

These DELTABEAM® Frame installation instructions are intended to be used together with the project's erection method statement where the instructions may be complemented. If there are differences between the erection method statement and the instructions given below, the differences should be approved by structural engineer.

Before assembling the DELTABEAM® Frame

1. Control measurements for foundations: Anchor bolts

Should be done well in advance of the first deliveries

- ☐ See Peikko's Technical Manuals for HPM® Rebar Anchor Bolt or PPM® High-Strength Anchor Bolt for further information.
- ☐ Locate the anchor bolts where the composite columns are to be installed
- ☐ Inspect the bolts visually to ensure that they are not damaged
- ☐ Measure the locations of bolt groups and individual bolts
- ☐ Ensure that the locations of bolts are within the tolerances (for HPM® Anchor Bolts see Table 2 below, for PPM® High-Strength Anchor Bolts see the Technical Manual)
- ☐ Contact Peikko if the tolerances are exceeded

Table 2. HPM® Anchor Bolt installation tolerances and tightening torques.

Anchor Bolt	HPM 16	HPM 20	HPM 24	HPM 30	HPM 39
Thread diameter [mm]	16	20	24	30	39
Color code	Yellow	Blue	Gray	Green	Orange
Installation tolerance [mm]	±3	±3	±3	±3	±3
Bolt protrusion, h_b [mm]	105	115	130	150	180
Grout thickness, t_{grout} [mm]	See the correct elevation from project drawings				
Spanner size [mm]	24	30	36	46	60
Recommended torque value, min-max [Nm]	120-170	150-330	200-570	250-1150	350-2640

2. Deliveries and storage on site

The steel members of the DELTABEAM® Frame are delivered to the site in lots according to the project schedule. The deliveries should be planned so that assembly is possible as soon as the goods have arrived on site. The surface treatment of the steel members is not designed for long-term weather exposure.

- ❑ Reserve a storage area for the steel members which is large enough, flat and is within the reach of the planned crane positions
- ❑ Prepare lifting and moving equipment for unloading the items from the truck
NOTE: the DELTABEAM® steel members are not loaded onto the truck in the order of installation. The steel members are marked with identification codes in accordance with the drawings.
- ❑ Lay the steel members on wooden logs and to protect the surface treatment
- ❑ If the steel members are to be stored in piles place wooden logs between them and ensure that the pile is stable (see Figure 7)
- ❑ For long-term storage, cover the steel members

Figure 7. Storing of DELTABEAM® Frame steel members in piles.

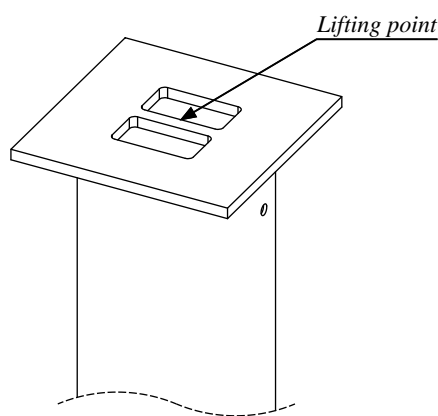


Erecting columns

1. In the storage area

- ☐ Locate the next column in order according to the assembly plan
 - ☐ Check the column identification label to ensure that the column is correct
 - ☐ Ensure that the column is free of dirt, water, snow, and ice
 - ☐ Check that the internal reinforcement is intact
 - ☐ Lift the column using the hoist bracket located at the top of the column (see Figure 8)
- Attach the lifting hook directly to the lifting point.*
Do not use fabric slings between the hook and the lifting point
The weight of the column is shown on the label attached on the column

Figure 8. Lifting point located at the top of the column.



2. At the assembly location

- ☐ Adjust the lower nuts and washers of the Peikko HPM® or PPM® Anchor Bolt to the correct level
- ☐ If the column needs to be propped, have the equipment ready
- ☐ Ensure the correct alignment of the column before laying it on the anchor bolts
- ☐ Lower the column onto the anchor bolts and install the upper washers and nuts
- ☐ Screw the upper washers and nuts onto the bolts and align the column to the vertical by adjusting the leveling nuts
- ☐ Tighten the nuts at least to the minimum given in the installation manual of Peikko's HPM® or PPM® Anchor Bolts. For HPM® Anchor Bolts see Table 1. For PPM® Anchor Bolts see the technical manual.
- ☐ If the column is to be propped, the diagonal props are fixed into the floor and to the threaded holes of the column profile (see Figure 9)
- ☐ Release the crane
- ☐ Grout the joint between the column's base plate foundation/floor using non-shrinking grout. See the installation manual for Peikko's HPM® or PPM® Anchor Bolts for further information

Figure 9. Propping a column.



Concreting columns

Columns can be filled with concrete by two different methods:

- Pumping from the bottom
- Filling from the top

The filling method affects the column design, so it is always decided during the design process.

1. Before concreting

- ☐ Ensure that the column is free of dirt, water, and ice
- ☐ Ensure that the column is installed in the correct vertical position
- ☐ Ensure that the steam holes are closed using plastic plug
- ☐ Ensure that there is a large enough opening at the top of the column to control the filling
- ☐ Ensure that the propping (if required) is intact
- ☐ Ensure that the concrete (grade, aggregate size, consistency) fulfills the planned requirements
- ☐ When pumping from the bottom, ensure that a suitable hose input joint (see Fig 10) is available and that it fits into the column and the concreting hose
- ☐ Have a shaft or form vibrator ready for compacting (if not using self-compacting concrete)

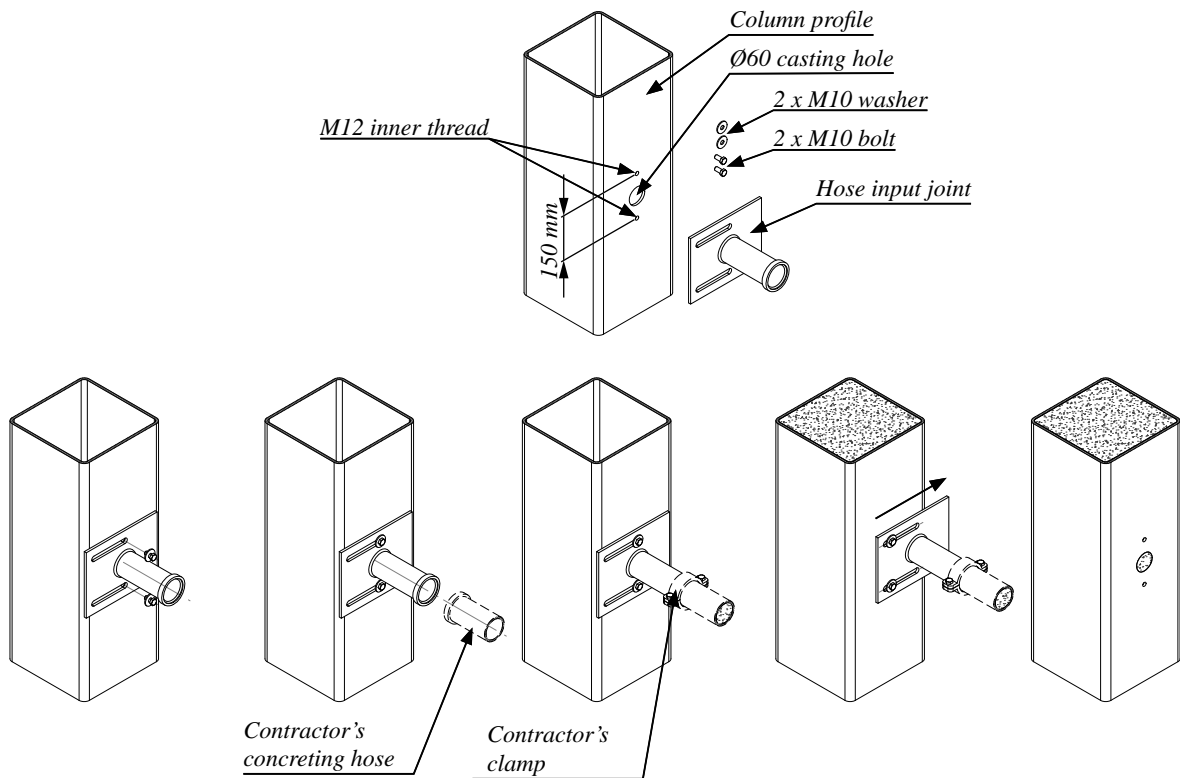
2. Receiving the concrete

- ☐ Self-compacting concrete: verify the consistency and temperature of each batch
- ☐ Regular concrete: check each batch visually
- ☐ Air-entrained concrete: measure the air content of the concrete in each batch

3. Concreting – pumping from the bottom

- ☐ Align the pump hose, avoiding sharp bends and steep climbs
 - ☐ Before concreting, pump any inadequate concrete into a concrete waste dump
 - ☐ Attach the hose to the input joint (see Fig 10)
 - ☐ Start filling the column (recommended filling rate is 1 m/min)
 - ☐ If the filling is blocked and the concrete pressure starts to rise, do not try to open the blockage by increasing the pump pressure
 - ☐ When the concrete level reaches the top of the column, continue pumping as long there is segregated concrete coming out
 - ☐ Take extra care that the concrete at the top end of the column is properly compacted and in the last 1.5 m from the top of the column if necessary
 - ☐ Close the hose input joint by sliding the joint (see Fig 10)
 - ☐ Remove the concreting hose and connect it to the next column
 - ☐ Wipe any external concrete splatters from the column
 - ☐ When 30 minutes have elapsed from the end of the concreting, check the level of concrete at the top of the column
 - ☐ If the concrete level has dropped, top up the column with additional concrete and vibrate the top section as long as there are air bubbles coming up
- NOTE:** With self-compacting concrete, vibrate according to the instructions provided by the concrete supplier. Optionally, the top end can be filled by grouting.
- ☐ When the concrete has hardened enough (approximately 12 to 24 hours) remove the input joint

Figure 10. Operating the hose input joint.



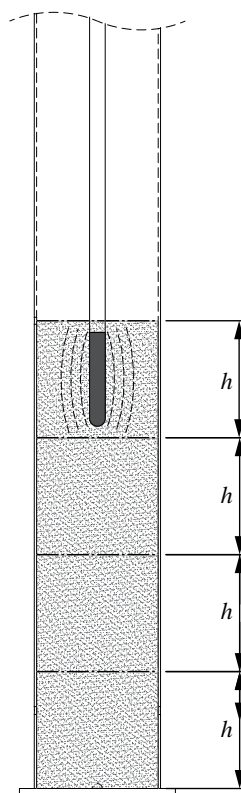
Concreting truck with pump.



4. Concreting – filling from the top

- ☐ Align the pump hose, avoiding sharp bends and steep climbs
 - ☐ Before concreting, pump any inadequate concrete into a concrete waste dump
 - ☐ Lower the vibrator to the bottom of the column
 - ☐ Start filling the column (recommended filling rate is 1 m/min)
To prevent segregation, minimize the drop height of the concrete. Never use a drop height of more than 1 m.
 - ☐ Use the vibrator in vertical steps so that the maximum step size (h) is 30 cm (see Figure 11), simultaneously monitoring the filling and staying 10–20 seconds at each step. Do not move back and forth.
 - ☐ Take extra care with vibrating for the last 1.5 m from the top of the column
 - ☐ Wipe any external concrete splatters from the column
 - ☐ When 30 minutes have elapsed from the end of the concreting, check the level of concrete at the top of the column
 - ☐ If the concrete level has dropped, top up the column with additional concrete and vibrate the top section as long as there are air bubbles coming up
- NOTE:** With self-compacting concrete, vibrate according to the instructions provided by the concrete supplier. Optionally, the top end can be filled by grouting.

Figure 11. Compacting the concrete in layers with a shaft vibrator.



5. Concreting at cold temperatures

When the air temperature is below +5°C during casting or two days thereafter, a cold weather concreting plan must be prepared. Precautions should be taken when daily average temperatures remain below +10°C. Rapid strength concrete is recommended. Higher strength concrete, cold weather concrete, or hot concrete may also be considered. Columns can be equipped with internal heating cables.

- ☐ Remove any snow and ice inside the column
- ☐ Ensure that the heating cables are intact
- ☐ Wrap the column in insulation material
- ☐ Monitor and record the temperature during the hardening process

Installing DELTABEAM® Composite Beams

Refer to the DELTABEAM® Slim Floor Structures, Technical Manual.

