Installation of DELTABEAM

These DELTABEAM installation instructions are intended to complement the project's erection method statement. Peikko's technical support can help with the erection method statement if required. If there are differences between the erection method statement and this document, the differences should be approved by the structural engineer.

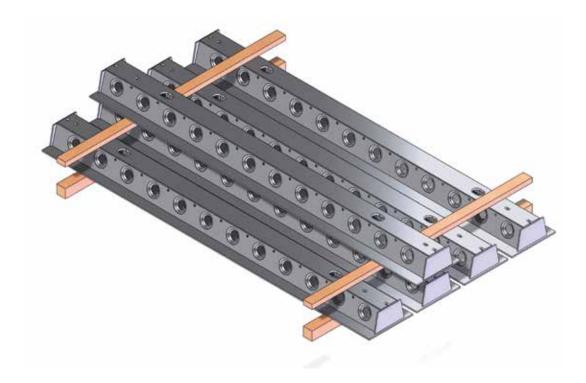
NOTE: IF THE INSTALLATION TOLERANCES OF DELTABEAM ARE EXCEEDED, PEIKKO MUST BE CONTACTED. DELTA-BEAM OR CONNECTIONS BETWEEN DELTABEAMS CAN'T BE MODIFIED WITHOUT PERMISSION FROM PEIKKO.

Deliveries

DELTABEAMs are delivered to the site according to the agreed project schedule. Delivery of each shipment should be confirmed with Peikko two weeks prior to shipping. DELTABEAMs of different lengths are not loaded in the order of installation at the factory because it is not economical or practical. The beams are marked with identification codes in accordance with the drawings.

Storage on-site

The DELTABEAM's visible bottom part is painted with anticorrosive primer. For long-term storage, the beams must be covered. Piling strips are used under the beams to protect the surface treatment. Piling strips should be free from grease or other substances that may damage the surface treatment. When storing beams in piles, the bearing capacity and the level of the surface should be verified.



Lifting and moving

DELTABEAMs can be lifted and moved using ordinary lifting equipment, such as cranes or forklifts. The weight of each DELTABEAM is displayed on the product sticker on the beam or in the fabrication drawings. The CE marking sticker can also be found on the beam. DELTABEAMs must be lifted using the lifting holes on the top plate symmetrically to the axis of the center of mass. The maximum allowed lifting angle of the chains must be notified. In special cases, when there are no lifting holes, DELTABEAMs can be lifted with chains attached to the web holes. In some cases, a third chain is needed in order to lift DELTABEAM and maintain its balance. For example, DELTABEAMs with wide formwork sheets should be lifted using the lifting holes and a third chain should be assembled to the sheet.





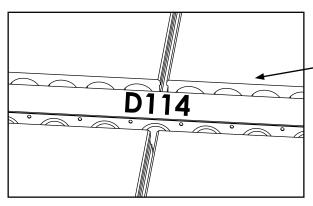


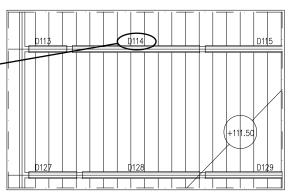
NOTE: ALWAYS USE APPROVED LIFTING CHAINS AND LOCK THE CHAIN HOOKS.

NO LIFTING STRAPS / CHAINS AROUND DELTABEAM: THIS IS A HEALTH AND SAFETY RISK.

Assembling DELTABEAMs

The project's erection method statement must be followed at all times. Every DELTABEAM has an identification code on the top plate. The beams are installed in such a way that the identification code on the top plate of DELTABEAM can be read in the same direction as marked in the element lay-out drawing.





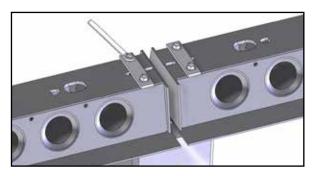
Connecting DELTABEAMs

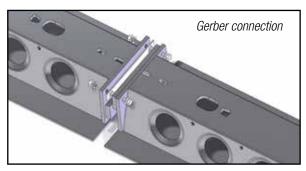
DELTABEAMs are connected according to the project's erection method statement, the installation plans, and the connection details. The connection details are specified in the construction plan for each project. Shim plates and steel packs should be placed according to the erection method statement. The DELTABEAM delivery only includes installation material for the connections between DELTABEAMs (Gerber and Side connections).

The DELTABEAM's weight is not effective enough to stabilize the frame during installation of the slabs. Therefore, DELTABEAMs should be connected prior to assembling the props and floor units. This prevents the beams from moving. If on-site welding is required, the process and the qualification of the welders should be in accordance with the erection method statement.

Shim plates in Gerber and Side connections are used by default to allow installation tolerance. Installation tolerance is +5 mm / -10 mm and the maximum thickness of the shim plates is 15 mm. DELTABEAM lengths have been designed with the shim plate so that a 5 mm shim plate is set to every connection after DELTABEAM is installed but before the bolts are tightened. Possible variations to the designed total length of the beam line are taken into account by adding or removing the number of shim plates from other connections within the allowed tolerances.

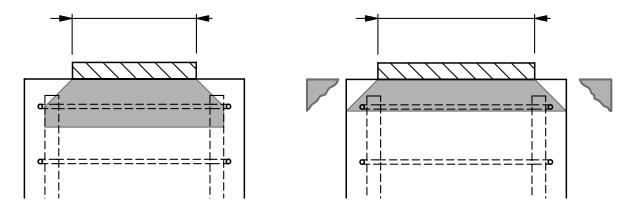






When assembling continuous DELTABEAMs, the location of each DELTABEAM and total length of the beam line should be confirmed prior to tightening the bolts in the Gerber connections and other connections. The ends of the continuous beam lines must be prevented from uplifting during installation.

Steel packs are placed on the reinforced concrete structure so that the effect of the contact stress remains inside the perimeter of the stirrup reinforcement. The risk of spalling can be reduced by applying chamfers to the edges of the concrete structure. The usage of neoprene is not recommended between DELTABEAM and the support.



NOTE: DELTABEAM MUST NOT BE CUT WITHOUT PERMISSION AND INSTRUCTIONS FROM PEIKKO, OPEN OUT BOLT HOLES, etc.

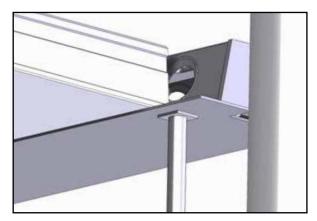
Propping DELTABEAMs

Propping should be carried out according to the project's erection method statement prior to assembling the floor units. DELTABEAMs must be connected according to the erection method statement, the installation plans, and the connection details before propping. The locations of the props and the loads to the props must be in accordance with the structural engineer's instructions.

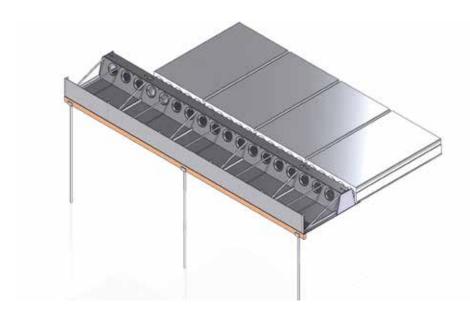
The stability of the props must be confirmed when they are assembled. The foundation for the props must also be secure and solid. The props should be assembled as close to the beam support as possible. The props should be placed at the loaded side of the beam, below the web. The props may be removed only when the joint concrete and the infill concrete of DELTABEAM has reached the required strength.

With hollow-core slabs, DELTABEAM propping is used only to prevent the rotation of the beam at the supports. The function of DELTABEAM propping is not to prevent deflection. The hollow-core slabs should not be propped without permission from the manufacturer.

When DELTABEAM is bearing on the end of a wall running parallel with the beam the propping plan prepared by structural engineer should be followed.







The DELTABEAM's wide formwork sheet must always be supported. A board is placed under the corner of the wide formwork sheet. The board is supported with props. The board must be as long as the supported formwork sheet.

Special attention should be paid to asymmetrically supported beams, long beam spans, or tall propping heights. When the propping heights are tall, traditional methods such as temporary columns or towers are used. Peikko can offer special solutions to propping problems, although this must be taken into account in the DELTABEAMs' design.

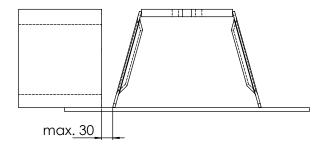
NOTE: DELTABEAM PROPPING IS USED WITH HOLLOW-CORE FLOORS ONLY TO PREVENT THE BEAM FROM ROTATING AT ITS SUPPORTS.

Assembling floor units

The DELTABEAMs' connections and the props must be securely installed, tightened, or welded before assembling the floor units. To minimize the rotation of the beam, the floor units should be assembled alternately on different sides of the beam. After the slabs are installed, the necessary formwork, edge forming, and slab reinforcement will be carried out.



Floor units should be assembled directly on the beam ledge. Usage of neoprene is not recommended. Floor units should be assembled so that there is a gap of a maximum of 30 mm between the DELTABEAM's web and the end of the floor unit. If this gap is exceeded, contact Peikko or the structural engineer. Finally, all holes on the bottom side of DELTABEAM (locations of consoles, Side connections and Gerber connections) should be blocked. The joint and ring reinforcement are also assembled.

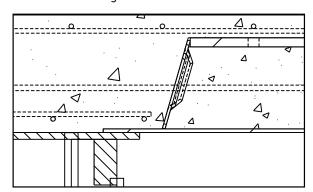


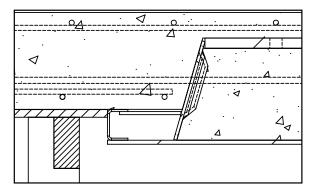
The composite steel sheet should be assembled according to the erection method statement. The composite steel sheet should be supported at the same elevation as the beam following the precamber shape. No room for settlement should be allowed. Filigran slabs are supported at the same nominal camber as the floor. The precambering is fabricated to DELTABEAM to ensure that DELTABEAM is level after the floor is installed.

NOTE: MATERIAL MUST NOT BE STORED ON THE FLOOR BEFORE THE INFILL CONCRETE HAS HARDENED. THE FLOOR ABOVE MUST NOT BE BUILT UNTIL THE INFILL CONCRETE HAS HARDENED.

In-situ concrete slab

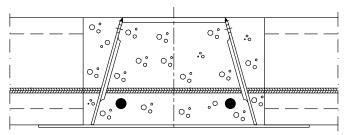
In-situ concrete slabs are built to the nominal level. To achieve a flush bottom surface with an in-situ slab, it is recommended that the formwork be built under the bottom plate. With the downstand on the beam ledge, the formwork is built against the web of the downstand.

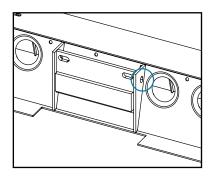


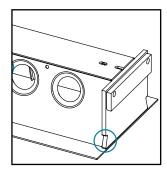


Reinforcement

Reinforcement is installed in accordance with the erection method statement. The DELTABEAM's minimum transverse reinforcement is 94 mm²/m. The transverse reinforcement must be assembled even if rebars are being bent over DELTABEAM. The transverse reinforcement should always pass through the DELTABEAM's web holes or through the additional web holes (with deep DELTABEAMs). There is a hole in the Side connection for assembling the ring reinforcement and a notch in the Gerber connection for the rebar.







Casting the concrete

DELTABEAMs are cast with concrete simultaneously with the slab or the joints of the hollow-core slabs. DELTABEAM must be filled with concrete in one run. DELTABEAM must be cast completely in order for it to secure the properties of a composite beam. DELTABEAM is designed for temporary live load according to EN 1991-1-6 and its National Annex.

Structural concrete is always used when casting the concrete. The concrete grade is in accordance with the project's erection method statement. The concrete's properties are determined according to the project's concreting plan. The recommended maximum aggregate size is 8 mm (not more than 16 mm). The lower parts of Gerber and Side connections must be properly filled with concrete. Topping concrete is cast according to the erection method statement.

Casting the concrete:

- 1. Confirm that DELTABEAM is clean for casting.
- 2. Confirm that the formwork and the reinforcement are in accordance with the design.
- 3. Initial infill may be done through the casting holes in the top plate. DELTABEAM is filled with concrete up to the bottom edge of the web holes.
- 4. After the initial infill, the final concreting is done only from one side of DELTABEAM.
- 5. Ensure that DELTABEAM is completely filled with concrete by checking the air holes on the opposite side of DELTABEAM. The beam is full when concrete runs through the air holes. Concrete spillage over the beam must be avoided as this will make it harder to observe whether the beam is full.
- 6. Compact the concrete with a poker while concreting. The entire infill process may be done through the casting holes in the top plate, but it will be slower and require more work with the poker to run the concrete. Mind the formwork plate and the vertical web when using a poker.



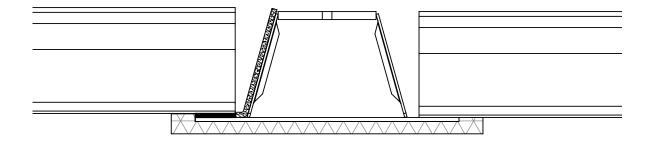




Additional fire protection

Additional fire protection is done according to the project's erection method statement. DELTABEAMs with expansion joints must be protected against fire from below. When the expansion joint is on the beam ledge the entire width and length of the beam must be protected against fire. The expansion joint can also be located at the end connection or at the Side connection.

The vertical web of the DR-type DELTABEAM must be protected against fire on-site if the vertical web is not protected against fire by permanent structures such as walls. A wall would act as permanent structural fire protection. If DELTABEAM is being connected to a fire-protected steel structure, the extent of fire protection must be done according to the erection method statement. Unprotected DELTABEAM will conduct heat to the steel structure through the connection.



After installation

Any damage to the surface treatment should be repaired as soon as possible. The surface treatment should be completed with the top layers as soon as possible.

Safety

All valid health and safety rules must be followed during installation. Fixing points for handrails and other safety products can be ordered separately.



On-site check list

1. Storage on-site

- Use piling strips to protect the surface treatment
- Cover DELTABEAMs in long-term storage on-site

2. Lifting and moving

- DELTABEAMs are lifted by the lifting holes located in the top plate. Always lock the chains.
- Note the maximum allowed lifting angle of the chains

NO LIFTING STRAPS / CHAINS AROUND DELTABEAM: HEALTH AND SAFETY RISK

3. Assembling DELTABEAMs

- First check the instructions and the requirements in the erection method statement
- DELTABEAMs are installed in such a way that the identification codes of the beams read in the same direction as marked in the element lay-out drawing
- The beams must be connected (with bolts or welds) to supports prior to beginning the assembly of the floor units
- When assembling DELTABEAMs on reinforced concrete columns, use either one wide steel pack or two smaller packs: one small pack in the middle is not sufficient
- Prior to tightening the bolts on the Gerber connections, check the location of each DELTABEAM and the total length of the beam line

4. Propping

- With hollow-core slabs as close to the DELTABEAM support as possible, at the loaded side of the beam, below the web
- With other floor types the erection method statement is followed
- Remove only after the concrete has hardened

5. Assembling floor units

- Assemble the floor units directly on the beam ledge without any layers between
- Max. 30 mm gap between the DELTABEAM's web and the end of the floor unit
- To minimize the rotation of the beam, assemble floor units alternately on different sides of the beam

6. Reinforcement

- The minimum transverse reinforcement through DELTABEAMs is 94 mm²/m, from slab to slab in joints or voids
- In edge beams use L- or U-shaped rebars

7. Casting the concrete

- Fill in one run, fill only from one side, observe from the other side. The beam is full when concrete starts to run through the small air holes in the upper part of the web. Mind the formwork plates when using a poker.
- Ensure that concrete fills the gap between Gerber and Side connections

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