e.g. transport belts installed in the anchoring points dedicated by the manufacturer.

It is unacceptable to use the gondola without the manufacturer's instructions (DTR), and without the preparation of the IBWR for work with the gondola. The nacelles are not under the control of the Office of Technical Inspection (UDT), but require gradual inspection recorded in the maintenance log.

It is unacceptable to tamper with UTB (Handling Equipment) protections, i.e. limit switches, overload switches and others.

Each shift of a heavier load than the previous one requires a lifting test, i.e. lifting the load about 50 cm and holding it for about 5 minutes.

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14. **Transport rollers and undercarriages** are auxiliary equipment necessary in the transport of machines, devices and materials. Due to the structure and technical properties, the following are distinguished:

- a. **fixed gauge transport rollers** ①
- b. **adjustable transport rollers** ②
- c. **steered tag transport chassis** ③



15. **The use of motor-powered trolleys for activities related to the unloading and / or transport of machines, equipment and materials:**

a. Only an employee with the appropriate UDT qualifications is authorized to operate motor-powered trolleys, in relation to the operated device - it is also subject to technical inspection - work with the use of a trolley that does not have a valid UDT certificate is prohibited.

b. Inside the buildings (halls), battery-powered and diesel-powered trolleys are allowed to move only and exclusively after the use of exhaust gas filters and after obtaining permission for the entry of a trolley powered by an internal combustion engine by the department responsible for the area (building) and the Health and Safety Department.

c. The area for unloading vehicles transporting machines, devices and materials should be properly marked, fenced and secured against the entry of bystanders by appointing observers in all directions of vehicle and pedestrian traffic. The path on which a loaded truck moves is subject to the same rules.

d. Any waste generated as a result of unloading vehicles should be cleaned on an ongoing basis, and after completion of works, the area should be restored to its original state.

e. It is allowed to tow loads with trolleys only with the use of steered, trailing transport chassis with a fixed drawbar. It is forbidden to tow loads with slings (belts, chains) if the ground on which the load is moving is steeply sloping and it is not possible to effectively slow down the movement of the load.

f. Loads carried on the forks of a truck should be transported as close to the ground as possible, taking into account the location of the center of gravity. Loads with irregular shapes and with a center of gravity located in the upper part of them must be properly secured against tipping, tilting, shifting by means of transport belts attached to the forks of the forklift or by other effective and safe solutions.

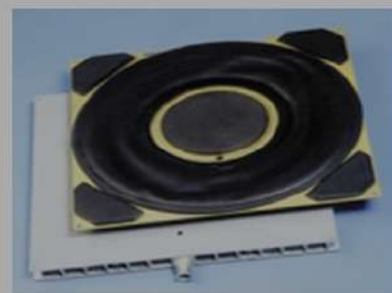
g. It is forbidden to yank loads from TIR trailers or containers. Loads should be ejected by hitching a connecting element to the rear part of the load (e.g. a pallet). During these works, the danger zone should be left (due to the risk of "launching" the sling with the catch).

### REMEMBER!

Before the UTB enters the area, it is necessary to make sure that the ground has adequate load-bearing capacity (in particular, the ceilings of buildings).

Some of the buildings on the premises of LG have a basement! When setting up the supports, make sure that none of them stands on weaker ground

It is unacceptable to place supports on manholes, curbs and directly on soft ground without the use of dedicated sleepers.



Pneumatic cushions used to raise the load to a small height (e.g. to put a pad or transport undercarriage) should be placed in such a way that the weight of the load is evenly distributed over them. The use of airbags should be carried out strictly according to the manufacturer's recommendations.



### 3. Rules for carrying out transport work

1. Works related to vertical transport of machines, devices, objects with the use of mobile cranes (also stationary cranes and other devices in certain situations) are works that, due to the high complexity of activities and a high degree of complexity, are subject to the risk of many hazards - it is necessary therefore, prior to their commencement, appropriate planning of works and development of the instructions for Safe Performance of Works (IBWR) and obtaining a permit to carry out works.

2. Before commencing transport works in a specific area, the danger zone should be delimited and fenced off and it should be marked accordingly. If the works are carried out along the road or other areas with heavy traffic - the contractor is obliged to provide observers and / or completely close the work area, organizing traffic via alternative roads in consultation with the departments responsible for the areas (buildings).

3. In the case of transporting machines and devices inside buildings using a mobile crane and a working platform (gondola) through temporary façade openings - the transport contractor is also obliged to secure the area inside the building (limiting access by unauthorized persons) and secure the exposed infrastructure for pollution, flooding with rain, bird access, etc.

4. The place where the wall of the building is opened should be secured from the inside with a barrier closed with a padlock, so that when the work is not performed - there is no possibility of access to the opening and thus the risk of falling from a height by plant employees and other people.

5. The contractor of the works on his own makes anchor points for the employees responsible for removing the load from the work platform and for anchoring the work platform in the floor, ceiling or other place at the level where the work is carried out - only and exclusively in agreement and consent with the manager of a given building .

6. The anchor points referred to - to prevent workers from falling from height, they should meet the requirements of EN 795 and must meet a minimum pull-out strength of 10KN in the direction in which they will be used (class A1). Performing independent anchors requires carrying out tests for pull-out and shear, together with the preparation of a report on these tests.

7. If, during vertical transport, employees use ladders, scaffolding or mobile platforms to perform auxiliary activities - they are obliged to comply with the requirements specified in the standards:

1. Standard 1.1 Work on a ladder
2. Standard 1.2 Work on scaffolding
3. Standard 1.3 Operation of mobile platforms

and the requirements specified in other standards depending on the type and scope of the work performed.

8. The contractor is obliged to ensure constant, uninterrupted supervision over the course of transport works, if this condition is not met - the works will be suspended, as well as in the absence of functionaries at the place of work - a **Banksman** and a **Rigger-man**.

9. After the completion of transport activities, the work area should be properly cleaned and all stored materials and devices should not pose a threat to moving people, machines or vehicles, so it is mandatory to properly protect them against movement (e.g. due to wind), and marking - what is the responsibility of the contractor.

#### REMEMBER!

The slings are inspected by an authorized employee before their use. The slings shall be periodically inspected at least once a year.

Class A1 anchor point needs to be attached to a fixed structure.



The link between the work-at-height harness and the anchor point is a self-locking device. It is the only acceptable type of equipment used to ensure confined operation at the time of unloading the platform. Devices of this type conditionally must meet the PN-EN 360 standard and must provide the possibility of vertical and horizontal (HV) work.



It is not possible to use one anchor point for the worker and the platform at the same time.



### 4. Good and bad practices in transport works



The load transported by the transport platform must be secured against moving while being lifted. Disconnecting the cargo securing devices is possible only after the platform is docked to the anchoring points in the target building.

During transport, free chain slings should be secured by fastening them to the block or to the slings that are currently in use. It is forbidden to leave loose slings when carrying loads. When carrying large-length loads, the length and type of slings must be adjusted accordingly. It is unacceptable to use slings, the use of which creates a risk of the load slipping due to incomplete hauling.



The securing of the target area where the pick-up is carried out must be mandatory prior to commencing any work. It is forbidden to leave the opening in the facade of the building without protection with permanent barriers locked with a "key" and a tarpaulin.



Securing, marking and appointing observers in the area of transport works is the responsibility of the contractor. Traffic of pedestrians and vehicles should be via alternative routes.



### REMEMBER!

It is strictly forbidden to stand on or under the platform while it is being raised or lowered.

When starting lifting, the banksman should signal the employees involved in the work about the commencement of this activity, e.g. by means of a sound signal.

When lifting or lowering a load of large dimensions or irregular shapes, it is the rigger-man's responsibility to install safety lines to facilitate guiding and picking up the load at the destination. The length of the rope should be adapted to the shape and length of the load and to any difficulties in the place of transport and picking up the load.

When loading the transport platform, adjust the way the loads are distributed on it (also taking into account their centers of gravity) so that when the loads are unloaded from the front part of the platform - the weight of the loads from the rear part of the platform does not tilt it horizontally - which will prevent the rest of the load from being rolled out on the cargo platform. In general, it is recommended that loads with the predominant weight be placed closer to the front (descent) part of the platform.



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Hitching the load to the forks of motorized trolleys and other devices of this type, eg Manitou, is allowed only and exclusively with the use of dedicated transport traverses. The use of lines, belts or slings and other materials not intended for this purpose is prohibited.

Transport work consisting in removing pallets from transport containers must be carried out with the use of dedicated grips with manufacturer's nameplates and marking of the maximum weight of the towed load.

The use of holders of unknown origin, without labels or with damaged elements connecting them - as in the case of slings and other transport accessories, is prohibited. It is also forbidden for employees to stay within the area of the pulled load while it is being pulled out.



Transport lugs dedicated to pulling out transport pallets from containers may be used only with strict consideration of their load capacity, weight and technical condition of the pallet. If the base of the pallet is damaged - the wooden spacers are cracked or damaged during transport or their pull-out strength is questionable - choose another way to pull the pallet out of the container, e.g. by grasping the rear part of the load right next to the base (using the arm dedicated to this work) shown below).



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The safest and fastest way to load and unload goods from shipping containers is to use dedicated loading accessories for motorized trucks - e.g. hydraulic Tynelader platforms or similar. Such systems allow for quick and precise loading of the container and protect the load from damage, have a load capacity of up to 28T and significantly reduce the number of employees necessary to handle unloading - only the operator of the truck and platform is required.

### REMEMBER!

It is not allowed to make holes, cut or modify the forks in any way. The drilled forks must be taken out of service.

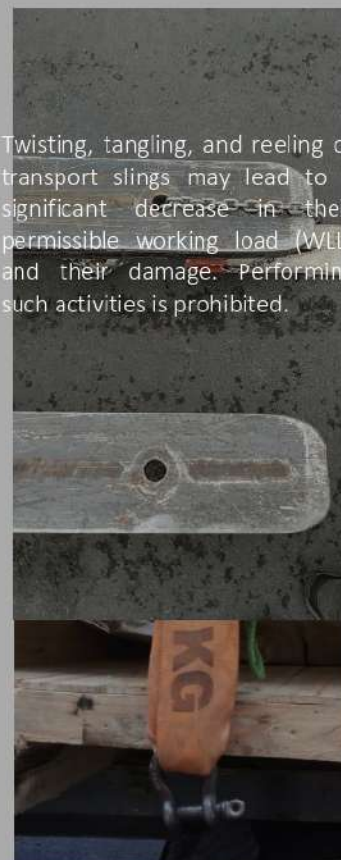


Incorrect selection of the slings in relation to the shape and length of the load, and inadequate method of attaching them may result in displacement (sliding of the slings towards each other) and, as a consequence, uncontrolled displacement or drop of the load from the slings. It is necessary to properly select the method and measures before starting the lifting of the load and after it is lifted to the control height of about 50 cm - check the stability and location of the slings. All the above-mentioned activities are rigger-man tasks.

Connecting with each other, tangling in the throat of the hook and layering the slings as well as using materials and devices not intended for this type of work for lifting loads is prohibited. Hand hoists (chain, rope) are not slings and cannot be used for this purpose.



Twisting, tangling, and reeling of transport slings may lead to a significant decrease in their permissible working load (WLL) and their damage. Performing such activities is prohibited.







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An employee is not allowed to stand on the load, over a load or under a load that is suspended or lifted.

At the stage of planning transport works, especially during its loading, it is necessary to take into account a safe method, devices and tools necessary for its safe unloading.

The use of makeshift solutions without taking into account the effects of physical forces and the strength of the load bedding (base), including the use of machines not intended for this purpose or technically insufficient, is prohibited, as it may cause loss of control over the load and cause its damage.