

CONSOLIS BETONIKA	INSTALLATION RECOMMENDATIONS FOR PRECAST REINFORCED CONCRETE PRODUCTION	EDITION 1 September 2008
	INSTALLATION OF GIRDERS AND BEAMS	

1. General Part

At the company, L-shaped and upside-down T-shaped girders are manufactured and also one-slope and two-slope I-shaped cross-section roof beams are produced.

Most frequently used (typical) assembly of beam joining to column and its installation is described in the Recommendation. Non-typical assembly installation methods should be indicated in each individual project.

2. Inspection of Production Items on Construction Site

All production items of the Company are marked by a special label meeting requirements of standards. In the label, the following information is provided: name of a production item and identification number, name of the client / object, identification number of the contract, geometric dimensions, the weight, manufacture date, a checking mark of the Quality Service.

It is recommended to verify quality of all transported production items prior to unloading and/or during it. When checking geometric dimensions of production items, drawings should be used and Tables of Production Tolerances enclosed to the contracts. When visually inspecting production items, it shall be necessary to make sure that they do not have damage that may be caused by loading or transportation events. After the discrepancies or damage have been detected, the Construction Manager and Manufacturer's Representative (Project Manager) should be informed immediately. The Manufacturer shall assume obligation to take all necessary actions immediately to eliminate discrepancies, still claims concerning damage to production items shall be accepted only then when they are stated prior to unloading the production item from the transportation vehicle.

3. Unloading, Hoisting. Interim Storage

Unloading of girders and beams is carried out using double-branch lifting strops (chains), selected by the weight of the production item and distance between the lifting eyes. If a girder or a beam are long (over 15 m length) and heavy (over 10t) items, four lifting eyes may be designed in one item. In this case, an item shall be unloaded using two cranes or a special traverse. One should pay attention that during lifting, the angle between the branches of the strop should be $\leq 90^{\circ}$. In order to prevent the item from swaying, the ropes should be tied at its ends, by which the item would be held and properly directed (Fig. No.1).

When storing girders or beams on the construction site, supporting members should be placed at the eyes or in the gap between the eye and the end of the item. As production items are massive and of heavy weight, the rest bars underneath should be of not less cross-section than 150x150 and they should rest throughout the entire surface area on the ground of storage site (Fig. No.2).

4. Installation, Adjustment, Temporary Propping of Shelves, Concreting

Prior to installation of girders and beams, the resting locations should be cleaned off and altitudes of column consoles checked. The installation works shall start from the correct hoisting the production item

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into the planned position. Having selected lifting chains of proper lifting capacity and length, the item shall be elevated from the ground and one should make sure whether the item is hanging in a horizontal position. If one notices that the item is not hanging in the horizontal position, one should adjust the horizontality of the item using chain type strops. If this has not been done, when the girder is being put on the column bolts the bolts may be damaged or even a part of column console may be split off (Fig. No.3).

After the item has been elevated into the proper height, one should turn the item via help of ropes in a way allowing hole occurrence above the column bolts. Carefully lowering the item, the installers that stand on installation areas shall adjust the item so that it will evenly prop on consoles at equal distances from the columns (about 2 cm) (Fig. No.7).

After the L-shaped or upside-down T-shaped cross-section girders have been installed, the struts shall be erected, at the distance of up to 1/10 length of the item from the column axes. The struts shall prop the shelf of the girder. The bearing capacity of the strut should be such that it would withstand the weight of floors and girder shelf falling on the girder. It is recommended to use from one to three struts at each end of the girder. The struts are required to prevent tilting of the girder when installing floor slabs (Fig. Nos. 4;5). The struts shall be allowed to be removed after the concrete of hollow core slab ties and longitudinal joints has reached the planned strength, or when all fastening assemblies of installed TT type slabs have been fully assembled and welded (see Installation Recommendations for HCS and TT type slabs).

Propping of girder shelves is a responsible and thoroughness requiring task. When a building being erected is a multi-storey one, the girders of all floors should be propped as indicated in the scheme. In this case, the struts are required of considerable bearing capacity (10÷30t). If the height of one storey of the building being erected is more than 5m, to carry out the propping shall be a complicated task. Even prefabricated temporary metal supporting members should have to be used. *Therefore, the construction companies when preparing themselves for installation should foresee and evaluate all work and costs related to propping the girder shelves.*

One should necessarily pay attention to the fact that prior to installation of floors, the column bolts that tighten girders or beams should be filled up with concrete. When carrying out installation of typical production items, bolts shall be concreted only at one end, the bolts at the opposite end of the girder shall be left free. The Project Constructor shall indicate in what way the concreting shall be carried out and submit working drawings of the assemblies. If the bolts are left non-concreted, then they are sprinkled up with polyurethane or filled up with extremely weak cement mortar S7.5 (not vibrating) so that rust will be prevented. After the bolts have been filled up at both ends of the item, the washers shall be placed and nuts tightened with 0.25 kNm force. The gap between the end of the production item and the column when an assembly of joining is a typical one, shall not be concreted. Other solutions should be indicated in the drawings of assembly installation.

One should pay particular attention to the fact that roof beams installed at a height become like “sails”, as their height may reach 3 m. Therefore it shall be necessary as fast as possible to install on them either roof beams or metal trusses or structural ties or even specially manufactured temporary ties (Fig. No.6). The structure of temporary ties and installation should be approved by the Project Manager of the building being erected.

5. Measures in Winter

When installing girders and beams in the winter time, one should ensure that prior to installation, the snow and the ice should be thoroughly cleaned from these items and from column consoles or other bearing surfaces as well. When concreting the bolts, the concrete should be with anti-freezing admixtures selected by

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the existing ambient air temperature. Prior to filling with mix, it may be sometimes required to heat slightly the place to be concreted using a gas burner or steam. The concreted assembly should be immediately covered with heat-insulating material (stone wool or special purpose mats). In the case of extremely cold weather, during initial setting of the concrete, the concreted place should be heated.

6. Safety at Work

All Works of unloading, storage, installation should be organized on the basis of the following documents that regulate safety at work:

DT8-00 “Safe Use of Elevating Machines Regulations“.

DT5-00 “Safety and Health in Construction Regulations“.

The workers that carry out installation of girders and beams should be having heard a course on instructions of safety at work for installers, they should possess certificates of installers and hitchers and know all abovementioned items of the Recommendation. One should observe and ensure that strangers do not get into installation zone, and machinery either that could contact the temporary propping devices of girders. To unload and hoist into the planned position, standard facilities should be used that match the weight and overall dimensions of the production items. The workers, when installing girders should stand on the installation areas. If the height is considerable, it is recommended to use auto-car towers, lifting devices or scaffolds.

The Recommendation has been prepared by UAB “Betonika“ according to recommendations of the concern “CONSOLIS“.

INSTALLATION OF GIRDERS AND BEAMS

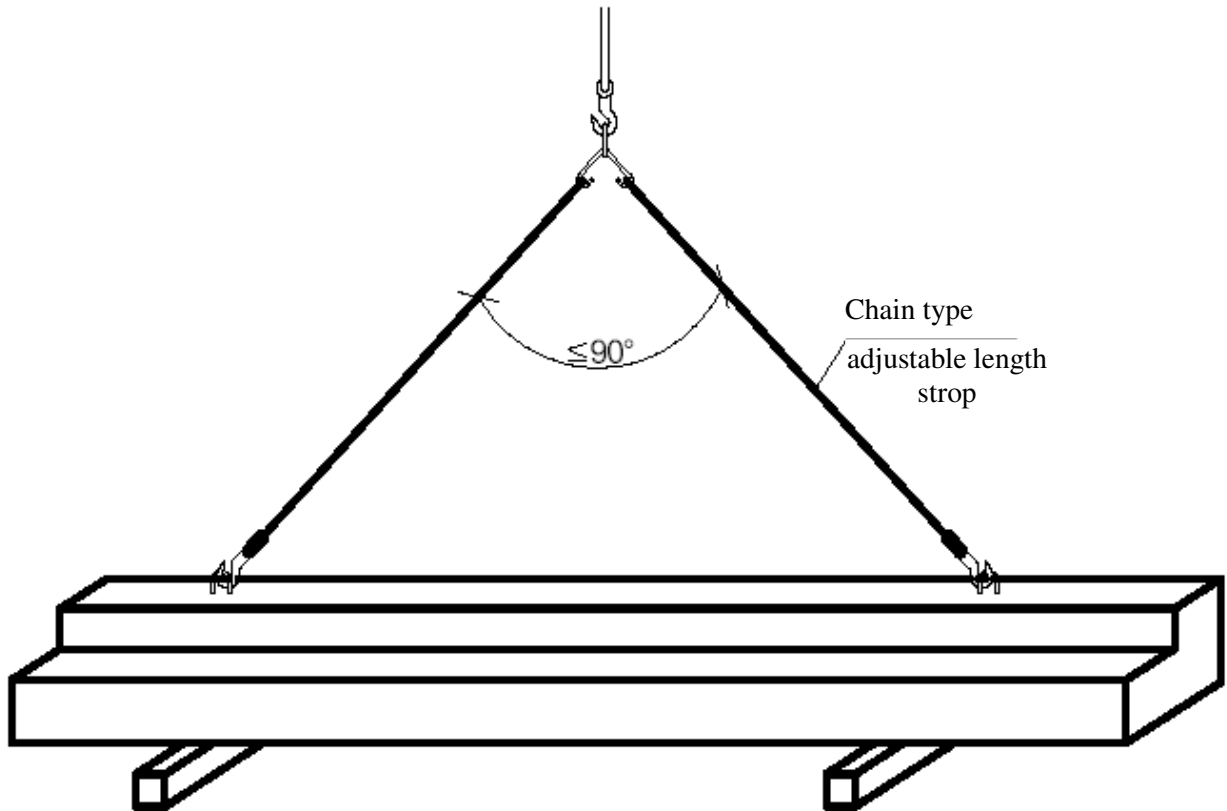


Figure No.1

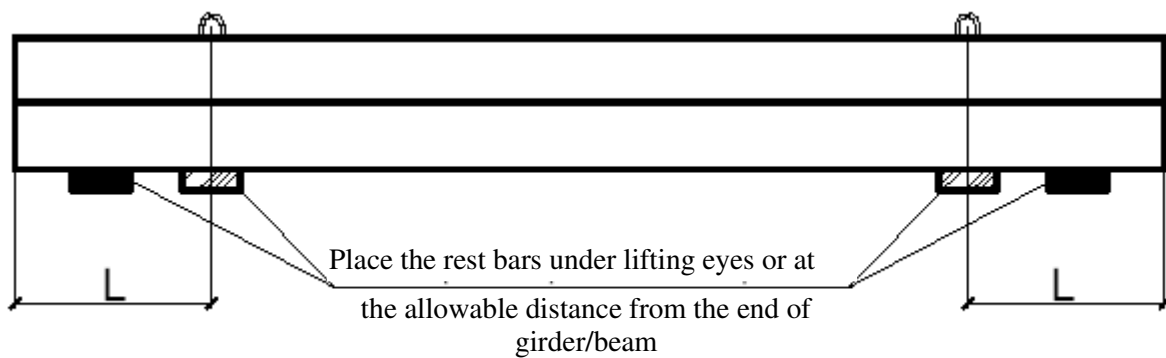
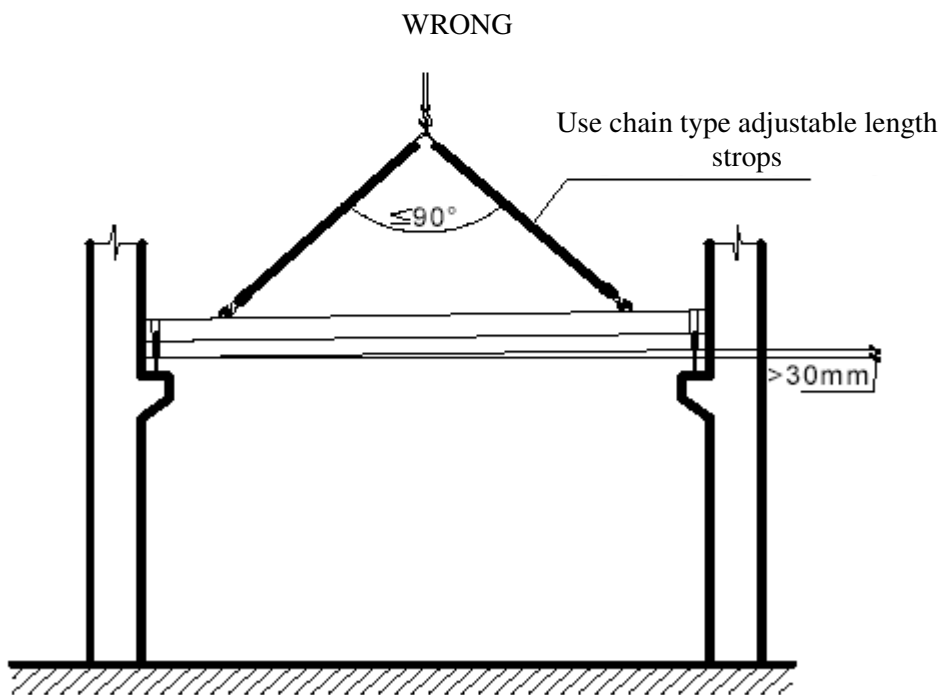
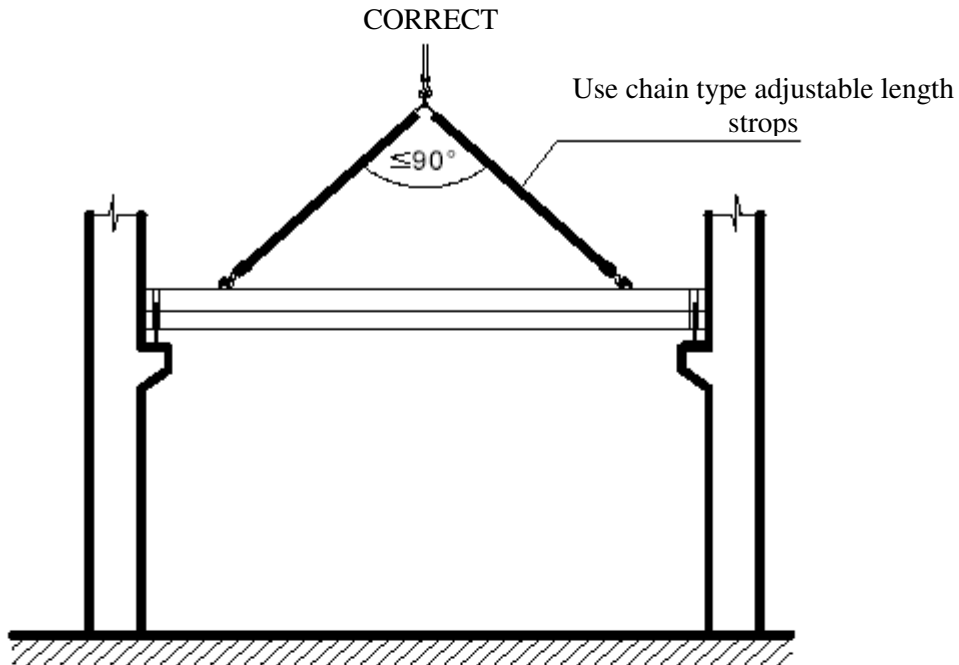


Figure No.2

INSTALLATION OF GIRDERS AND BEAMS



Note: Installation shall be wrong if the allowable distance has been exceeded. This may be the reason for damage to the bolts let out from column consoles.

Figure No.3

INSTALLATION OF GIRDERS AND BEAMS

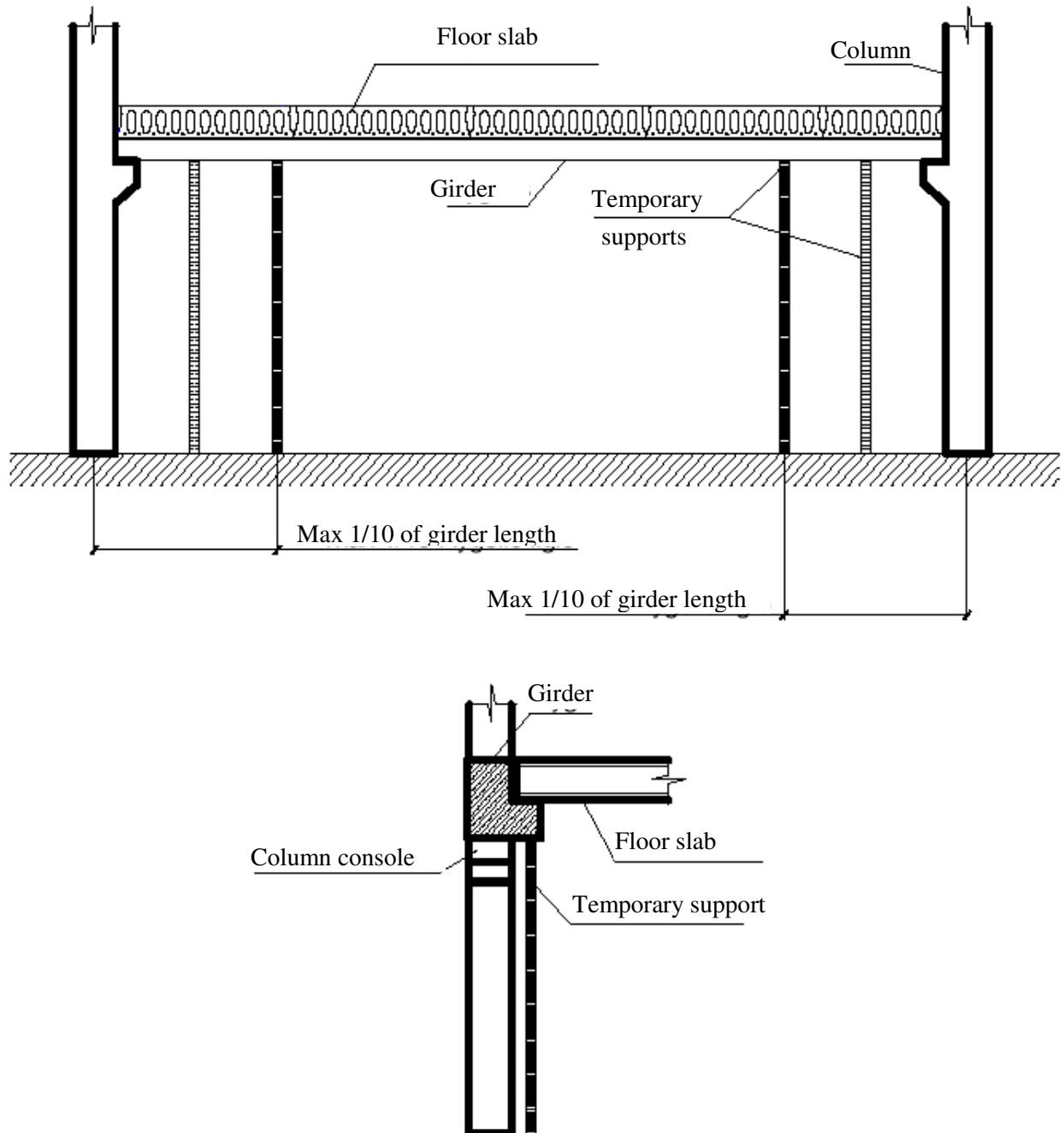
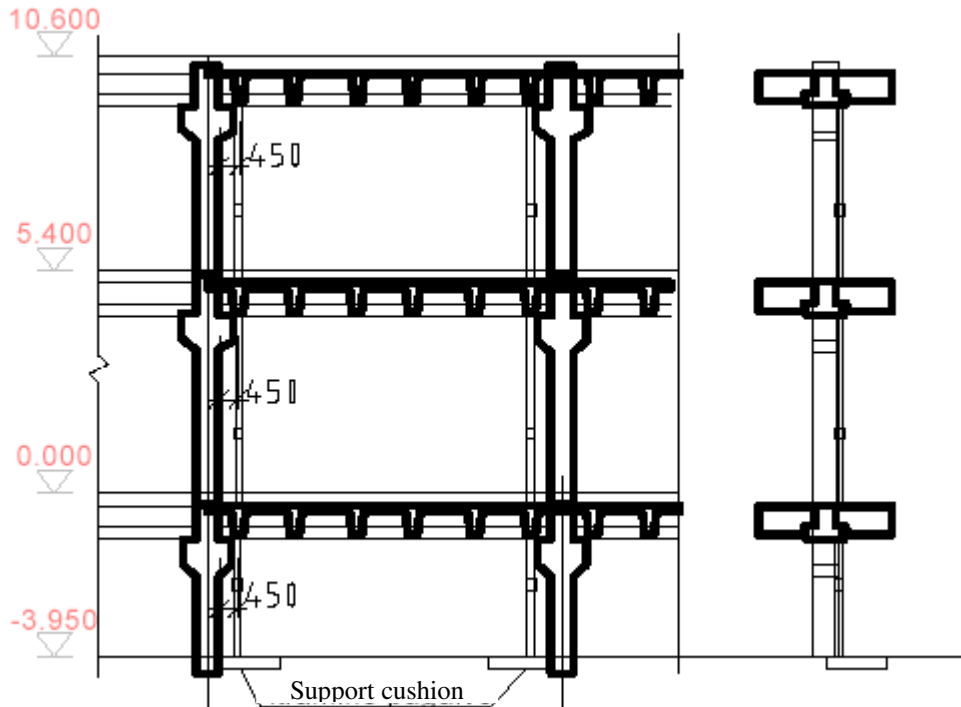


Figure No.4

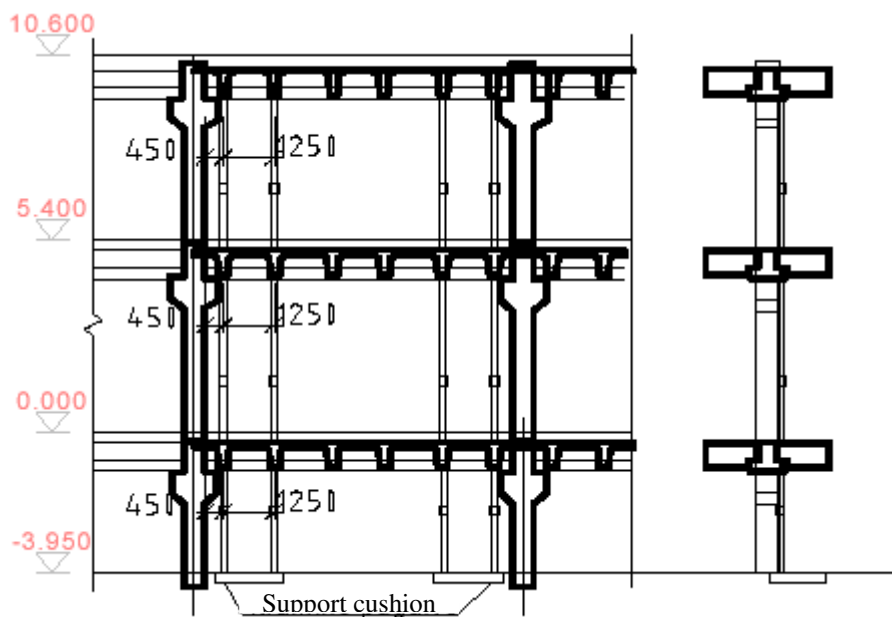
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Girder propping schemes

Using 30 t bearing capacity supports
for ground floor girders may 20 t bearing capacity supports be used



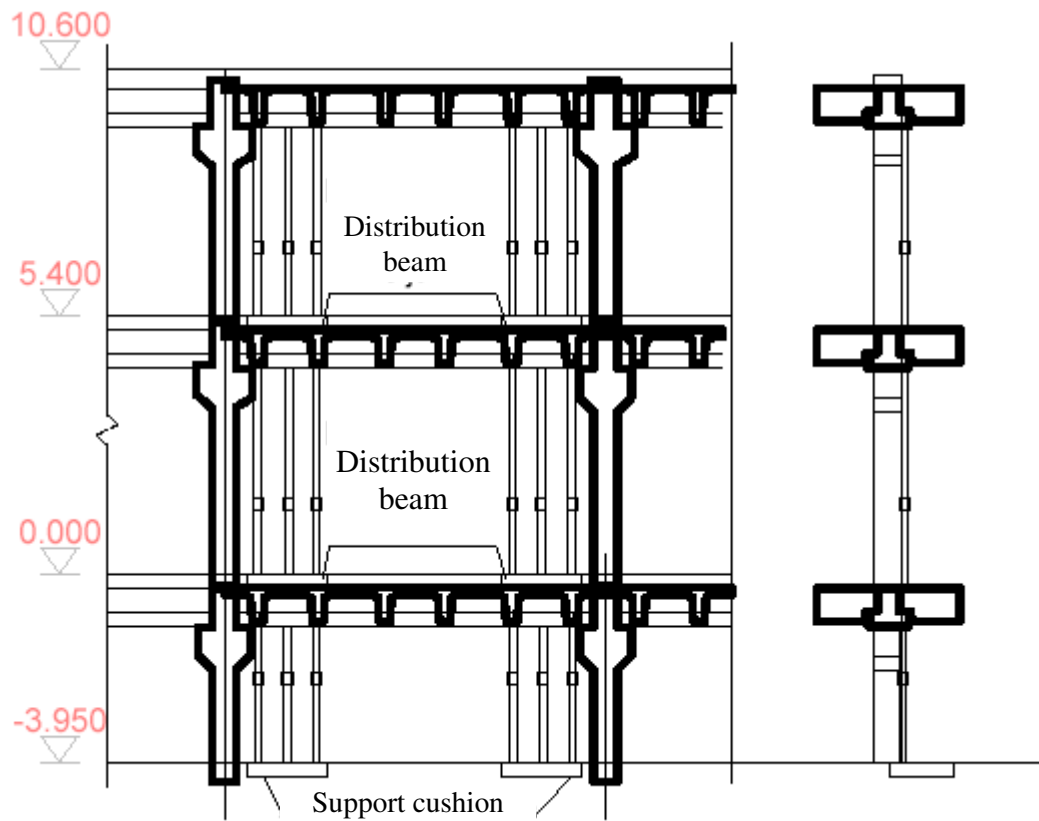
Propping schemes using 15 t bearing capacity supports
For first floor girders may 10 t bearing capacity supports be used



INSTALLATION OF GIRDERS AND BEAMS**Girder propping schemes**

Propping scheme using < 15 t* bearing capacity supports

* - overall bearing capacity 30 t of supports at one end of the girder

*Notes:*

1. Supports for the ground and first floor girders shall be erected in the zone of TT slab edges. The provided distances may change therefore should be revised every time.
2. The support or distributing beam cannot be erected further than 2 m from the end of the girder being supported. If other propping variants are required, it shall be necessary to coordinate with the Constructors of the Project.
3. The area of support cushion shall be selected depending on ground strength on the construction site, for 30t load.
4. The ends of the distributing beam cannot go out from slab edge dimension.
5. The supports may be removed after on all floors assemblies of slab connection to girders have been fully installed.

Figure No.5

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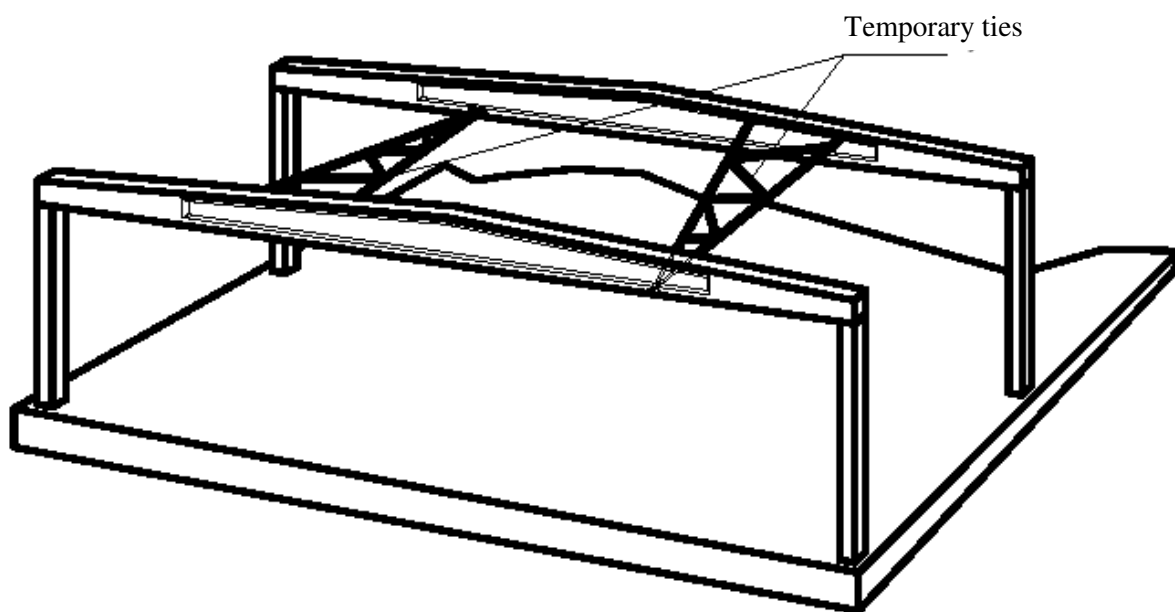
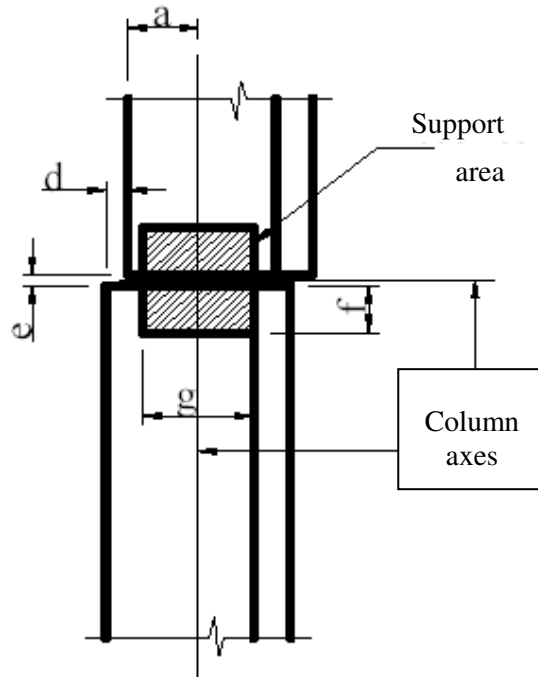


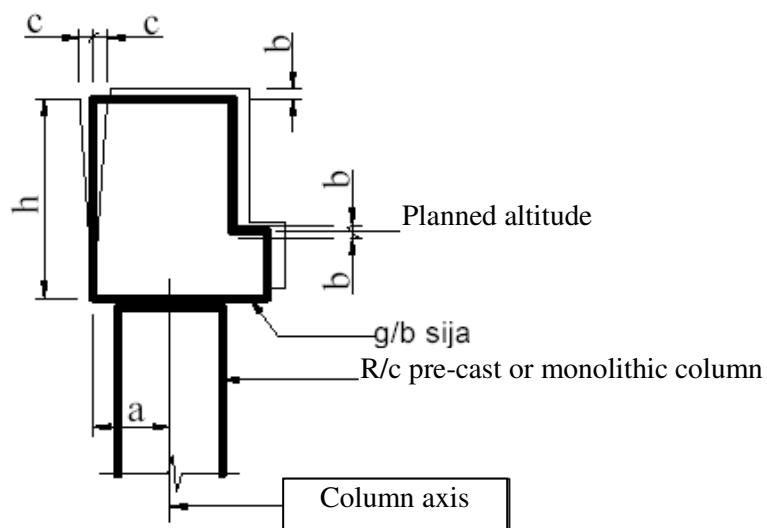
Figure No.6

INSTALLATION OF GIRDERS AND BEAMS

PLAN



CROSS-SECTION



g/b sija = r/c beam

Figure No.7

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Installation tolerances for girders and beams

Pre-cast r/c girders and beams on pre-cast r/c, monolithic r/c, masonry or steel structures

a = distance from building axis	± 25 mm
b = deviation of support altitude* from the planned	
maximum down	15 mm
maximum up	10 mm
c = maximum deviation from the perpendicular	h/6 mm
maximum	15 mm
d = maximum shift from the planned edge	
in places of architectural importance	10 mm
in places visible with difficulty	15 mm
e = planned width of junction on support	
in places of architectural importance	± 10 mm
hidden junctions	± 20 mm
in places visible with difficulty	± 15 mm
f = support length (in direction of the hole)	± 20 mm
g = support width	± 15 mm

Notes:

* or top of the member, when the member is without shelves