Manual for loading and unloading concrete elements

Skandinaviska Byggelement AB Lättklinkerbetong AB Swerock AB

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PURPOSE
The purpose of this manual is to ensure that production personnel, forklift operators, drivers, fitters and unload officer know how to safely and efficiently load and unload vertical and horizontal concrete elements. With this handbook, we want to achieve safer transport and workplaces.

GENERAL
This manual is designed to apply to Peab Byggsystem (Skandinaviska Byggelement, Lättklinkerbetong and Smidmek) plus Swerock AB/Cliffton and will be used by these companies. All personnel involved in loading, transport and unloading shall have knowledge of how concrete elements are to be loaded, unloaded and secured, as well as measures and checks.

RESPONSIBILITY
Each company is responsible for ensuring that this manual is communicated and understood by all personnel involved and that the document "Load restraining on road vehicles" published by TYA (The Transport Union's Occupational and Work Environment Committee) is also communicated and understood by the driver.

All loading must be carried out in accordance with applicable load securing regulations.

Loading

Before loading commences, all surfaces where elements are to be placed must be thoroughly cleared of snow, ice and gravel.

Pallets must be clean and free from loose objects and returned goods. Pallets and trestles should be checked for cracks and other damage. If any defects are detected, the pallets/trestles should be taken out of service and the superior manager/transport manager notified.

Each factory shall have approved ladders used for loading. If loading takes place in the dark, the loading area must be well lit.

Straps and tensioners on pallets from Katrineholm must be left at the factory. Straps are supplied with other pallets and wall stands.

To avoid damage to the elements and tensioning device, edge guards must always be used.

The driver is the loading manager when loading directly onto a truck.

If the involved personnel/driver feels uncertain about the load, the immediate superior/transport manager must be contacted.

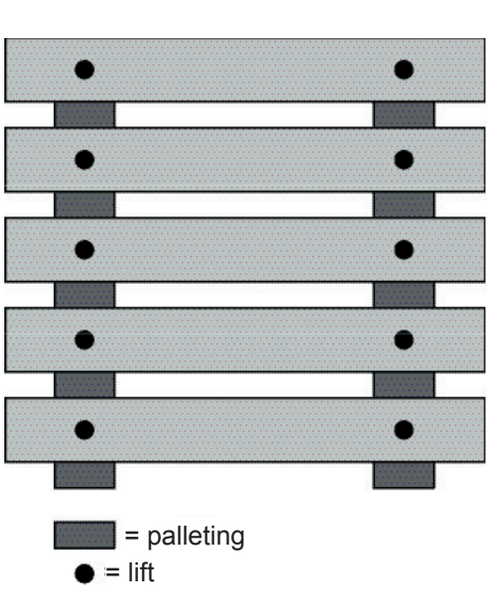
Important! All loading must be carried out in accordance with applicable load securing regulations.

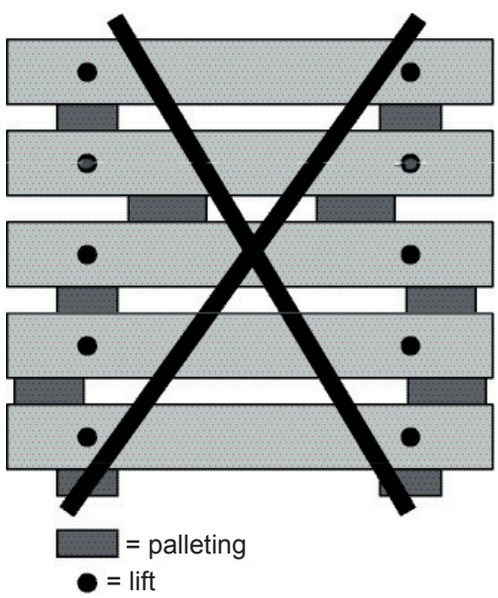
WARNING! RISK OF CRUSH INJURIES.
The load bed/carrier of the transport unit must be completely free of unsecured cargo (any loose materials) as otherwise it may fall off the load bed in transport, which may result in damage to surrounding buildings, materials and persons.

Horizontal concrete elements

Balconies

Important! When loading balconies, it is essential that palleting is done as shown below, normally directly under lift, and that the load does not exceed permissible width.





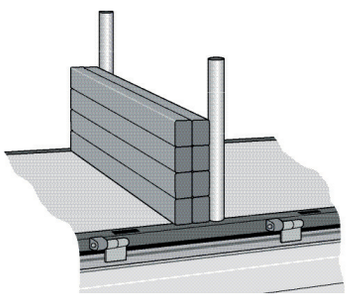
Horizontal concrete elements

Hollow core slabs

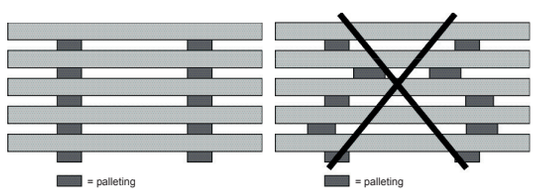
Important! When loading hollow core slabs, wooden battens must be at least 150 mm high and provided by the carrier. Palleting may only be done at two points and placed edge-to-edge against the two straddler truck lifting booms.

The load must be stabilised in accordance with applicable cargo securing regulations.

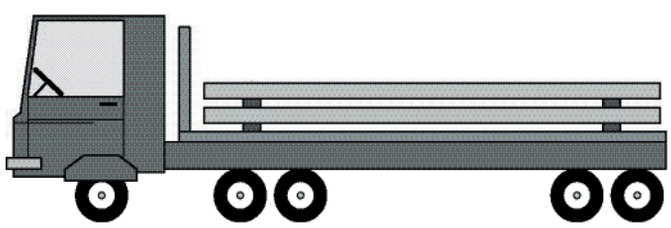
NOTE! When unloading with scissors/yokes, the centre of the scissors/yoke should be on the marked line on the element, see further instructions on scissors/yokes.



Example load stabilisation

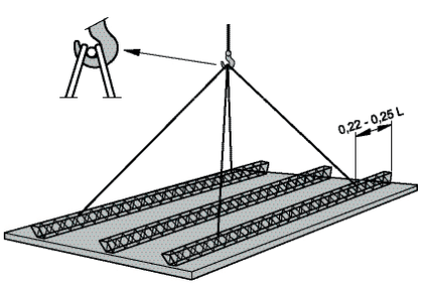


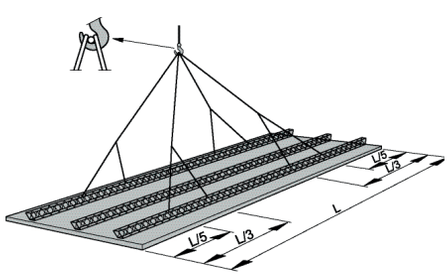
Example of correct and incorrect palleting of hollow core slabs



Transporting on lorry

Lifting structural floor elements



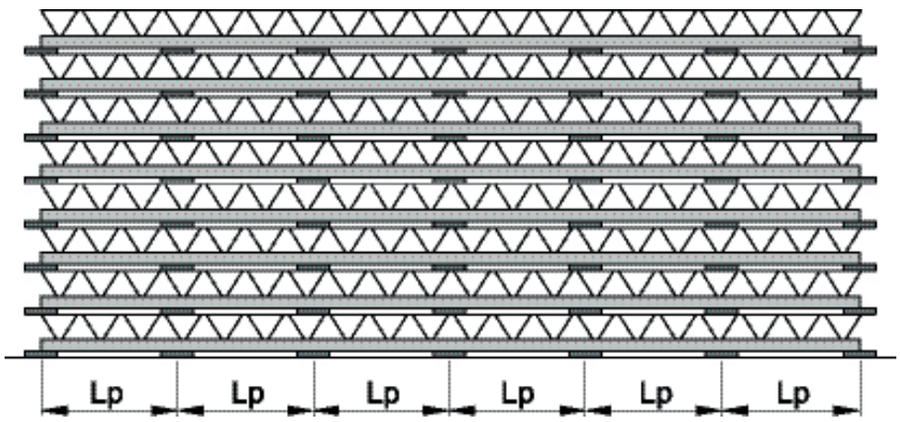


Form stripping and lifting
Lifting strength is shown on the shop drawing. Form stripping should normally be done with lifting device at several lifting points. In the absence of this type of lifting device, form stripping may be carried out in accordance with this description.

Structural floor element with std ladder
Elements with a maximum weight of 1.6 tonnes are lifted with 4 safety hooks. The lifting hooks shall be attached to the intersections of the reinforcement beam with a spacing of 0.22 to 0.25 times the length of the element from the ends of the element. The lifting points are shown in the shop drawing. The lifting points are marked on the reinforcement beam.

Elements weighing over 1.6 tonnes are lifted with 8 safety hooks. The lifting hooks shall be fastened to the intersections of the reinforcement beam with a spacing of L/5 and L/3 times the length of the element from the ends of the element. Lifting points are shown in the shop drawing. The lifting points are marked on the reinforcement beam.

Stacking structural floor elements

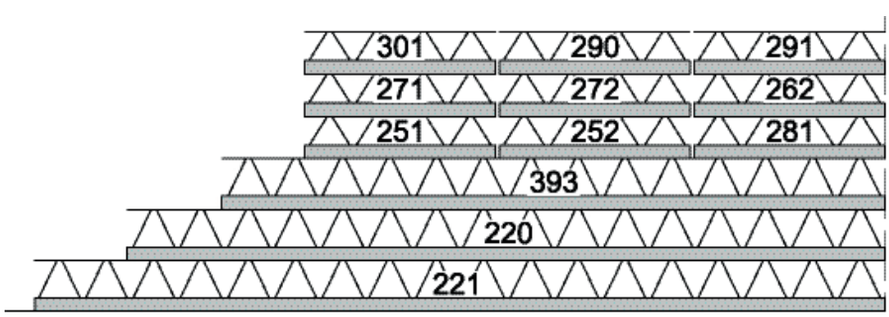


- Stacking should be done on a flat surface. The substrate should cover the entire element.
- Spacers of uniformly thick boards are placed vertically aligned on the ladder intersection.
- Spacers always at endpoints and max distance between other spacers, as shown in the table and figure above.

Number of elements	Lp max (m)
6	1.4
7	1.2
9	1.0
11	0.8
14	0.6

When horizontal elements are put into production, one side should be stacked to make as straight an edge as possible, see figure below.

The straight edge of the stack should face the door (at the Katrineholm production site).

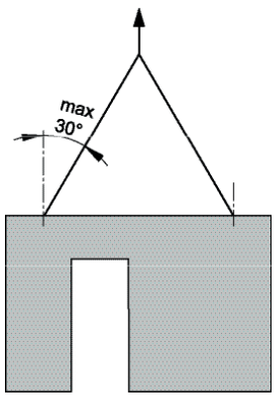


Example of how horizontal elements should be loaded.

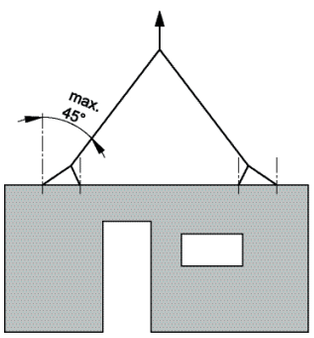
A batten every 1.5 metres is required when loading structural floor elements.

Double wall elements

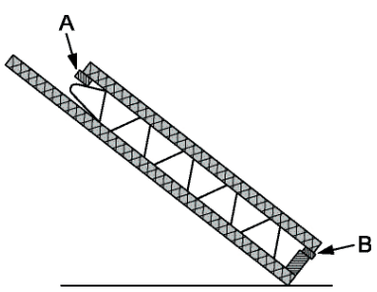
Double wall elements have 2 or 4 lifting anchors depending on the weight and shape of the element.



Element with 2 lifting anchors delivered standing should be lifted with a two-strand lifting chain with safety hooks. The strands may have a maximum angle of 30° from vertical

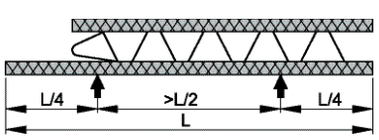


Double wall element with 4 lifting anchors delivered standing should be lifted with 4 safety hooks and self-linking strands. The strands may have a maximum angle of 45° from vertical.



Double wall elements loaded/transported horizontally. Normally, horizontal elements have 4 lifting anchors and this means that all lifting anchors should be used for lifting.

Note! *double wall elements shall be reinforced with wood at the top at the lifting points (A) and "blocked" at the bottom (B) to avoid damage when lifting.*

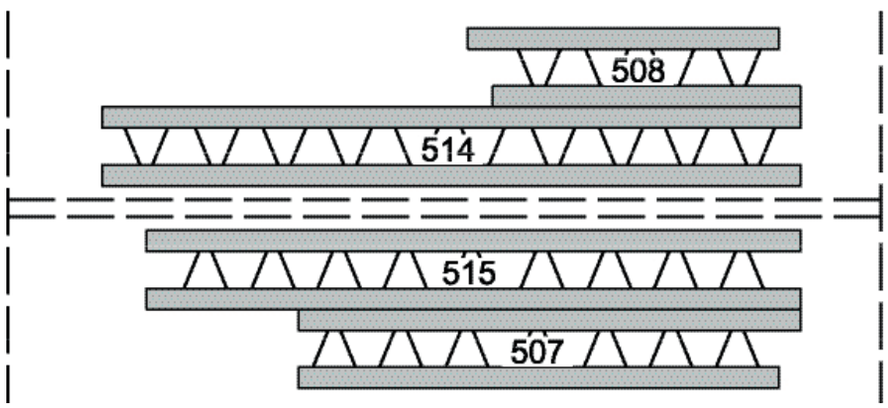


Horizontal double wall elements can also be lifted with a forklift truck. In this case, the forklift forks must be positioned perpendicular to the reinforcement beam at a distance of about L/4 from the ends of the element.

Standing concrete elements

When standing elements are placed on the carrier in production, they shall be positioned in such a way that a straight edge is formed on one side, see figure.

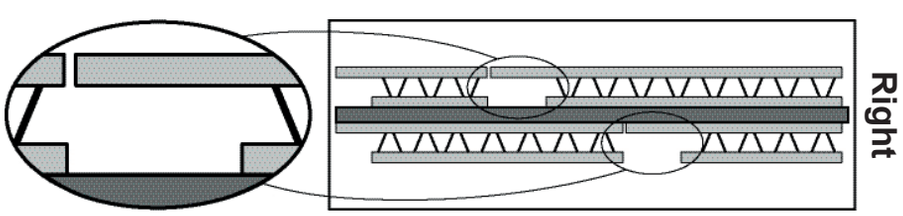
The straight edge of the load shall be facing forward and the centre of gravity shall be centred towards the centre of the load in order to for it to be moved by forklift without any of the elements cracking or falling off when moving.

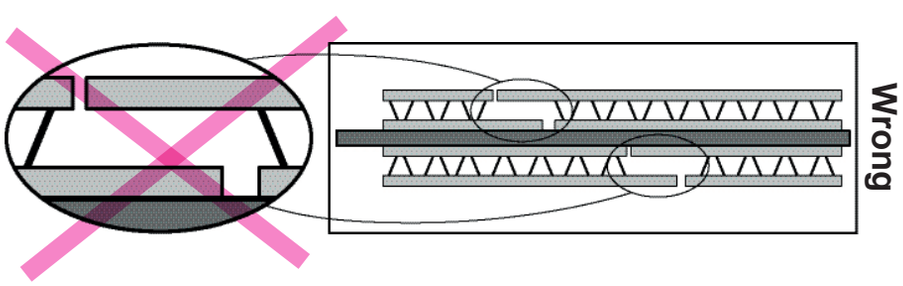


View from above. Example shows double wall.

EXAMPLES OF HOW TO LOAD STANDING ELEMENTS.

NOTE! When loading, check that the elements are not overlapping as there is a risk that they may crack during transport and fall during unloading.





Elements with irregular form

Elements that have an irregular form, e.g. L-shaped, must be loaded in consultation with the driver so that they are stable during transport as otherwise they can fall/crack. Side (1 is to face the straight edge of the load.

Elements should be loaded according to Fig. A

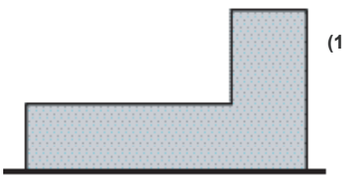


fig. A

Elements can be loaded according to Fig B with a transport brace.

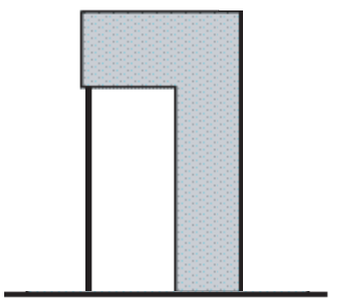


fig. B

Elements must not be loaded according to Fig. C.

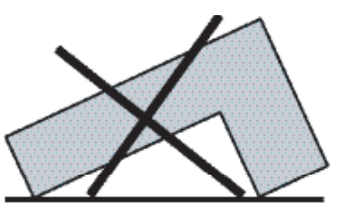


fig. C

Loading walls on to transport unit

Important! Make sure there is no loose material on the transport unit.

Straps and tensioners from the factory in Katrineholm are to be left at the factory.

Edge guards must always be used to avoid damage to the elements and tensioning device.

Loading carriers/loose A-trestles

Carrier/loose A-trestles shall be secured to the transport unit when loaded. The carrier must be firmly anchored to the transport vehicle.

If loose A-trestles are used, they should be fastened to the "stay hole" of the transport unit before loading.

Friction rubber mats can be used for a better coefficient of friction.

Unloading

An unload officer from the workplace should be present when unloading. An unload officer possesses knowledge of the workplace, its daily routine and interaction with crane/machine operator.

The unload officer must have knowledge and experience so that he is aware and absolutely certain of his responsibilities and powers. Training in safe lifting is a basic requirement.

The unload officer's task is to:
- carry on a dialogue with the driver, work supervisor and crane/machine operator
- coordinate so that unloading takes place safely for all, including third parties. This includes things like weather conditions.
- give the crane operator the go-ahead for lift

An acceptance check must be carried out upon arrival at the work site before unloading by the unload officer or the receiving manager. The check includes a visual inspection of the load, i.e. that the goods correspond to the order and that there is no visible damage from loading and transport. The packing note is reconciled with the called load, delivery-specific lifting instructions and that the driver has the necessary skills.

Transport with an unsafe load or other discrepancy shall be prohibited from entering by the unload officer/receiving manager. The discrepancy report should be written by both parties. Measures are decided in consultation between the affected parties.

Before unloading, the unload officer shall confirm that the unloading site is safe. This means that:
- the unloading site is cordoned off and clearly marked
- be aware of whether the unloading site changes, e.g. bearing capacity and level of ground
- vehicles unloaded at the correct site
- cranes/machinery in the area are operating in a safe manner (e.g. do not lower support legs outside hardened surfaces and have pads)
- unloading site is clearly illuminated if necessary
- other measures unique to the workplace

A risk assessment shall be carried out and any necessary measures taken before lifting.

The driver's task is to:
- notify arrival at the work site (see phone number on fp)
- approve the designated unloading point. If the unloading point is not correctly adapted to the checklist (see last page), the driver has the right to refuse unloading
- perform individual load securing of standing elements – a standing element must never be unsupported
- have training in safe lifting and received introduction for the workplace
- be responsible for the goods until the lift from the vehicle takes place

Driver's task in the event deliveries left at the workplace:
- ensure the ground at the storage site is sufficiently level to allow the pallet to be left without the risk of the elements tipping over

The task of crane/machine operator is to:
- before each unloading session, perform a risk analysis that takes into account prevailing circumstances such as weather and wind, the goods being unloaded (weight, size), etc.
- be responsible for the lift once it has begun

Loading and unloading stirrup trailers

High walls delivered by stirrup trailer must be handles carefully to be safe.

The walls are placed on a stirrup trailer where each element is secured individually by means of "arms" on the platform all the way to the headboard so that the wall cannot tip either during transport or when it is laid up.

When the stirrup trailer is loading the pallet, the hydraulic arms of the stirrup are pushed against the walls to keep them stable while in transport.

The wall must be fastened both up and down on the pallet. Make sure the discs for the nuts are against the headboard and that nuts/wedges look whole.

The wall must stand all the way in against the headboard and each one must be secured by means of the arms. Also lay in spacers to protect the façade.

It is essential to attain a balance and the correct centre of gravity on the pallet, which can withstand a maximum of 27 tonnes.
Placing the centre of gravity on the battens will extend the life of the wood.

A pallet with walls on must stand on a level surface so that it cannot in any way tip over. A single wall must not be left on the pallet for a long time as there may be a risk of tipping. Also keep in mind that the ground can change over time, for example during frost thaw.

There must be plenty of space – about 30 metres per pallet and width to access the pallet during loading/unloading.

When unloading, each wall element and anchor must be loosened individually from the stirrup trailer.
After coupling the wall, both brackets are loosened fully so that the brackets and walls are not damaged while lifting.

It is recommended to loosen the walls from the outside and in, i.e. not take the wall in the middle first as this will increase the risk of damaging the walls.

When lifting a pallet, take one at a time and they must be empty of goods/materials. A maximum of 3 pallets may be stacked on top of each other. The lift is made with a hook in existing holes, not with straps as it may shift.

Sometimes sheet metal is placed under the wall to distribute the pressure from the wall correctly. This sheet should be returned to the factory after unloading.

Individual securing of walls

Individual load securing shall be carried out at the workplace for elements loaded in such a way that they may tip over during unloading. If the individual elements are unloaded from the lorry's load bed, the driver is responsible for coupling correctly and maintaining the securing of the individual load.
The unload officer gives the all-clear for the lift.

The workplace is responsible for securing the elements on load carriers that are kept in a storage yard.
When the delivery is unloaded in connection with installation, the driver releases the straps from the carrier.

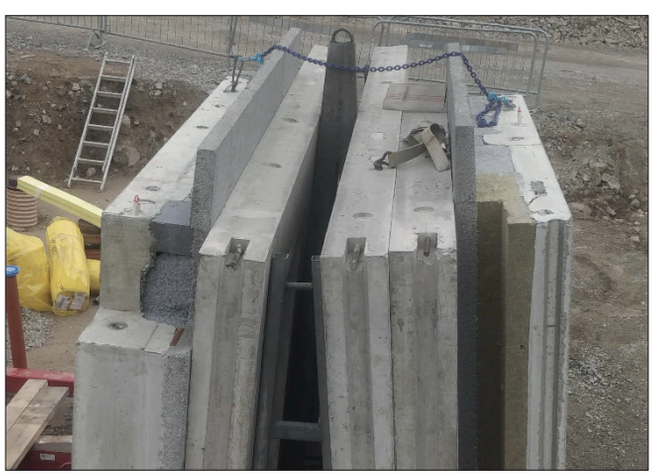
NOTE!! The top strap/chain that anchors the walls should remain in place.

All standing elements must always be individually secured when the main straps are not in place.
There are different ways to secure individually. Here is our recommendation.

Unloading walls from load carrier/lorry

Release the top strap after coupling to the wall you are about to lift up.

Lift up one wall at a time, the other walls must remain anchored to each other to prevent tipping.



The top strap can be replaced with a chain that together with 2 hooks with latch anchors the walls. Lifting chain 6mm, Class 8 is recommended here. Load hook with latch, Class 8. Chains and hooks are not supplied by Peab Byggsystem.

When there is only one wall left in the load carrier, it is essential that wall be anchored to one of the A-trestles.

In winter, check that the wall elements are not frozen together before lifting. If the elements have frozen together, separate them before lifting.

After unloading

After unloading is complete, the unload site shall be cleared of materials used in the transport and loading timber shall be piled in crates intended for return.

Handling of clinker concrete load carrier (pallet) for redelivery.

When the wall elements/load carrier are strapped, the strapping and loading equipment shall be packed as described below.

1. Separate straps and tensioners. Roll up the straps with the hook "outwards".

2. Put straps, tensioners, edge guards and hooks in a collar pallet or in the box located at the end of the load carrier, see picture below.

3. The material needed to ensure the transport of wall elements, such as rubber, wooden wedges and pieces of beam, etc., is placed in the box located at the end of the carrier.

4. Fold up the A-trestles and place in the carrier as shown below.

5. Stack the load carriers onto each other. When stacking, be careful that the A-trestles are not crushed as adjustment may be required at times. Up to 11 load carriers can be stacked on each other.

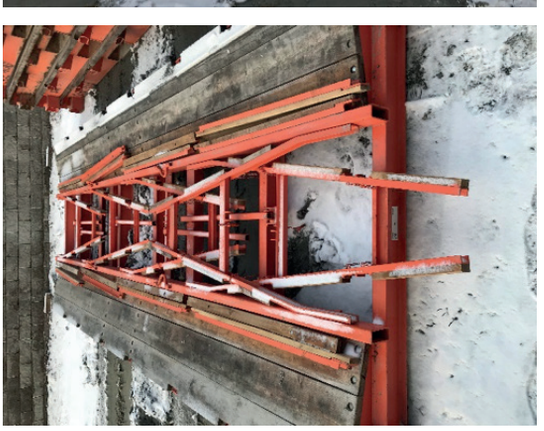
Instructions for dismantling A-trestles from Katrineholm

1. Start by removing all pins to the crossbars.

2. Place the crossbars on the plank both sides of the A-trestles.

3. Loosen the pins for the diagonal stays on the A-trestles.

4. Fold up the A-trestles as shown so that they are not be damaged when stacking several carriers on each other.



5. Finish by folding the last A-trestle back over the others as shown.

Survey of unloading site

CHECKLIST

TRANSPORT & MACHINERY

SWEROCK

Project	Date of execution
Other	

- The unloading site shall be clearly identified and free from obstacles (e.g. overhead lines, branches, trees and building materials). Sometimes road plates may be needed for easy access.
- The unloading site not be on an incline, even small gradients increase the risk that concrete elements may become unbalanced. The road should be able to withstand 10-tonnes axle pressure.
- If reversing is required, the road width must not be less than 4 metres.
- The road in winter must be free from snow and salted/gritted before the vehicle arrives at the work site.
- Road safety must not be affected.
- An area at least equal to the height/width of the concrete elements shall be cordoned off around the unloading site to protect personnel, the general public and materials. The same cordon is required in order to protect the general public, especially cars, bicycles and pedestrians.
- Make sure that there is a good lighting if the work is to be carried out at dusk or in the dark.
- The unloading point must occasionally be moved, so check these points once more.

CHECKPOINTS	YES	NO	NOTE
Is the free space around the access road sufficient?			
Is the access road free of inclines?			
Is the unloading site free of obstacles?			
Is the condition of the access road OK?			
Is the bearing capacity of the access road OK?			
Is the access road wide enough?			
Is the access road sufficiently maintained?			
Is the bearing capacity of the unloading site OK?			
Is the unloading site level?			
Are the entrance and exit to the workplace safe for road traffic?			
Is the unloading site located so that road safety is not compromised?			
Have sufficient measures been taken to cordon off and secure the unloading site?			
Is the correct and undamaged fall protection equipment available?			

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