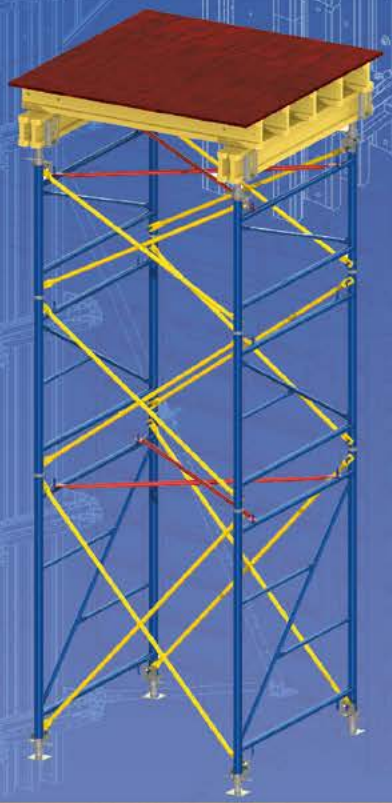
Load-bearing scaffolding
TOP TOWER 60



VARIANT

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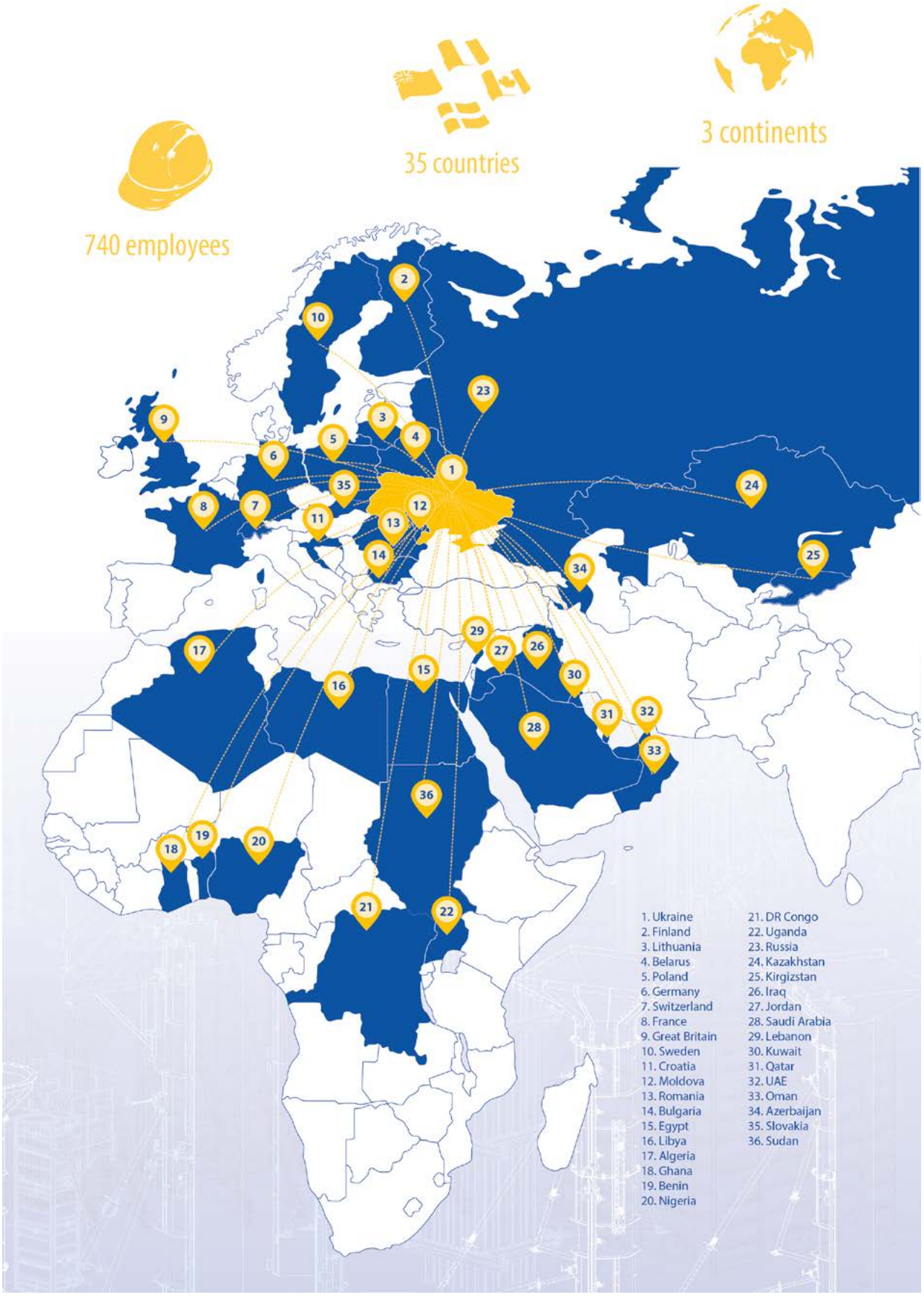
ISO 9001
BUREAU VERITAS
Certification
N° 00000


740 employees
35 countries
3 continents
1. Ukraine
2. Finland
3. Lithuania
4. Belarus
5. Poland
6. Germany
7. Switzerland
8. France
9. Great Britain
10. Sweden
11. Croatia
12. Moldova
13. Romania
14. Bulgaria
15. Egypt
16. Libya
17. Algeria
18. Ghana
19. Benin
20. Nigeria
21. DR Congo
22. Uganda
23. Russia
24. Kazakhstan
25. Kirgizstan
26. Iraq
27. Jordan
28. Saudi Arabia
29. Lebanon
30. Kuwait
31. Qatar
32. UAE
33. Oman
34. Azerbaijan
35. Slovakia
36. Sudan

Contents

GENERAL INSTRUCTIONS

This user manual (method statement) is aimed at everyone who will be working with the «VARIANT» product or system it describes. It contains information on how to set up this system, and proper use it.

All persons working with the product described herein must be familiar with the contents of this manual and with all the safety instructions it contains.

The customer is to ensure that the information materials provided by «VARIANT» are available to all users, and that they have been made aware of them and have easy access to them at the usage location.

Persons who are incapable of reading and understanding this booklet, or who can do so only with difficulty, must be instructed and trained by the customer.

Always observe all construction safety regulations and other safety rules applying to the application and using of our products in the country and/or region in which you are operating.

In the relevant technical documentation and formwork usage plans, «VARIANT» shows the workplace safety precautions that are necessary in order to use the «VARIANT» products safely in the usage situations shown. In all cases, users are obliged to ensure compliance with national laws, Standards and rules throughout the entire project and to take appropriate additional or alternative workplace safety precautions where necessary.

The customer is responsible for drawing up, documenting, implementing and continually updating a hazard assessment on every construction site. This document serves as the basis for the site-specific hazard assessment, and for the instructions given to users on how to prepare and use the system. It does not substitute for these, however.

This manual can also be used as a generic method statement or incorporated with a site-specific method statement.

The equipment/system must be inspected by the customer before use, to ensure that it is in suitable condition. Steps must be taken to rule out the use of any components that are damaged, deformed, or weakened due to wear, corrosion or rot.

The customer must ensure that this product is erected and dismantled, reset and generally used for its intended purpose under the direction and supervision of suitably skilled persons with the authority to issue instructions. These persons' mental and physical capacity must not in any way be impaired by alcohol, medicines or drugs.

The equipment/system must be assembled and erected in accordance with the applicable laws, Standards and rules by suitably skilled personnel of the customer's, having regard to any and all required safety inspections.

Many of the illustrations in this user manual show the situation during formwork assembly and are therefore not always complete from the safety point of view.

Combining our formwork systems with those of other manufacturers could be, but needs to be checked by customer compatibility «VARIANT» product/system with other independently under its responsibility.

It is not permitted to modify«VARIANT» products because of a safety risk.

Only original «VARIANT» components may be used as spare parts. Repairs may only be carried out by the manufacturer or authorized facilities.

We reserve the right to make alterations in the interests of technical progress.

WARNING NOTES

«VARIANT» products and systems must be set up in such a way that all loads acting upon them are safely transferred.

Do not exceed the permitted fresh-concrete pressures. Excessively high pouring rates lead to formwork overload, cause greater deflection and risk causing breakage.

The stability of all components and units must be ensured during all phases of the construction work.

All connections must be checked regularly to ensure that they still fit properly and are functioning correctly. It is very important to check all screw-type connections and wedge-clamped joins whenever the construction operations require (particularly after exceptional events such as storms), and to tighten them if necessary.

Remove any loose parts or fix them in place so that they cannot be dislodged or fall free.

It is strictly forbidden to weld «VARIANT» products – in particular anchoring/tying components, suspension components, con-nector components and castings etc. – or otherwise subject them to heating. Welding causes serious change in the microstructure of the materials from which these components are made. This leads to a dramatic drop in the failure load, representing a very great risk to safety. The only articles which are allowed to be welded are those for which the «VARIANT» literature expressly points out that welding is permitted.

If a person or object falls against, or into, the side-guard component and/or any of its accessories, the component affected may only continue in use after it has been inspected and passed by an expert.

Provide safe workplaces for those using the formwork (e.g. for when it is being erected/dismantled, modified or repositioned etc.). It must be possible to get to and from these workplaces via safe access routes.

Fire-sources are not permitted anywhere near the formwork. Heating appliances are only allowed if properly and expertly used, and set up a safe distance away from the formwork.

The work must take account of the weather conditions (e.g. risk of slippage). In extreme weather, steps must be taken in good time to safeguard the equipment, and the immediate vicinity of the equipment, and to protect employees.

Do not strike the formwork until the concrete has reached sufficient strength and the person in charge has given the order for the formwork to be struck.

When striking the formwork, never use the crane to break concrete cohesion. Use suitable tools such as timber wedges, special pry-bars or system features such as «VARIANT» stripping corners.

When striking the formwork, do not endanger the stability of any part of the structure, or of any scaffolding, platforms or formwork that is still in place.

Observe all regulations applying to the handling of formwork and scaffolding.

SYSTEM OVERVIEW

The system of load-bearing scaffolding TopTower60 is based on robust frames made of galvanized or powder-coated steel, with maximum load-bearing capacity 70kN per leg. The TopTower60 has broad spectrum of applications in bridge-building, high-rise and industrial construction fields. The system supports different kinds of slabs cast in place (thickness, heights inclinations etc.), also the TopTower60 is used for shoring of precast elements. TT60 can be adjusted to different layouts and loads owing to variable inter-frame spacing. Assembly is easy, logical and fast, can be done by two workers. Individual adjustment of upper and lower supports is possible.

Load-bearing capacity:
- Load-bearing capacity up to 70kN per leg.
- The inter-frame spacing can be varied in order to provide necessary load-bearing capacity.

System adaptability:
- Excellent adaptation to different layouts, made possible by variable inter-frame spacing.
- Upper and lower supports with 50cm extension range each, for easier height adjustment.
- The system can be precisely adjusted to any length, width and height.

Cost-effective:
- Rapid pace of work and cutting of assembly costs.
- Fewer parts speed up assembly.
- High number of use cycles means lower follow-up expenses.
- Reduction of expenses by means of system adaptability.
- Galvanized or powder-coated frames, for long service life.

Easy handling and planning:
- Small number of different parts is used.
- For assembly no tools required.
- Any requirements for architectural concrete slab design can be met.
- Can cover a wide area of practical applications.

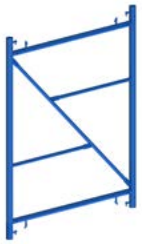
Safe use:
- Can be pre-assembled horizontally and lifted safely into the vertical position, due to inter-frame connections.
- Dependable stability.

SYSTEM IN DETAIL

The TopTower60 is a system with small number of components – simple for understanding and easy to use.

(A) Upper support TT60
Upper height-adjustment spindle, which is used for structure support and redistribution of the loads on rigid scaffolding frames, provides 50 cm of adjustment length (up to 30 cm without bracing, from 30 up to 50 cm shall be braced using frame tubes).

(B) Scaffold frame TT60

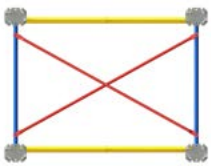
Basic frame 1.80 m	Basic frame 1.20 m	Basic frame 0.90 m
		

(C) Cross tie
Cross ties connect scaffolding frames horizontally and vertically, providing a stiff structure with guaranteed spatial rigidity. Changing inter-frame space by installation of cross ties of different sizes, makes it possible to adjust the system to various layouts

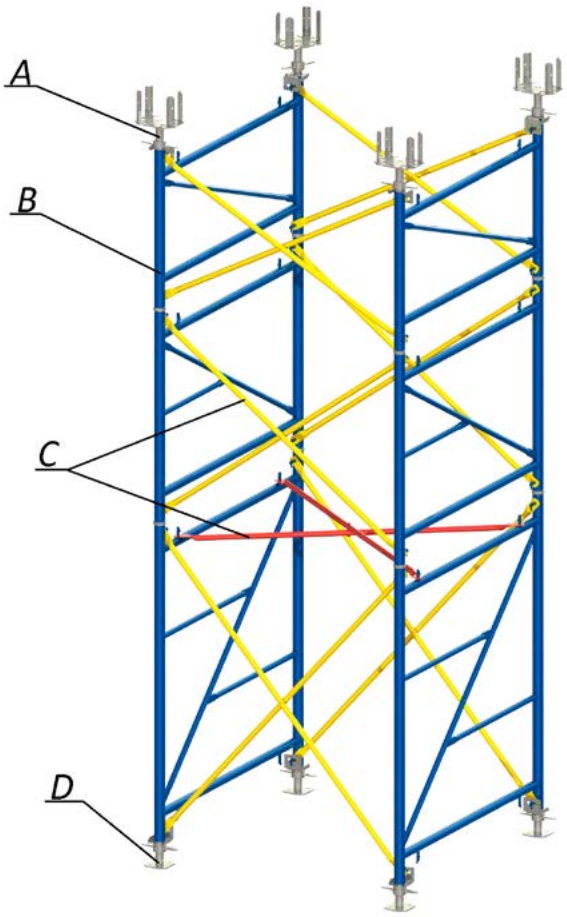
There are 3 standard tower dimensions, created by installation of cross ties horizontally and vertically. Horizontal installation depends only on inter-frame spacing, whereas vertical, depends on inter-frame spacing and height of the frame used.

Tower 1.5x1.0 m
Top view
Horizontal cross tie
1.2x1.0

Tower 1.5x1.5 m
Top view
Horizontal cross tie
1.2x1.5



Tower 1.5x2.0 m
Top view
Horizontal cross tie
1.2x2.0

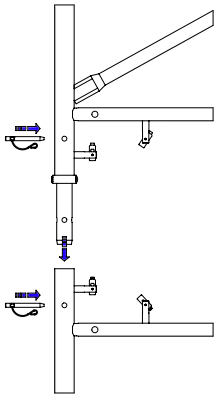


Cross ties used for different tower creation
Tower dimensions

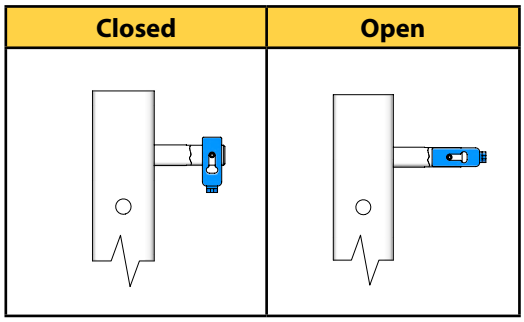
Type of installation	1.5x1.0 m	1.5x1.5 m	1.5x2.0 m
Horizontal	1.2x1.0	1.2x1.5	1.2x2.0
Vertical			
frame 0.9x1.5	0.9x1.0	0.9x1.5	0.9x2.0
frame 1.2x1.5	1.2x1.0	1.2x1.5	1.2x2.0
frame 1.8x1.5	1.8x1.0	1.8x1.5	1.8x2.0

(D) Lower support TT60
Lower height-adjustment spindle, which is used for structure support and redistribution of the loads on rigid scaffolding frames, provides 50 cm of adjustment length (up to 30 cm without bracing, from 30 up to 50 cm shall be braced using frame tubes).

Interconnection

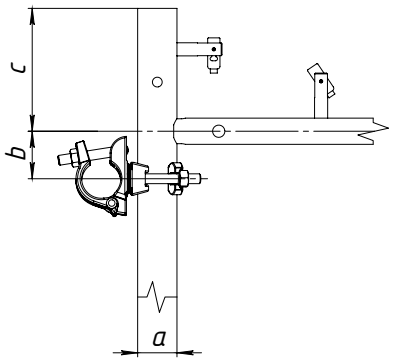


For reliable use and safe repositioning of assembled(preassembled) units by a crane, the Top Tower 60has interconnection system. Consisting of insertTT60, which is installed between two frames andfixed by retainers TT60 to each frame.



Integrated in every frame tried-and-tested interconnection system secure the diagonal crosses and has two defined positions (closed – open)

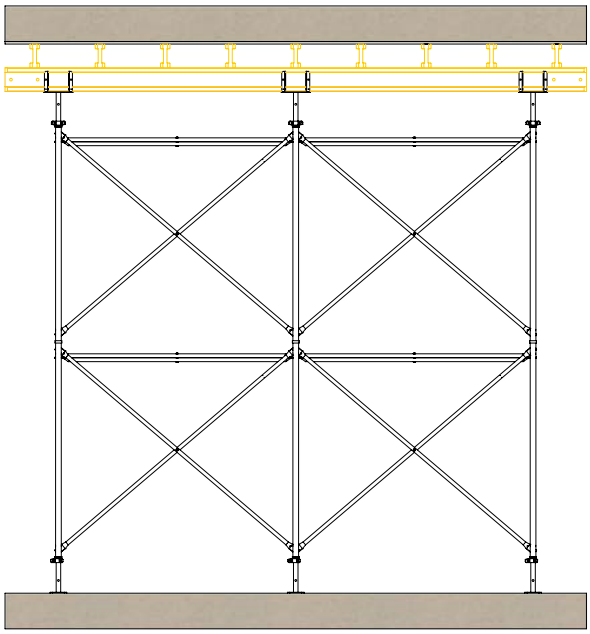
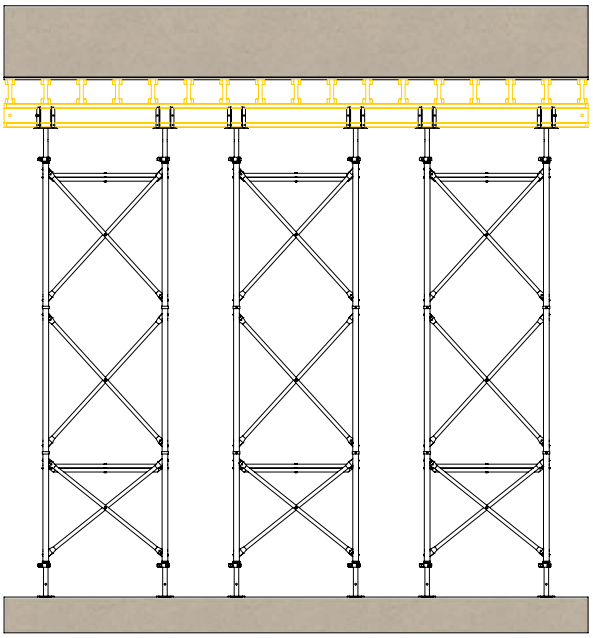
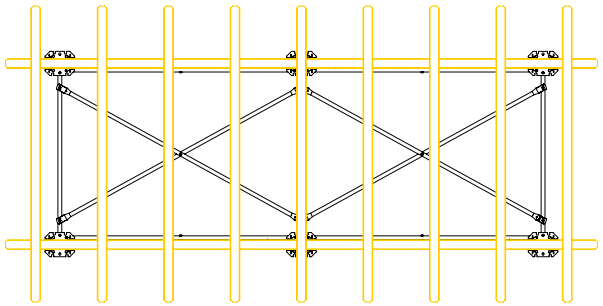
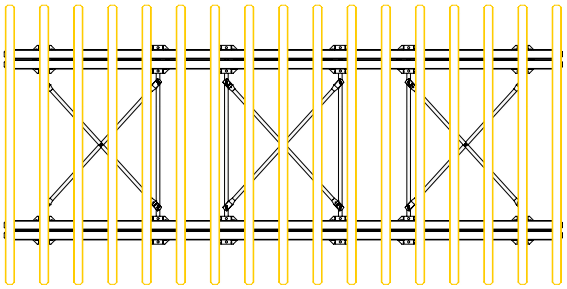
Connecting the couplers



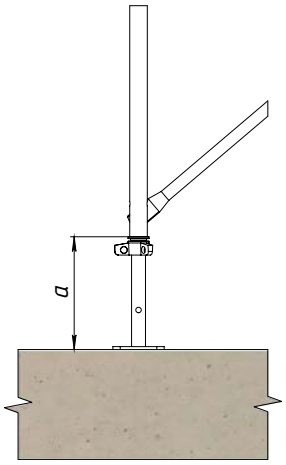
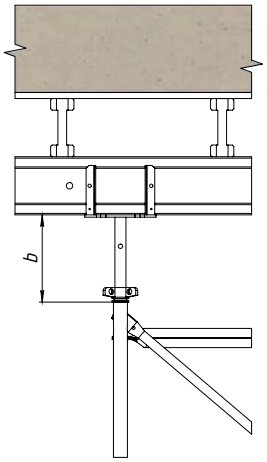
The framed tubes via couplers can be used to make a complete horizontal framework, e.g. for bracing towers that are over 6m tall.

ADAPTS TO DIFFERENT GROUND PLANS, HEIGHTS, FLOOR SHAPES AND LOADS

The different sizes of cross tie for each height of scaffolding frame enable the scaffolding frames to be spaced close together or further apart, depending on the load. In this way, only as much material is used as is really needed.

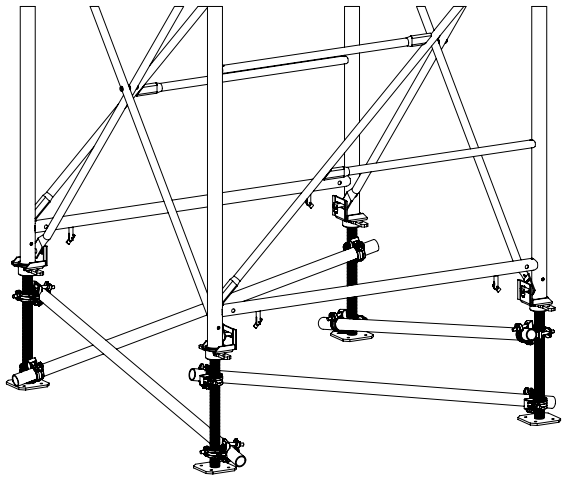
Heavy loads - frames spaced close together	Light loads - frames spaced further apart
	
Plan view 	Plan view 

HEIGHT ADJUSTMENT

Lower support TT60	Upper support TT60
	
a = max 30cm max 50cm (with bracing)	b = max 30cm max 50cm (with bracing)

• The 3 different heights of scaffolding frame (0.90m, 1.20m and 1.80m) enable coarse adjustment to within 30cm.

• Fine adjustment, to the last mm, is then made using upper/lower support:
- 30cm without additional bracing;
- 50cm with additional bracing.

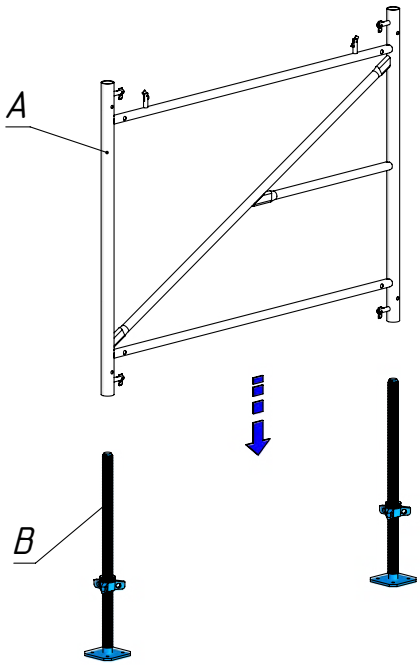


INSTRUCTIONS FOR ASSEMBLY AND USE

- Erect the load-bearing tower in the vertical on ground that is statically capable of supporting the load.
- Load-bearing towers that are over 5m in height must be back-stayed or braced to other towers.

ERECTING THE FIRST SECTION

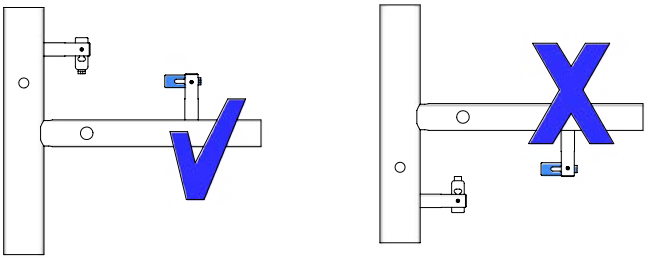
- Place two lower supports with 1.50m distance between each other.
- Insert the scaffolding frames into the lower supports.



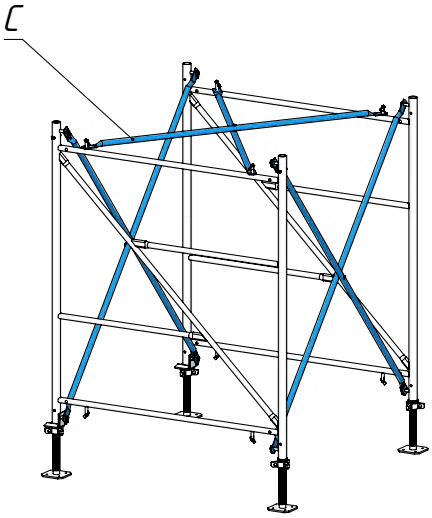
(A) Scaffolding frame TT60

(B) Lower support TT60

The gravity latches of the scaffolding frames 0.90x1.50m & 1.20x1.50m must always point upwards.

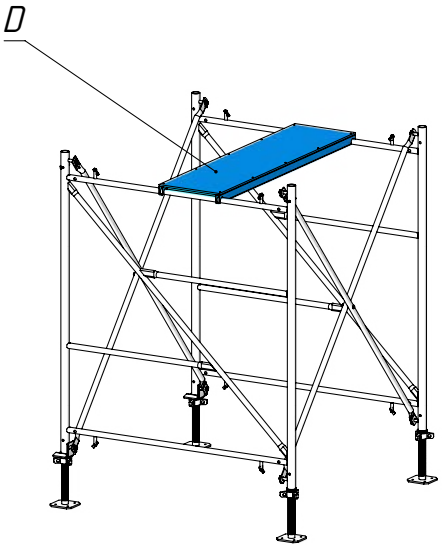


• Link the frames with cross ties: two vertical & horizontal on top.



(C) Cross tie

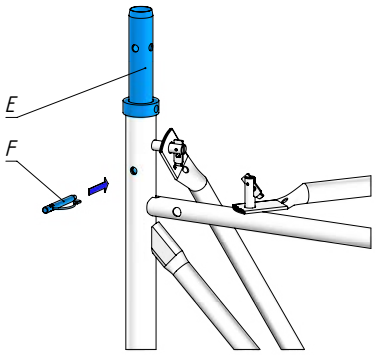
Mounting bridge TT60 is a part of the system, for easier and safer assembling.



(D) Mounting bridge TT60

STACKING THE FRAMES

• Put 4 inserts on top of the scaffolding frames. Fix them with retainers.

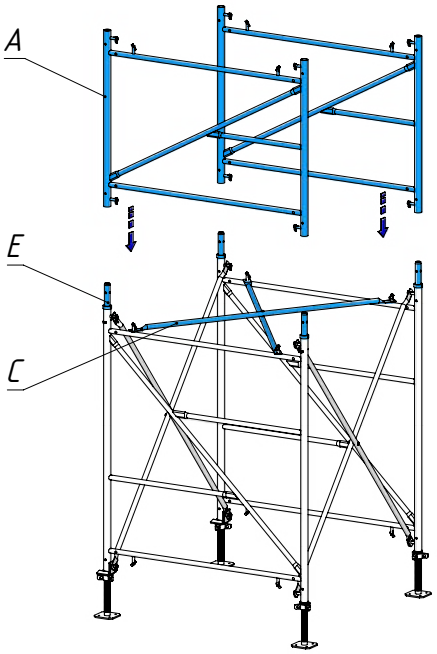


(E) InsertTT60

(F) Retainer TT60

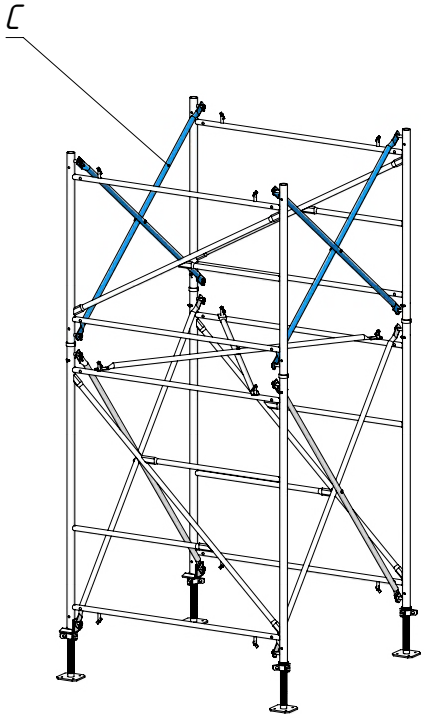
ERECTING THE SECOND SECTION

• Place scaffolding frames onto the bottom section.Fix them with retainers



(A) Scaffolding frame TT60
(C) Cross tie
(E) Insert TT60

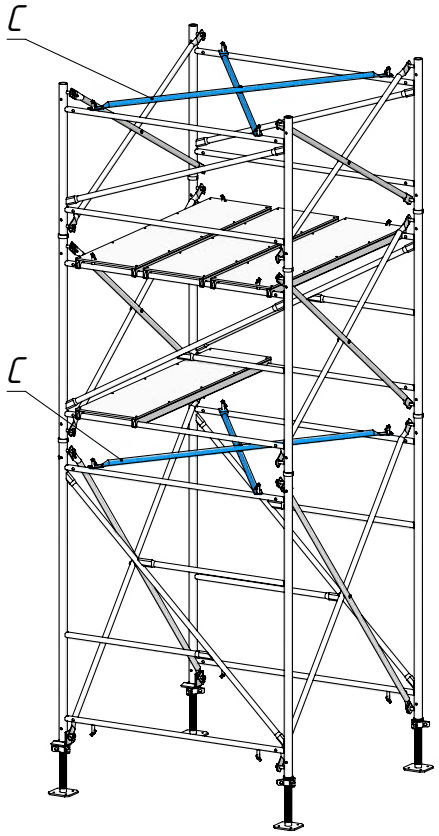
• Fit and secure cross ties in the same way as in the first section.



(C) Cross tie

ERECTING THE THIRD SECTION

- Put 4 inserts on top of the scaffolding frames. Fix them with retainers.
- Place scaffolding frames onto the bottom section.Fix them with retainers.
- Fit and secure cross ties in the same way as in the second sectionincluding horizontal cross tie.



(C) Cross tie

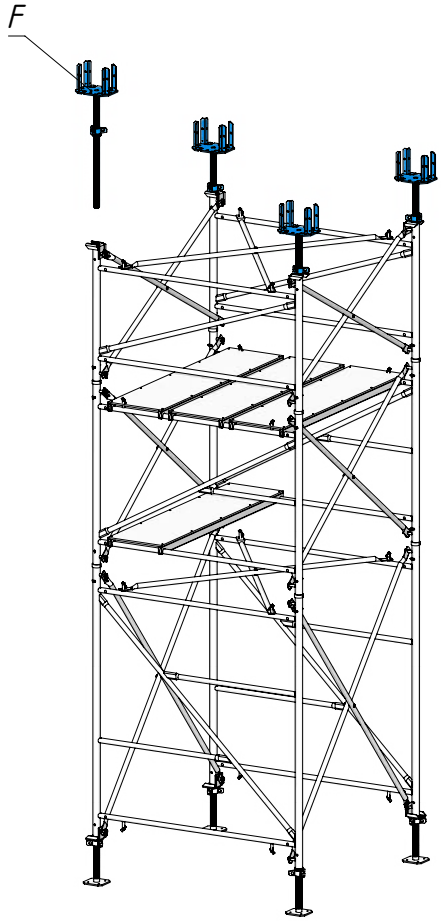
Horizontal cross ties 1.20x1.00m (1.20x1.50m; 1.20x2.00m; 1.20x2.50m) are needed at intervals of every two sections - beginning with the first section.

ERECTING FURTHER SECTIONS

Add further frames in the same way as for the 3rd section, and brace them in the vertical with diagonal crosses.

HEAD ZONE

• Insert the upper supports (F)



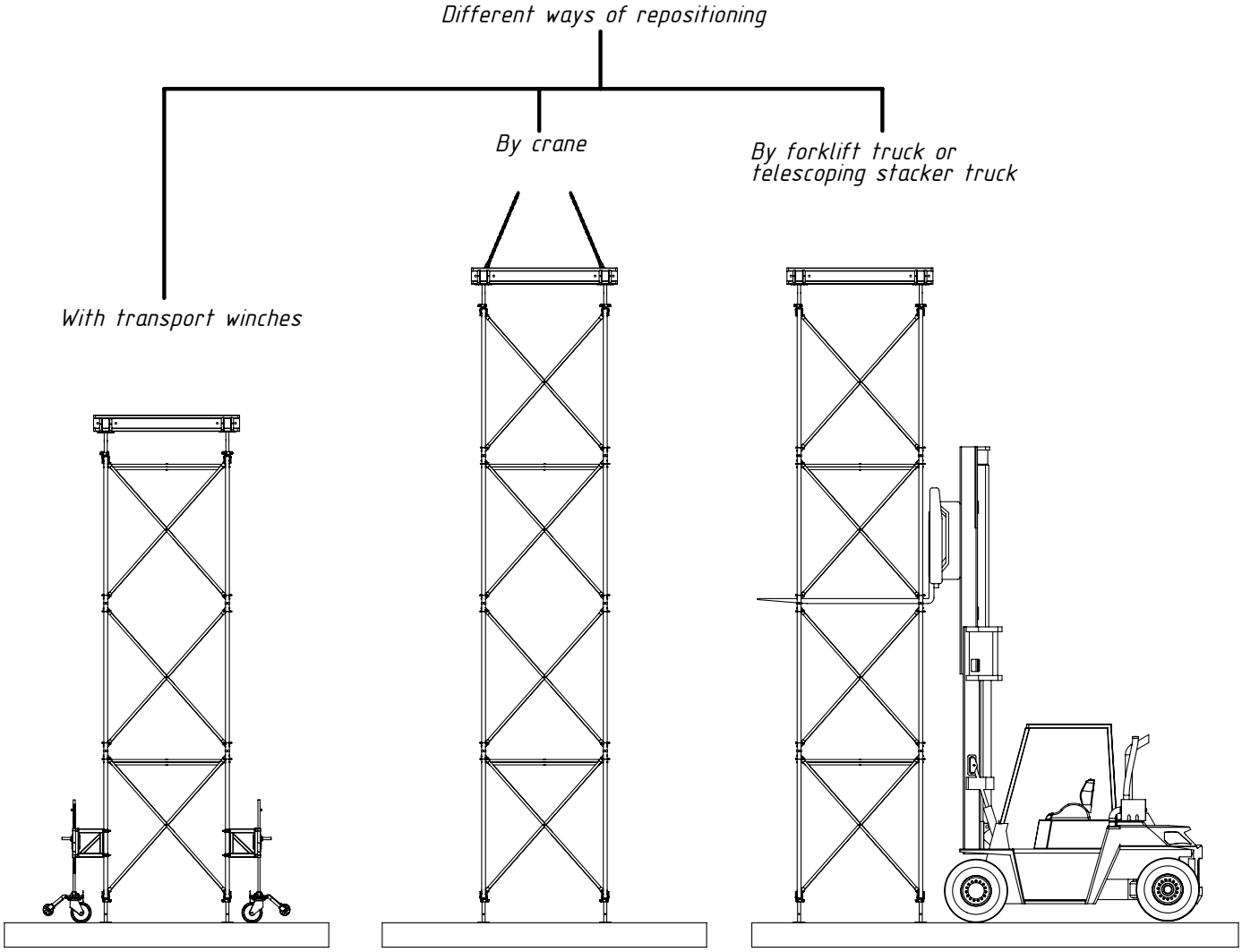
(F) Upper support TT60

Always place the primary beams (single or double H20 beams) centrally.

Dismantling

To dismantle, perform the above steps in reverse order.

REPOSITIONING, LIFTING BY CRANE/FORKLIFT

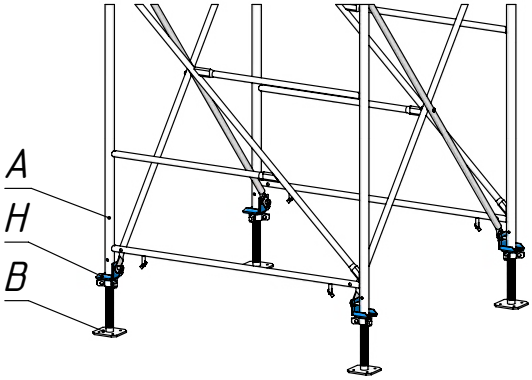


The most suitable approach to repositioning and dismantling should already be discussed and agreed with the site in the project phase, especially for very tall towers.

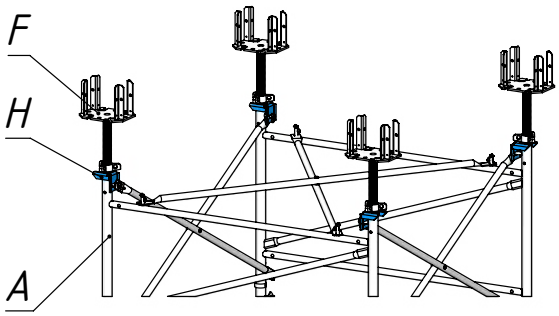
Note: There are also other ways of repositioning the towers that are not shown in this User manual. The customer (contractor) bears sole responsibility for use of all such methods and must prepare a separate risk assessment for any such intended method.

PREPARATION

Secure the lower support & upper support to prevent them dropping out using anti-dropout lock.



(A) Scaffolding frame TT60
(B) Lower support TT60
(H) Anti-dropout lock TT60



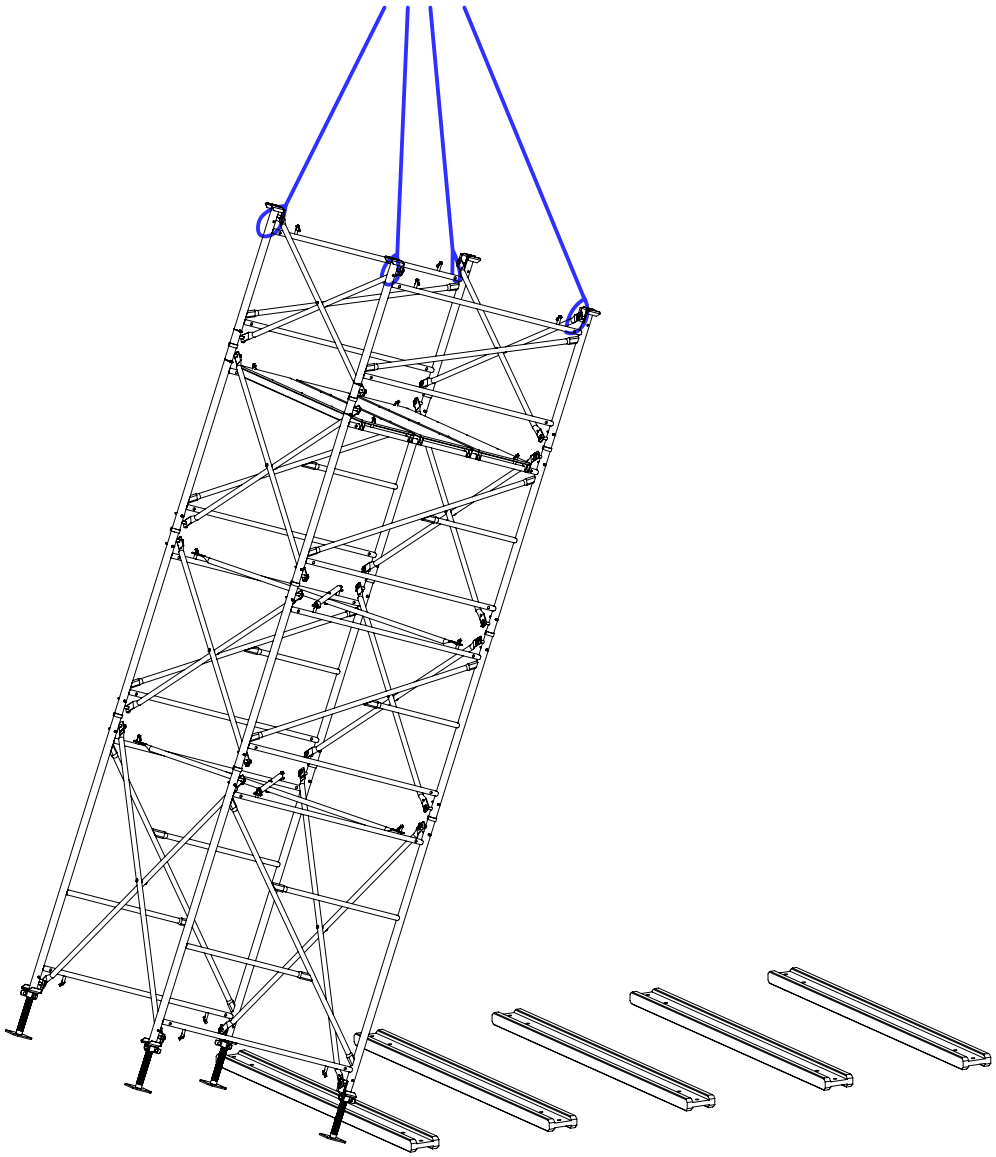
(A) Scaffolding frame TT60
(F) Upper support TT60
(H) Anti-dropout lock TT60

LIFTING INTO THE UPRIGHT BY CRANE

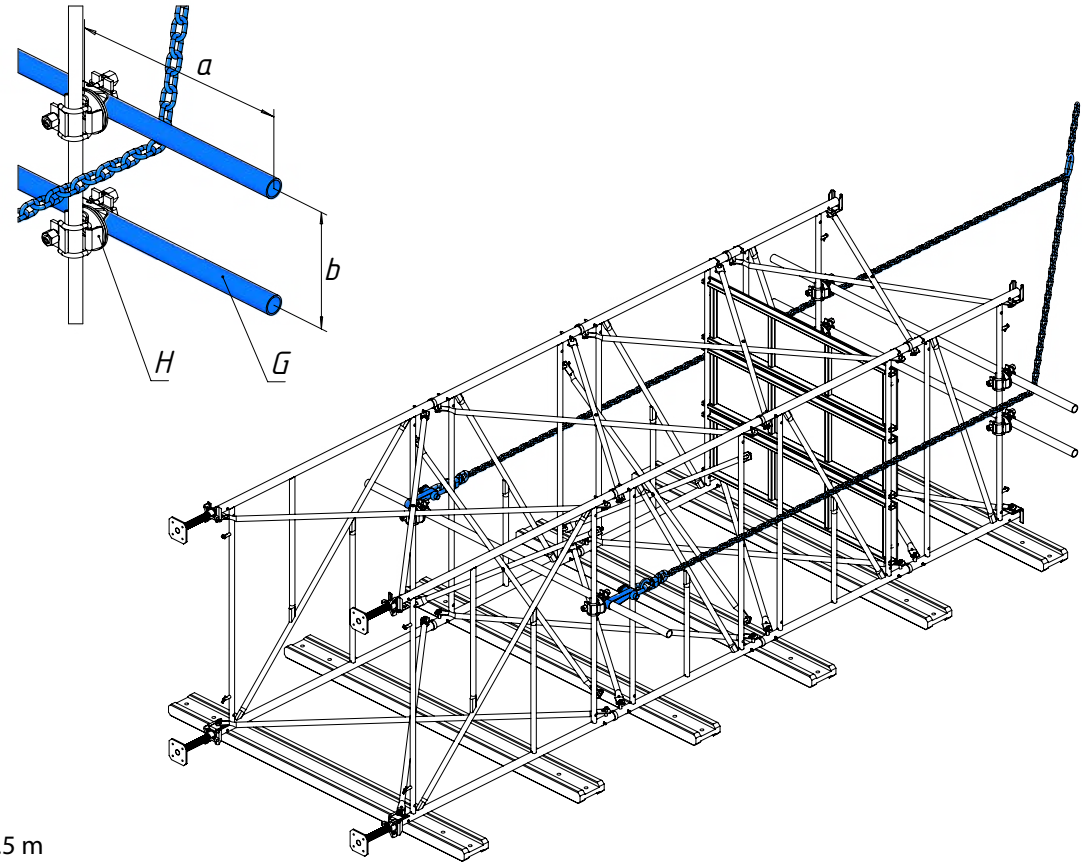
Check before attaching the lifting chain:
• All the spring locked connecting pins must have been fitted (to link the frames).
• All safety catches must be closed.
• All screw-jack head and base units must be secured against drop-out.
Max. extension length of the base units when the tower is being lifted into the upright: 35 cm!

Lifting into the upright
Note:
• Erect the load-bearing tower in the vertical on ground that is statically capable of supporting the load.
• If the load-bearing tower is over 6 m high, back-stay it or combine it with other towers.
Attach the lifting chain to the frames of the top "level" and lift the entire tower into the upright.

When the tower is standing in the upright, check once again to make sure that all the safety catches are closed.



Detaching the lifting chain near ground level:
This method must not be used for placing the tower back on its side!
Items needed:
1) 3 x Frame tubes 48 (G) (minimum length=Inter-frame space + 1.00 m)
2) 6 x swivel couplers, 48x60mm (H)
• Attach the scaffolding tubes:
1) one between the bottom frames
2) two between the top frames
• Attach two cables, chains or lifting straps to the bottom scaffold tube.
• Lead the cables, chains or lifting straps along the outside of the tower and between the top frame tubes.



a ... min. 0.5 m
b ... max. 0.2 m

After the tower has been lifted into the upright, the cables, chains or lifting straps are detached by a crewman working from ground level.
Dismantling
After the tower has been placed back on its side, it can be dismantled in reverse order.

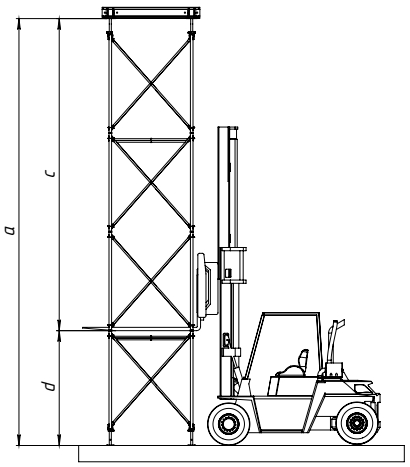
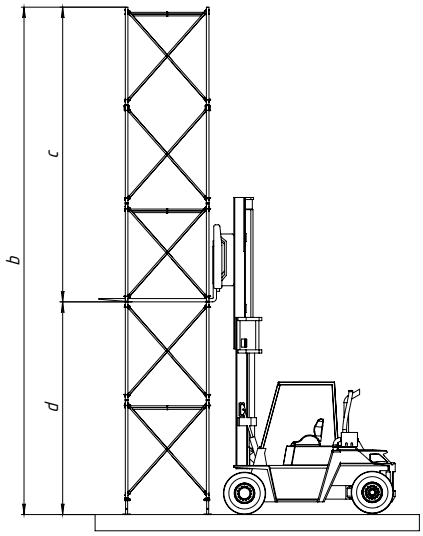
Note:
As early as in the planning phase, consideration should also be given to the dismantling operations (e.g. travelling/towing the load-bearing tower/unit into the reach of the crane for safe repositioning or for horizontal on-ground dismantling)!

LIFTING BY FORKLIFT TRUCK

Important points to remember when wheeling load-bearing towers:

- As well as the fork-lift driver, a specially trained watchman must also be on hand during all lifting, assembly and travelling operations:
- max. inclination of trackway: 2%.
- The floor must be stable, firm and sufficiently smooth (e.g. concrete).

Max. heights of load-bearing towers

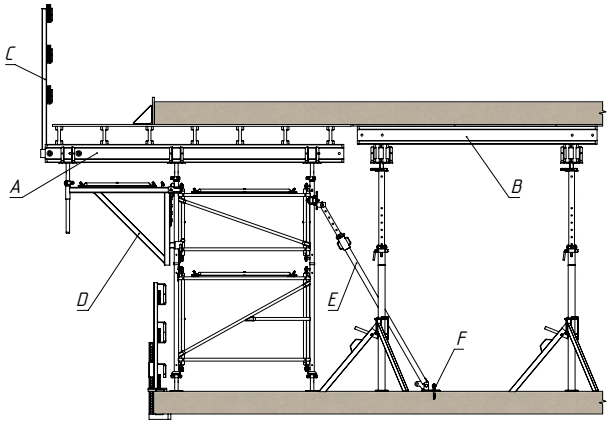
with superstrucure	without superstrucure
	

	Max. load on forklift 4000 kg		Max. load on forklift 2000 kg	
	When being travelled	When being lifted	When being travelled	When being lifted
a	7.20 m	9.00 m	5.00 m	7.00 m
b	9.00 m	12.60 m	7.00 m	10.00 m
c	5.40 m	9.00 m	4.00 m	7.00 m
d	3.60 m	3.60 m	3.00 m	3.00 m

TOP TOWER 60 COMBINED WITH VARIFLEX

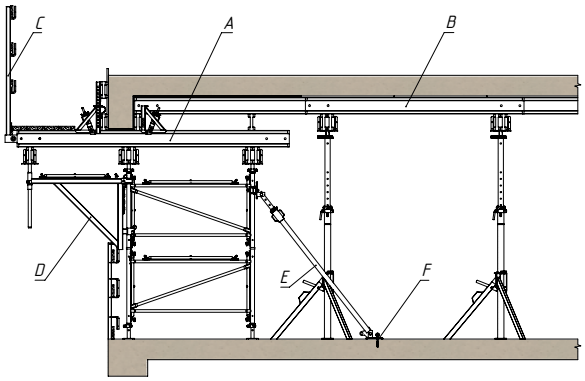
It is advantageous to combine Varifex formwork with TopTower60 system, particularly in edge-zones.
This is an easy, safe way of forming drop beams and slab stop ends with pre-mounted side railings.

With flat slab



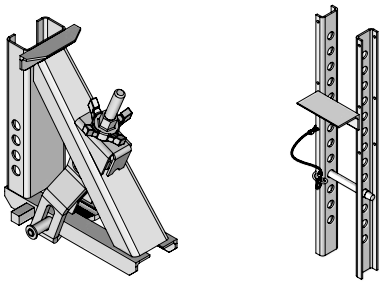
(A) TopTower 60 system
(B) Variflex system
(C) Handrail post
(D) Tower bracket TT60
(E) Tower strut 340
(F) Anchorage

With edge drop beam



(A) TopTower 60 system
(B) Variflex system
(C) Handrail post
(D) Tower bracket TT60
(E) Tower strut 340
(F) Anchorage

BEAM FORMING SUPPORT

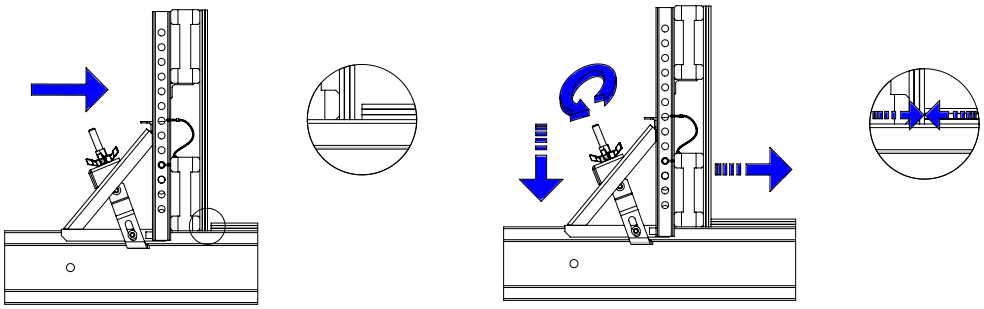


The beam forming support is a part of slab system for forming drop beams and slab stop-ends. In conjunction with the extension for beam forming support, exact height adjustment to within 1 cm is possible.

This does away with time-consuming jobsite squared-timber constructions. The beam forming support automatically clamps the formwork tight, result –cleanconcrete surfaces and grout-tight edges.

Work with the beam forming support

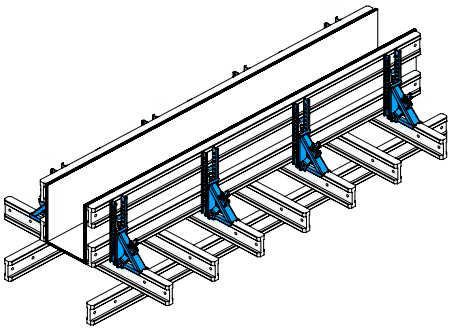
• Place the beam-forming support onto the secondary beam and push it up against the sidewall formwork.
• Clamp the beam forming support firmly into position.



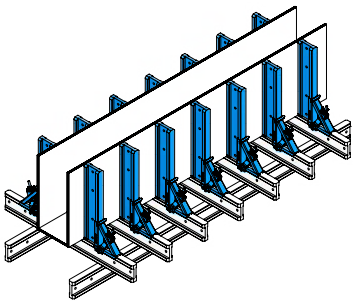
The diagonal bracing of the beam forming support ensures that the joint between the plywod sheets is automatically pressed together tightly when the beam forming support is clamped.

Formwork beams

- Horizontal up to a height of 60 cm



- Vertical up to a height of 90cm

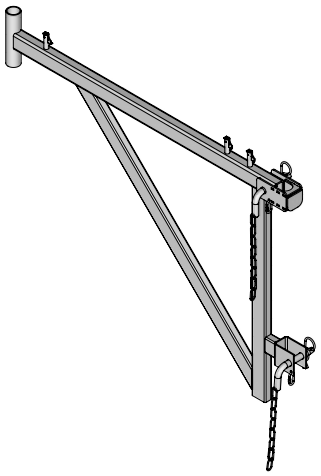


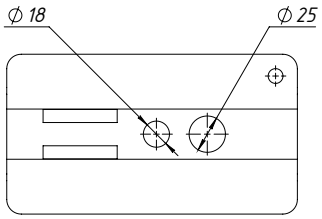
EXTENDING THE RANGE OF USE WITH BRACKETS

Safe access routes around slab edges with the tower bracket 1.2

• Before setting up and using the tower brackets, secure the towerwith tower bracing struts or tie-backs so that it cannot tip over.

• Tower bracing struts via bracing head join on top of the scaffolding tower. Anchorage tower bracing struts to the bottom slab by anchor bolt.





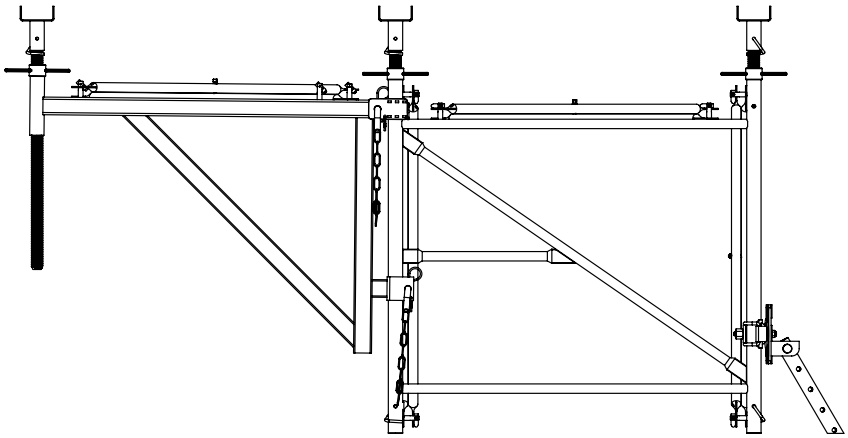
Every frame with a tower bracket must be braced by a tower bracing strut.

• Fix the tower bracket to the top of theframe via included top-pin and secure itby spring cotter.

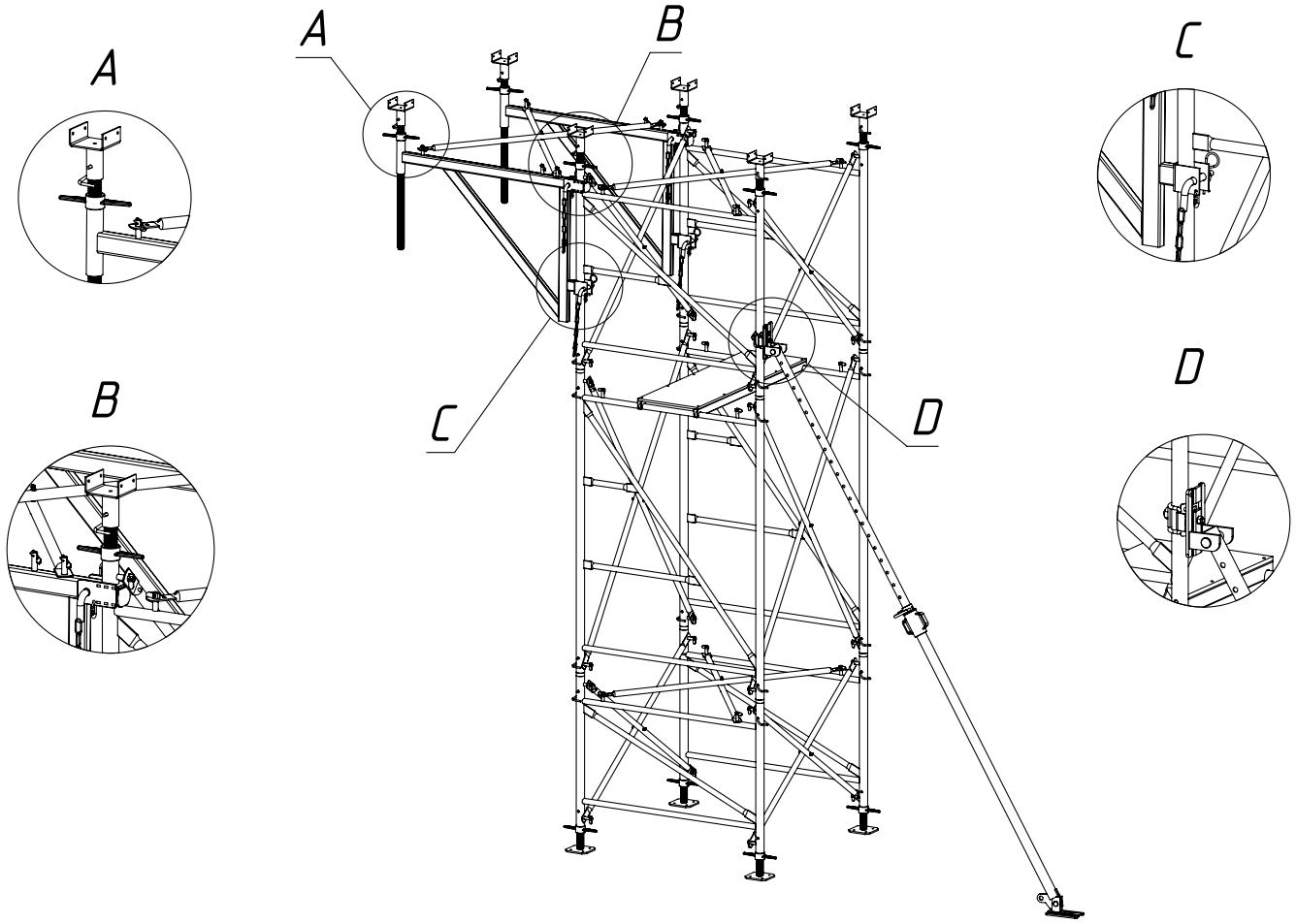
• Insert and secure the bottom-pin, toprevent accidental lift-out.

• Fit horizontal cross-tie between thebrackets and secure them with safetycatches.

• Put 2 assembled upper supports (screw with nut; upper support "fork"; retainer).



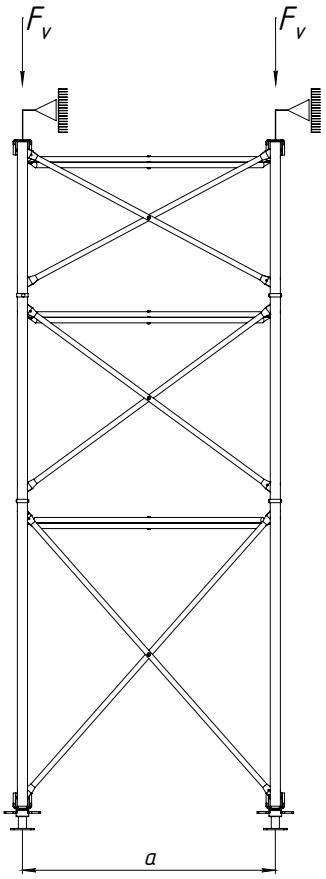
It is not permitted to load tower bracket when pouring.

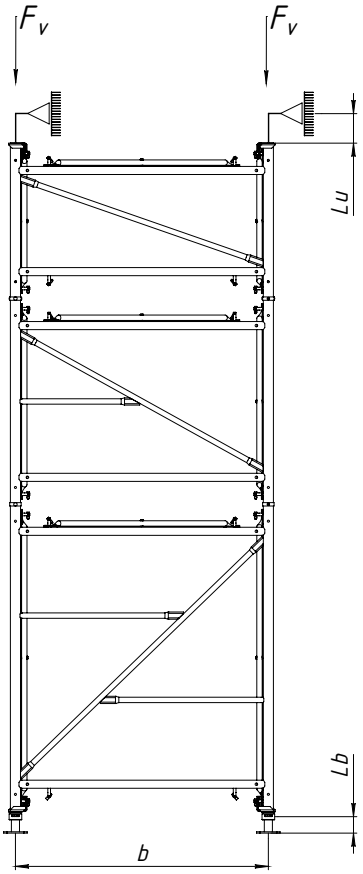

A
B
C
D
A
B
C
D

STRUCTURAL DESIGN

LOAD-BEARING TOPTOWER60 HELD AT TOP

Max. 4 block frames, with any combination of the 1.80/1.20/0.90m frames

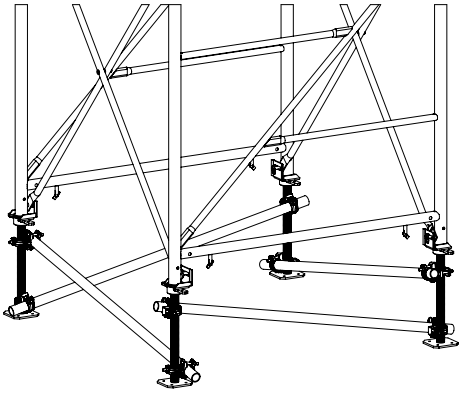




a = 1.0-2.5m
b = 1.5m

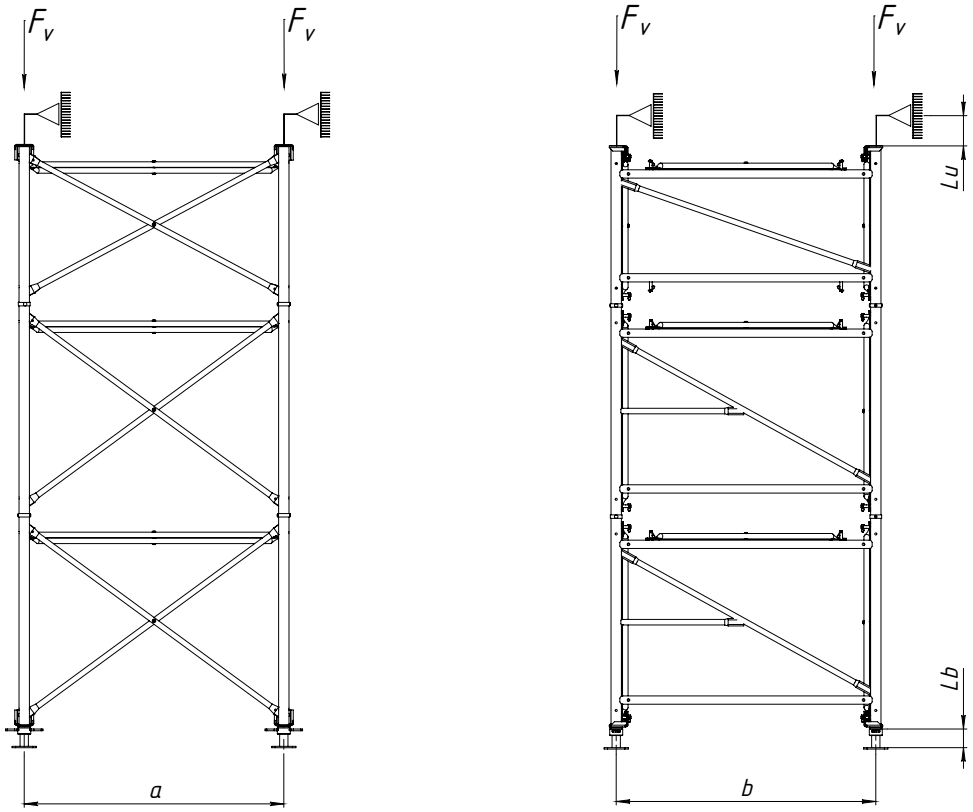
h = max. 6.0m
Lb= max 30cm
Lu = max 30cm

Permitted max.vertical load Fv per leg: 70kN



Using upper/lower support:
- 30cm without additional bracing;
- 50cm with additional bracing.

Any combination of the 1.20/0.90m frames



a = 1.0-2.5m
b = 1.5m

Lb = max 30cm
Lu = max 30cm

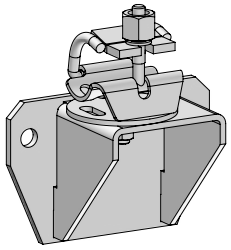
Permitted max.vertical load Fv per leg: 80kN

Design load on scaffolding depending on a project.

GENERAL REMARKS

Anchoring on the structure

With Anchoring shoe



Permissible force transmission for each Anchoring shoe for stair tower: 12 kN in all directions. Applies when fastened with Cone bolt M30x70and Universal climbing cone or two dowels.

Methods for fixing in concrete:

• By using a Cone bolt M30x70 to fix the anchoring shoe to an existing suspension point prepared with Universal climbing cones (diameter of hole in anchoring shoe = 32 mm). Hardwood shim (essential for ensuring a firm fit) prevents damage to the concrete (scratch marks).
• With one or two dowels (diameter of hole in anchoring shoe = 18 mm).

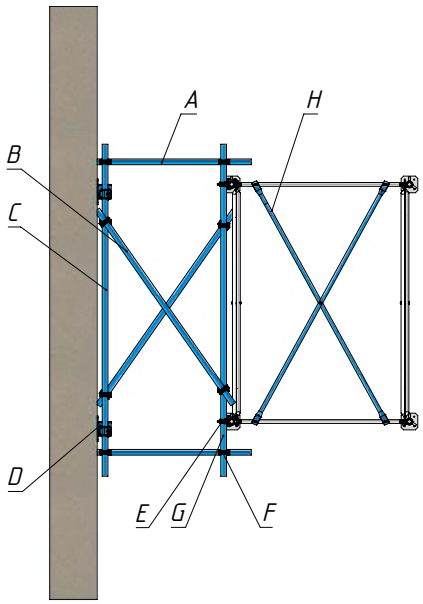
Required load-bearing capacity of the dowels used:

• Tensile force: Rd≥23.1 kN (Fperm.≥ 14.0 kN)
• Shear force: Rd≥6.6 kN (Fperm.≥ 4.0 kN)

Design of the anchoring planes

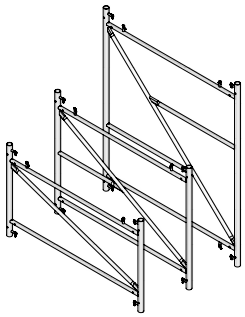
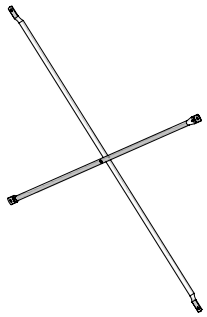
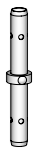
The load-bearing tower is connected to the Anchoring shoe by frame tubes and couplers.

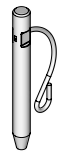
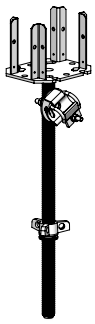
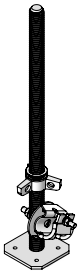
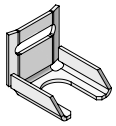
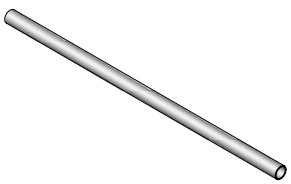
When designing units assembled from tubes and couplers, all applicable standards and regulations must be observed.

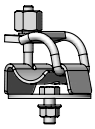
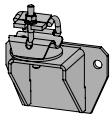
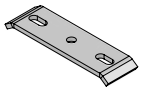
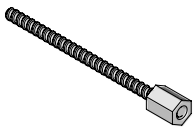
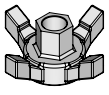
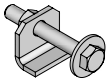


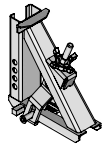
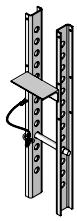
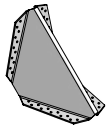
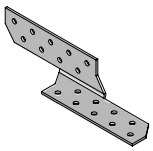
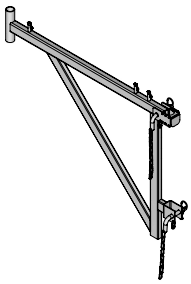
(A) Frame tube 48mm (Lmin=distance from structure)
(B) Frame tube 48mm (L=variable)
(C) Frame tube 48mm (L=variable)
(D) Anchoring shoe
(E) Swivel coupler 48x48mm
(F) Swivel coupler 48x48mm
(G) Swivel coupler 48x60mm
(H) Cross-tie

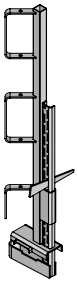
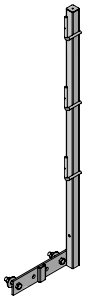
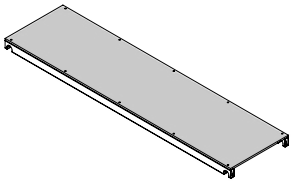
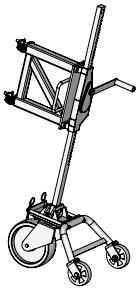
COMPONENT OVERVIEW

Item		[kg]	Article nº
Scaffold frame TT60  Options available: xx xxx 000 - Powder coated xx xxx 200 - Hot dip galvanized Custom size on inquiry	0.90x1.50m 1.20x1.50m 1.80x1.50m	20,49 24,77 33,56	62 110 000 62 120 000 62 130 000
Cross tie  Options available: xx xxx 000 - Powder coated xx xxx 200 - Hot dip galvanized Custom size on inquiry	0.90x1.00m 1.20x1.00m 1.80x1.00m 0.90x1.50m 1.20x1.50m 1.80x1.50m 0.90x2.00m 1.20x2.00m 1.80x2.00m 0.90x2.50m 1.20x2.50m 1.80x2.50m	4,08 4,67 6,06 5,36 5,86 7,12 6,79 7,19 8,24 8,22 8,56 9,46	61 210 000 61 220 000 61 230 000 61 212 000 61 222 000 61 232 000 61 214 000 61 224 000 61 234 000 61 216 000 61 226 000 61 236 000
Insert TT60 		1,19	62 400 100

Item		[kg]	Article nº
Retainer TT60 		0,07	62 402 100
Upper support TT60 		16,80	62 500 100
Lower support TT60 		14,06	62 502 100
Anti-dropout lock TT60 		0,68	62 404 100
Framed tube 	1.00m 1.50m 2.00m 2.50m 3.00m	4,60 6,91 9,21 11,51 13,81	94 100 200 94 150 200 94 200 200 94 250 200 94 300 200

Item		[kg]	Article nº
Swivel coupler 	48x48mm	1,22	95 106 100
Screw-on coupler 48 mm 	30 70 100	1,21 1,26 1,33	95 100 100 95 102 100 95 104 100
Anchoring shoe 		5,03	61 800 100
Clamping plate 		1,71	61 406 100
Clamping tie-rod 330 		0,95	61 408 100
Star - shaped nut 	15	0,40	95 206 100
Beam screw 	60 110	0,07 0,09	23 302 100 23 304 100

Item		[kg]	Article nº
Drop beam forming support 		7,77	52 302 000
Extension for drop beam forming support 		3,83	52 304 100
End - shutter support for slab 		1,73	52 312 000
Rafter plate 	right left	0,09 0,09	52 306 100 52 308 100
Tower bracket TT60 		16,28	61 410 000

Item		[kg]	Article nº
Handrail clamp 		12,40	52 400 100
Handrail post 		12,85	52 402 100
Mounting bridge TT60 	1.00m 1.50m 2.00m	9,45 13,76 21,63	61 412 000 61 414 000 61 416 000
Shifting wheel TT60 		47,46	61 600 000

Item	[kg]	Article nº
Tower strut TT60 340 	23,13	61 700 100
Tower strut TT60 540 	44,10	61 702 100

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