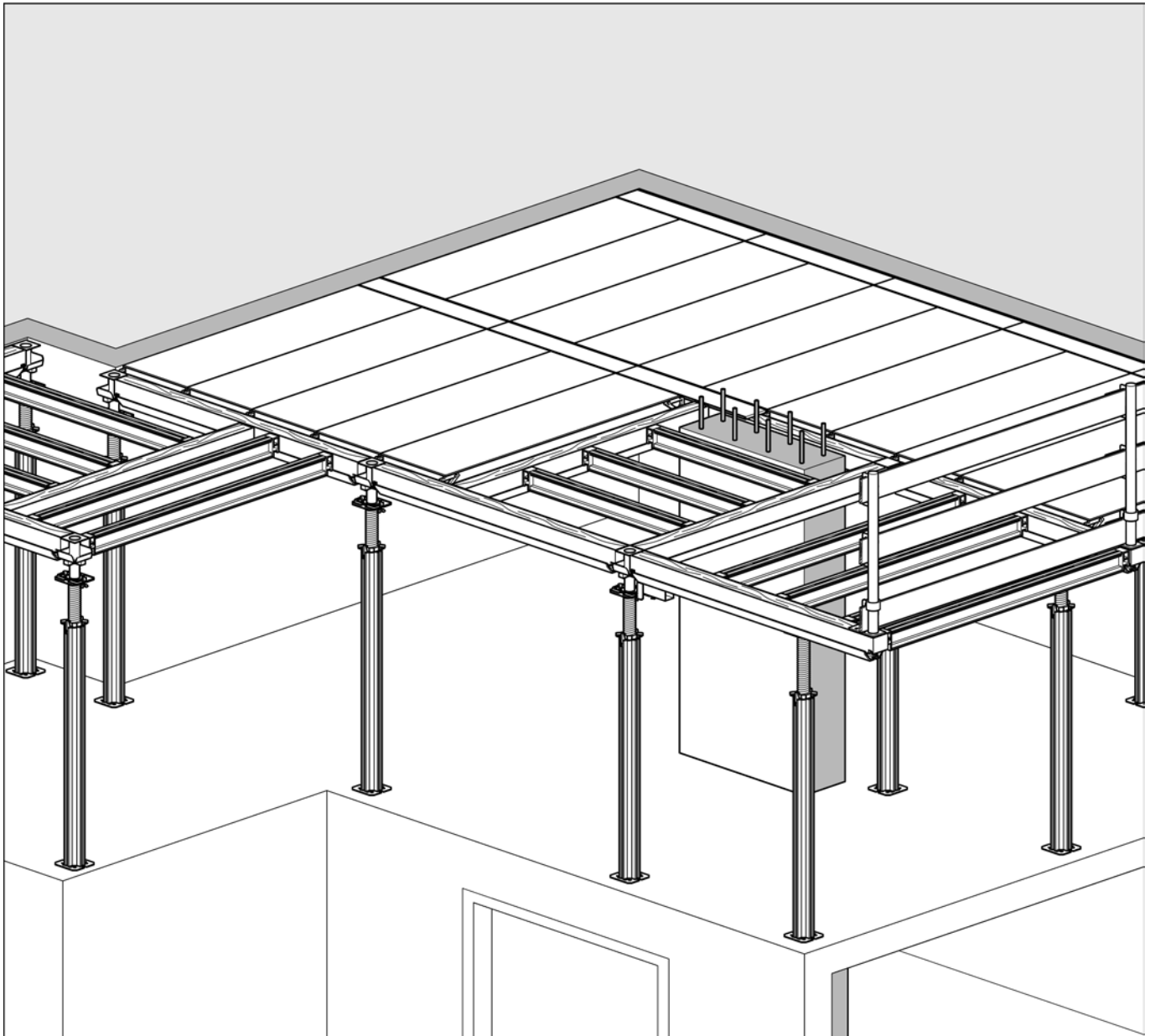




TITAN HV Slab Forming System

Instructions for use as of October 2010

Fast Setup & Dismantling, Easy to Use



Safety is the number one priority at Concrete Support Systems. As a result all of our concrete formwork and shoring products are designed to first be safe, and second to be productive. In order to ensure the safe use of the equipment, all of the personnel on the construction site should be familiar with the contents of this method statement. This document is not meant to cover all potential applications, but a core group of common situations. Should any applications arise that are not specifically described in this document, please contact your Concrete Support Systems representative.

Jobsite safety is your responsibility, and therefore you should schedule regular safety meetings specific to the concrete formwork and shoring setting, concrete placement, stripping and cycling operations. All jobsite personnel should be familiar with and in compliance with all applicable government regulations and codes, including, but not limited to industry safety standards developed and set forth by:

- **American Concrete Institute**
- **American National Standards Institute**
- **The Occupational Safety and Health Administration**
- **The Scaffolding, Shoring and Forming Institute**

Method Statement Illustrations

The drawings and/or photographs contained in this Method Statement are for illustrative purposes only and often show the product during the erection procedure. Please refer to your erection drawings for specific application design. All local and federal requirements must be followed when erecting formwork and shoring, placing concrete and stripping equipment. If you have any questions regarding your erection drawings, please contact your Concrete Support Systems representative.

Equipment Inspection:

All Main Beam and Secondary Beams should be inspected before each cycle for damage. This includes the inspection of bends, dents, cuts, damaged end caps, broken welds and missing or loose wood inserts. These beams must be removed from inventory and sent for repair.

All post shores should be inspected before each cycle for damage. Careful attention should be paid to the casting collar to ensure that not cracks have been produced by repeated hammer striking. It is important to note that you should NEVER strike the post shore with any type of hammer.

Jobsite safety is the responsibility of the contractor. Safe use of the supplied equipment is critical to the success of your project. As an invested partner, Concrete Support Systems recommends that the following practices be enforced:

1. Make all jobsite personnel familiar with this Method Statement.
2. Make all jobsite personnel familiar and compliant with local and federal codes.
3. Make all jobsite personnel familiar and compliant with industry standards.
4. Unload deliveries in a flat and stable area.
5. Inspect all components and accessories prior to use.
6. Remove any damaged or unsuitable components and/or accessories from the jobsite inventory.
7. Assemble equipment in a safe environment that has easy access for emergency vehicles.
8. Assemble equipment with trained professionals who are well versed in the erection and dismantling of concrete formwork and shoring.
9. Ensure that hard hats, safety glasses, safety vests, steel toe shoes, gloves and hearing protection are used at all times.
10. Regularly check and maintain all component connections, specifically and bolted and/or clamped connections.

General Shoring Safety

Always keep floors clean from debris.

Always ensure that shoring is plumb and properly supported.

Always remove excess concrete build up from equipment.

Always inspect welds and remove items with cracked welds from the inventory.

Always ensure that the post shore pin is fully engaged.

Always use the post shore handle for final grade adjustment.

Never strip the shoring prior to the concrete reaching sufficient strength.

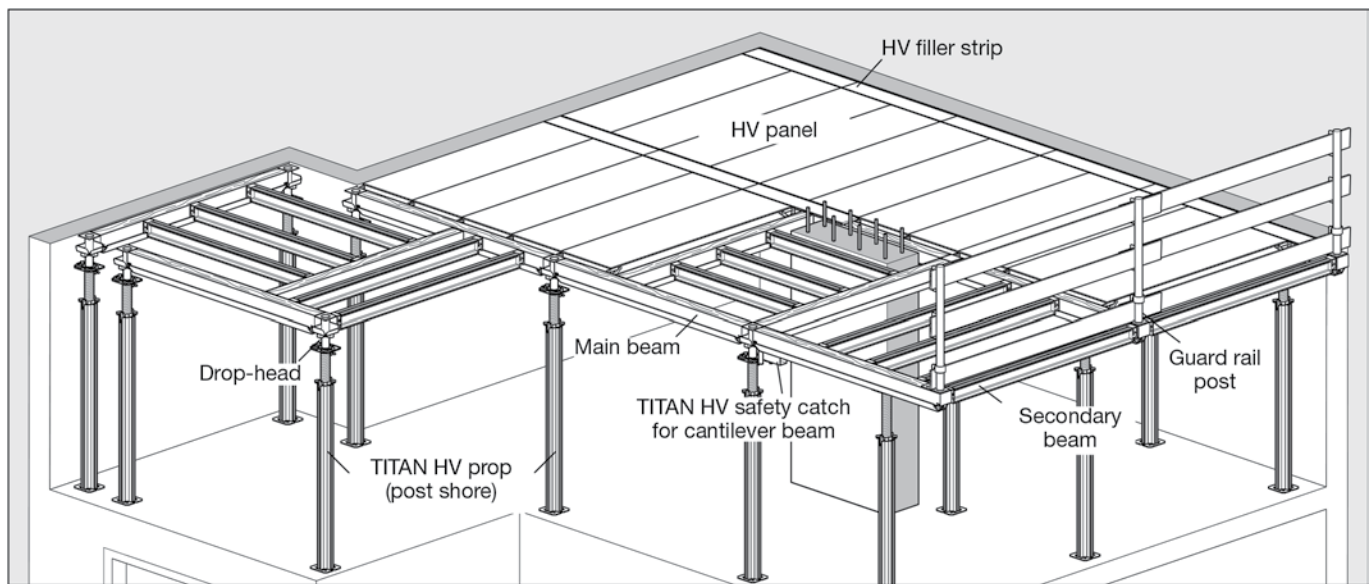
Never use a crane or motorized equipment to break concrete cohesion.

Never drop equipment.

Never strike aluminum equipment with hammers.

Never strike post shores with hammers.

Never remove pin from post shore while the post shore is vertical.



TITAN HV slab forming system | Fig. 1

The TITAN HV slab forming system with approved typical calculations consists of lightweight aluminium beams and props (post shores) with drop-head. In contrast to conventional floor slab formwork, the beams of the TITAN HV slab forming system can be hooked together to form a loadbearing grillage which can also transfer horizontal loads to existing supports. Hooking the beams onto the dropheads mounted on the props means it is possible to strike the formwork at an early date – just two to three days after concreting (provided the concrete has reached an adequate strength). All beams are then removed, only the props with the drop-heads and some of the form-

work panels remain to support the newly concreted floor slab. An additional system component is the HV panel, which can replace secondary beams and formwork panels and hence speed up the work. We can prepare a formwork proposal for you in our engineering office – based on the typical calculations and geared to your particular requirements. All the details and information on the drawings must be adhered to.

This document is provided by us as the manufacturing company so that you have the necessary instructions to deploy the TITAN HV slab forming system safely and economically. The following instructions

are intended to serve merely as a guideline. Once you are familiar with the system, other procedures are conceivable, provided all safety requirements are complied with. Please take the time to read the information given in these instructions for use prior to using the formwork system.

Instructions and training from a person familiar with the system are advisable prior to using the system for the first time. If you require additional information, please contact a qualified person from your company who has been trained by us, or get in touch with your FRIEDR. ISCHEBECK GmbH representative.

Attaching main beam to drop-head

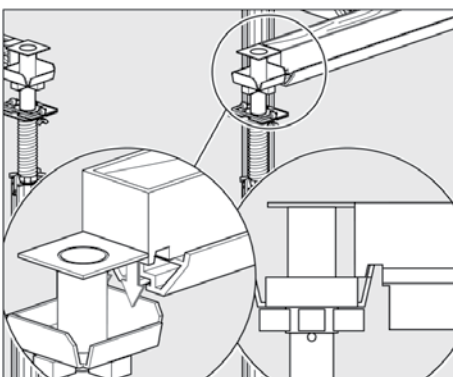


Fig. 2

Attaching secondary beam to main beam

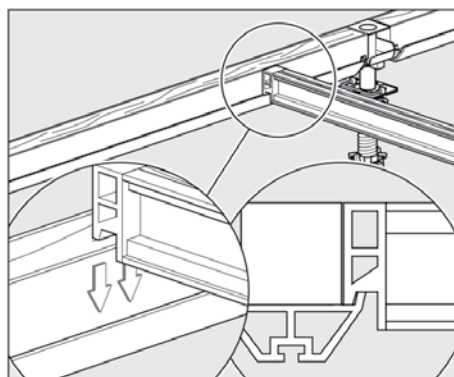


Fig. 3

Attaching HV panel to main beam

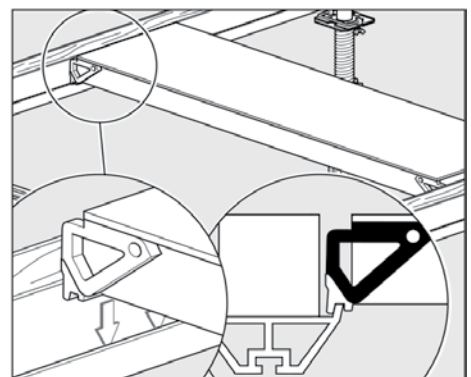
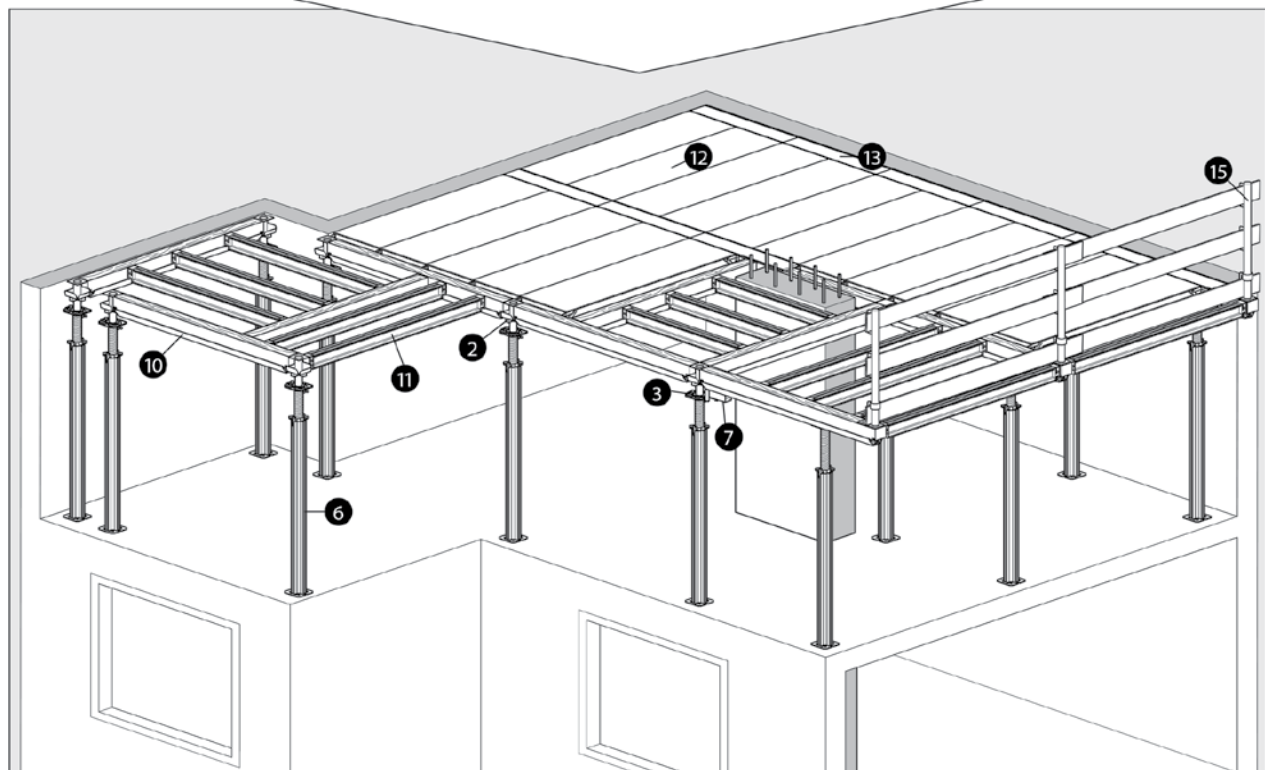
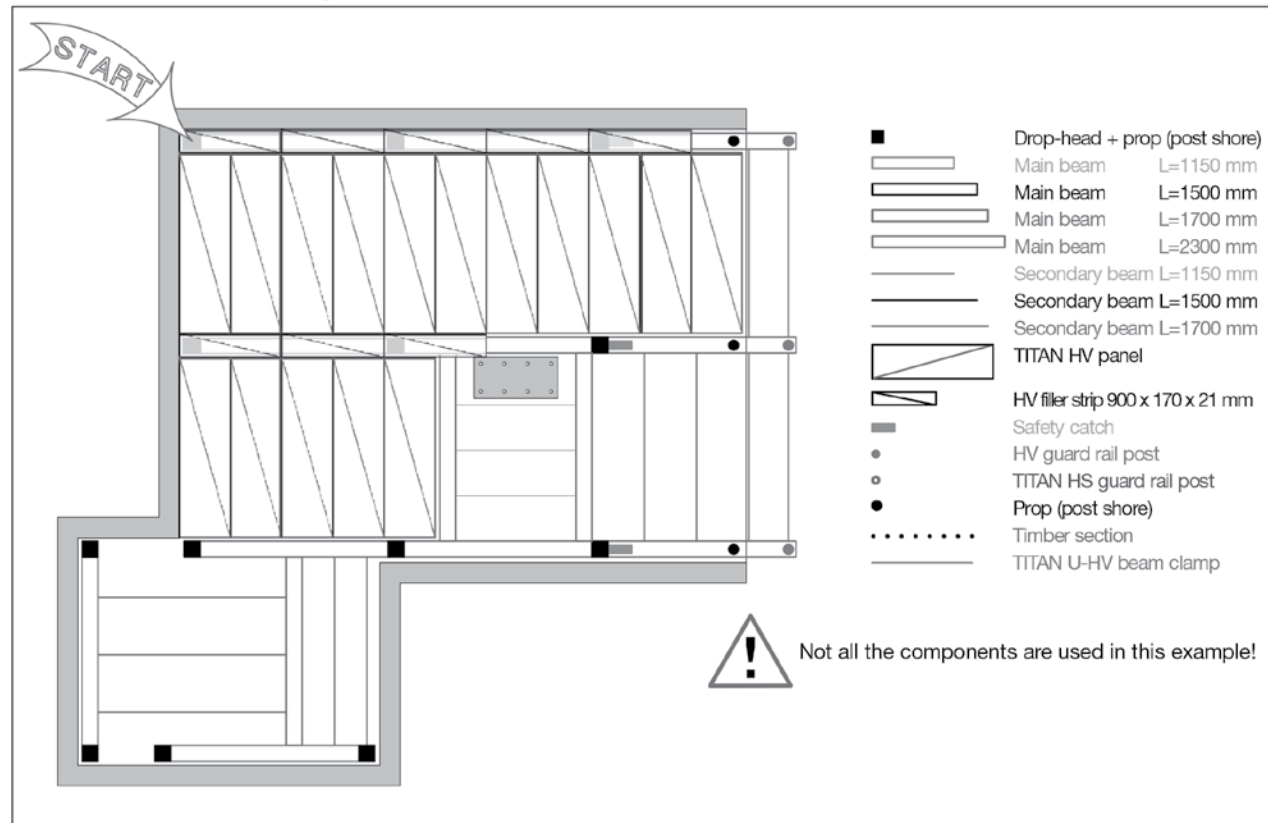


Fig. 4

Fig. 5 | Formwork layout drawing ① showing the components in formwork layout drawing



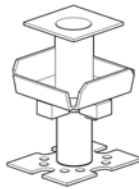
1 Formwork layout drawing

The formwork layout drawing shows the components required for the formwork. You must begin setting up the slab forming system at the starting point marked on the drawing.

2 Drop-head

The drop-head is fixed to the top of a prop (post shore). It forms the connection between main beams and/or secondary beams supporting HV panels.

Height: 250 mm
Top plate: 100 x 100 mm
Base plate: 150 x 120 mm
Drop height: 100 mm
Weight: 4.7 kg
Part No: 01204930



3 Fixing bracket

The fixing bracket is only required for attaching the drop-head to a TITAN prop. It is quickly attached and guarantees a secure fixing.

Weight: 0.46 kg
Part No: 06204990



4 Speed-thread bolts

The speed-thread bolts can be used to attach the drop-head to many other standard props (post shores).

Weight: 0.1 kg
Part No: 01204935



TITAN props (post shores)

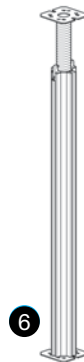
Any of the props from our range can be used for supporting the TITAN HV slab forming system. The TITAN S steel prop and the TITAN HV aluminium prop are given here as examples.

5 TITAN S steel prop

No. 2: height 1.80 – 3.00 m
Part No: 01201001
No. 3: height 2.30 – 3.50 m
Part No: 01201005
No. 4: height 2.60 – 4.10 m
Part No: 01201009
No. 7: height 4.00 – 5.50 m
Part No: 01201016

6 TITAN HV aluminium prop

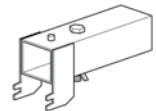
TITAN HV: height 1.75 – 3.05 m
Part No: 02204927
TITAN HV Maxi: height 2.95 – 4.25 m
Part No: 01204948



7 Safety catch

This is a restraint clamp for securing cantilevering main beams around the edge of a building. It prevents the beam from being coming disengaged from the drop-head and thus ensures better stability, better safety. It can also be used to secure connections between main beams (except between the 2.30 m main beam and other main beams).

Weight: 0.60 kg
Part No: 01204955



8 Wall spacer

The wall spacer is fixed to main beams set up parallel to a wall. It ensures the correct distance between main beam and wall for fitting HV filler strips. Only required in conjunction with the HV panel.

Weight: 0.60 kg
Part No: 01204954



9 Positioner

This is used to position a prop directly beneath a main beam. To do this, the positioner is fixed directly to the under side of the main beam (e.g. at edges with cantilevering main beams).

Positioner 38

For TITAN S props No. 2 and No. 3
Weight: 0.1 kg
Part No: 06204958



Positioner 50


For TITAN S props No. 4 and No. 7, also TITAN HV aluminium props.
Weight: 0.1 kg
Part No: 06204959




10 Main beam

This is a main element and together with the props forms the basic framework for setting up the system. Other elements, e.g. HV panels or secondary beams, can be attached to the main beams. The integral timber ground enables easy fixing of formwork panels (e.g. plywood sheeting). The main beams have coloured labels on their sides for distinguishing the different lengths at a glance. These colours match those used on the formwork layout drawing to speed up the work on site.


Length: 1.15 m
Weight: 8.5 kg
Grid size: 1.25 m
Part No: 01204904

Label colour: 


Length: 1.50 m
Weight: 11.2 kg
Grid size: 1.60 m
Part No: 01204906

Label colour: 


Length: 1.70 m
Weight: 12.7 kg
Grid size: 1.80 m
Part No: 01204908

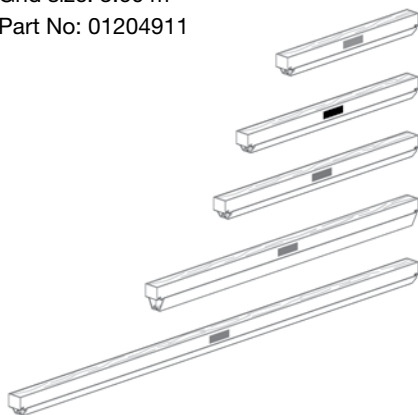
Label colour: 

Length: 2.30 m
Weight: 18 kg
Grid size: 2.40 m
Part No: 02204910

Label colour: 

Length: 3.50 m
Weight: 28.4 kg
Grid size: 3.60 m
Part No: 01204911

Label colour: 




11 Secondary beam

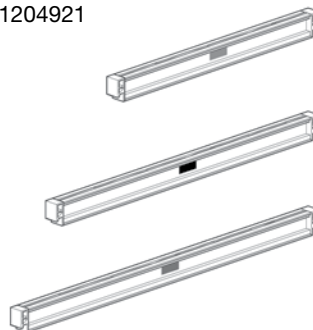
The purpose of the secondary beams is to support the formwork panels. There are fixed in the same plane as the main beams and therefore help to stiffen the entire system. The integral timber ground enables easy fixing of formwork panels (e.g. plywood sheeting).

Length: 1.15 m
Weight: 3.7 kg
Grid size: 1.25 m
Part No: 01204915

Length: 1.50 m
Weight: 5.0 kg
Grid size: 1.60 m
Part No: 01204918

Length: 1.70 m
Weight: 5.3 kg
Grid size: 1.80 m
Part No: 01204921

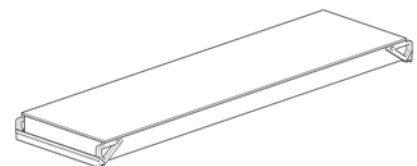
Label colour: 



12 HV panel

The HV panel consists of a lightweight aluminium frame and a GFRP sheet. It includes a quick-release support at one end which enables it to be installed and removed easily and safely from below, thus speeding up setup and striking.

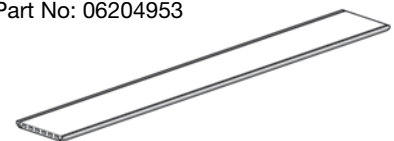
Length: 1.7 m
Width: 0.45 m
Grid size: 0.45 x 1.80 m
Weight: 16.5 kg
Part No: 01204951



13 HV filler strip

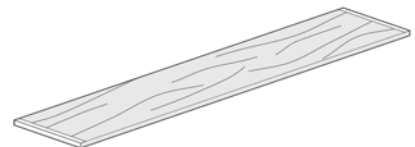
The HV filler strip closes the gaps between HV panels and is also used above main beams at edges.

Length: 0.9 m
Width: 0.17 m
Weight: 3.8 kg
Part No: 06204953



14 Formwork panel

Supplied by others!
Always check material thickness! 21 mm



5.1 Preparations for setup

Adjusting prop lengths

Set the props (post shores) to the correct height for the formwork. Allow for the height of the drop-head and the thickness of the formwork panel. The height to be set L with a 21 mm formwork panel is equal to the room height L_H - 271 mm.

$$L = L_H - 271 \text{ mm}$$

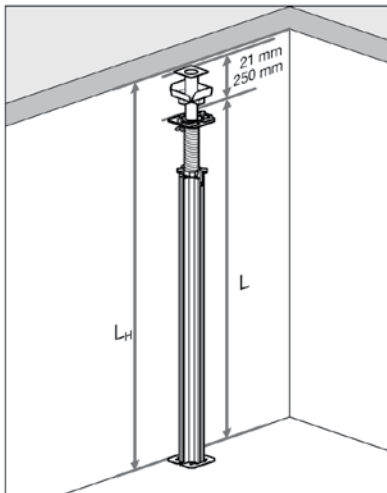


Fig. 7

Fixing drop-head to prop with speedthread bolts

Fix the drop-head to the prop (post shore) with two speed-thread bolts. To do this, insert the bolts from above and secure them with wing nuts underneath.

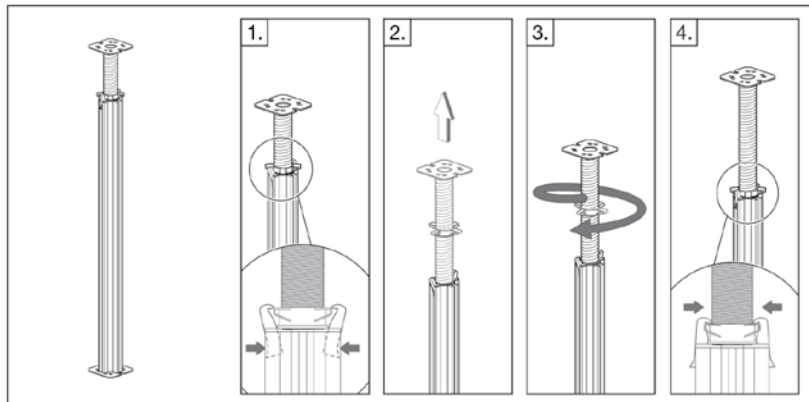


Fig. 8 | TITAN HV aluminium prop (post shore)

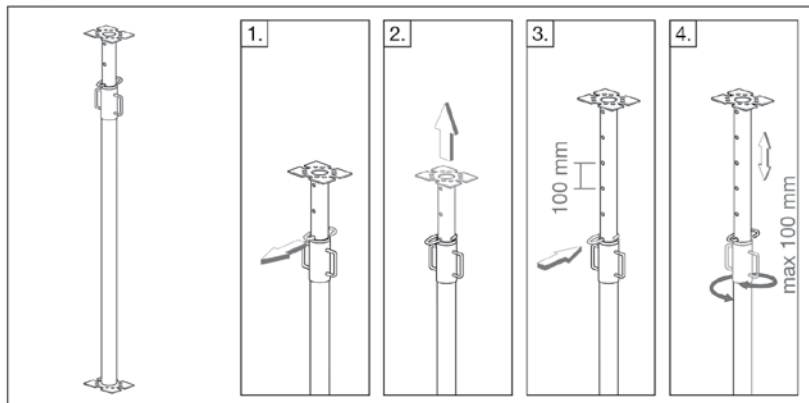


Fig. 9 | TITAN S steel prop (post shore)

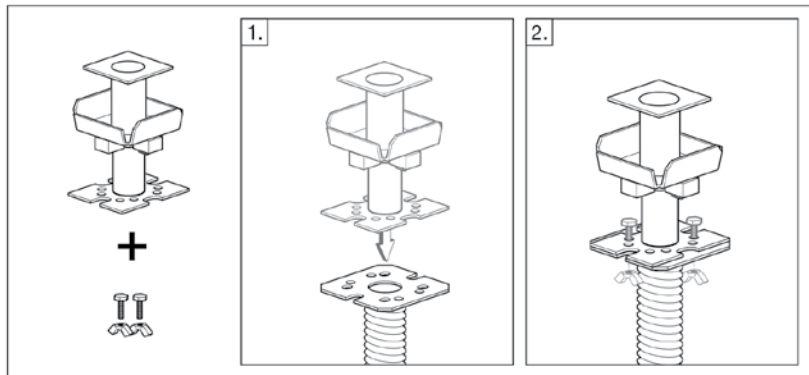


Fig. 10

Fixing drop-head to TITAN prop with fixing bracket

Fix the drop-head to the prop (post shore) with the fixing bracket.

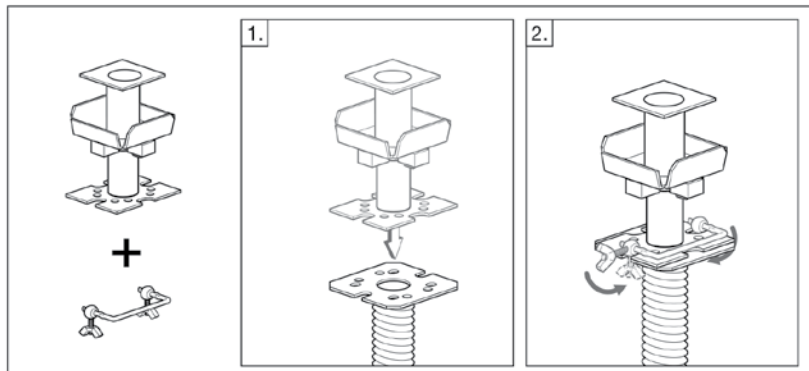


Fig. 11

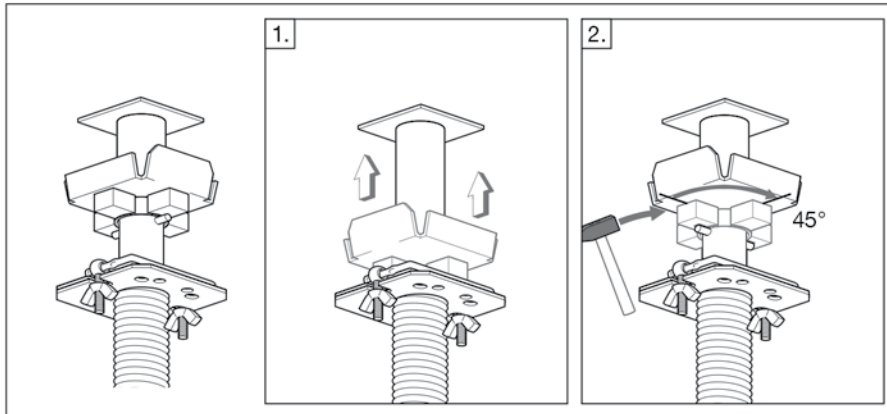


Fig. 12

Setting drop-head to formwork position

Raise the loadbearing plate and the release ring above the pins (1) and then turn the release ring through 45° (2).

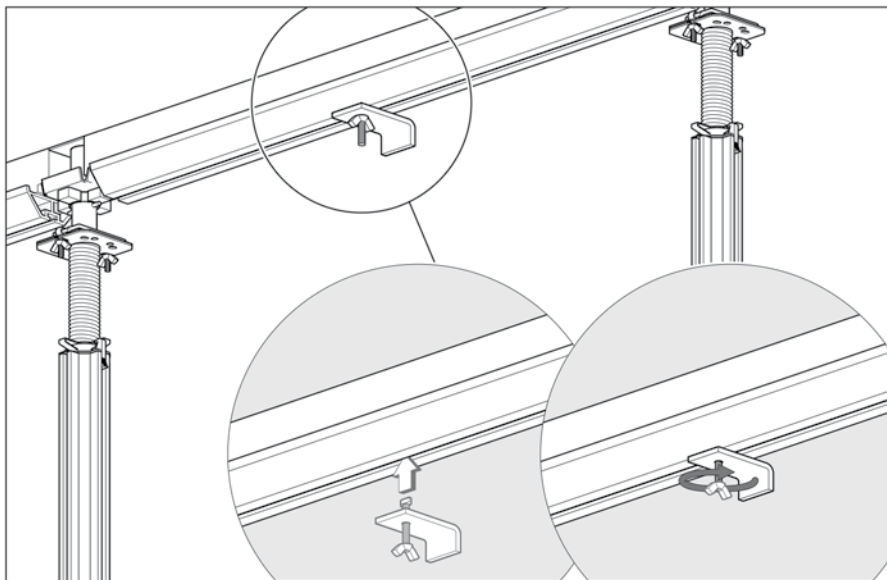
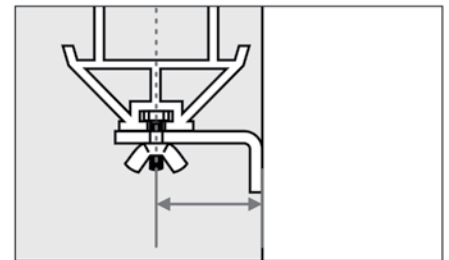


Fig. 13

Attaching wall spacer to main beam

The wall spacer fixes a main beam parallel to a wall at the correct distance from the wall. Fit the wall spacer into the groove on the underside of the main beam and fix it in place with the wing nut. (Only required in combination with HV panels.)



Spacing for HV filler strip adjacent to wall

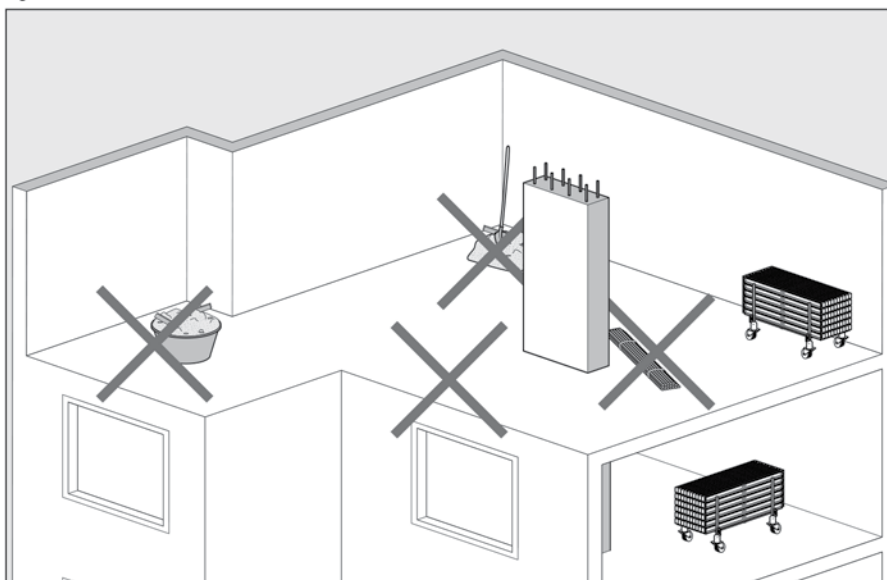


Fig. 14

Preparing the area

1. The area below the floor slab to be cast should be kept clean, clear of building debris and other unnecessary items so that the components for the slab forming system can be moved around in their wheeled storage racks.
2. Gather together the components needed for the slab forming system and store them in their wheeled storage racks. Ensure that suitable working platforms (provided by others) are available for setting up the slab forming system where this is necessary.

15 HV guard rail post

The HV guard rail post is required at edges and is simply inserted into the main beam. It is then easy to erect a safety barrier around the formwork.

Height: 1.32 m

Weight: 8.3 kg

Part No: 01204960

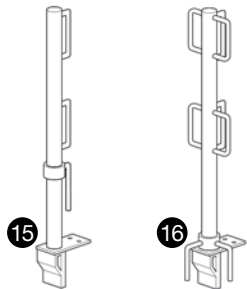
16 HV corner guard rail post

The HV corner guard rail post is required at corners and in areas where the main beams are positioned parallel to edges where there is a risk of falling.

Height: 1.32 m

Weight: 9.5 kg

Part No: 01204961

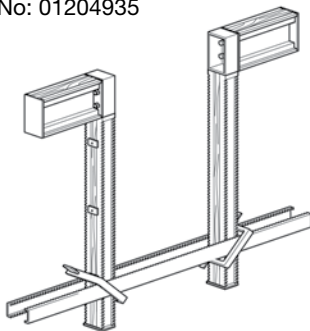


17 TITAN U-HV beam clamp

It is easy to incorporate the formwork for downstand beams with the U-HV beam clamp. It is suitable for a maximum depth of 800 mm and a maximum width of 830 mm.

Weight: 19.0 kg

Part No: 01204935

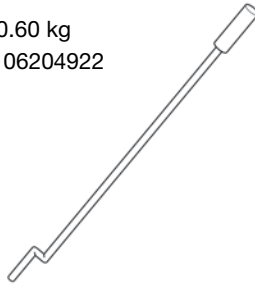


18 TITAN HV carbide cleaning scraper

For cleaning the groove in the main beam.

Weight: 0.60 kg

Part No: 06204922

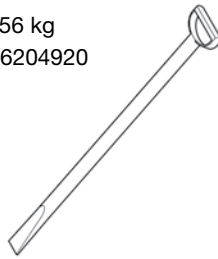


19 TITAN HV carbide concrete scraper

For the easy removal of concrete residue from HV panels.

Weight: 1.56 kg

Part No: 06204920



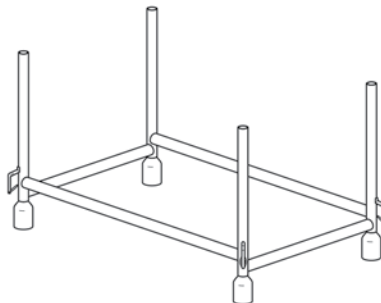
20 TITAN storage rack "Barelle®"

For the storage and transport of the components on the building site.

Weight: 38 kg

"Barelle®", painted, part No: 01206001

"Barelle®", galvanised, part No: 01206002



21 HV panel storage rack

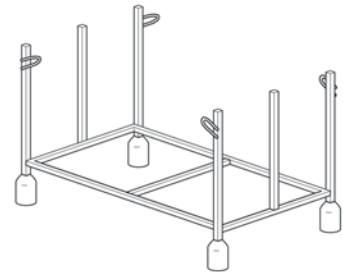
For the storage and transport of HV panels on the building site.

Rack 30 (for 30 HV panels),
part No: 01204952

Weight empty/full: 134 kg/629 kg

Rack 14 (for 14 HV panels),
part No: 01204953

Weight empty/full: 45.8 kg/276.8 kg



22 Fixed and swivel castors

These castors can be fixed to "Barelles" or HV panel storage racks.

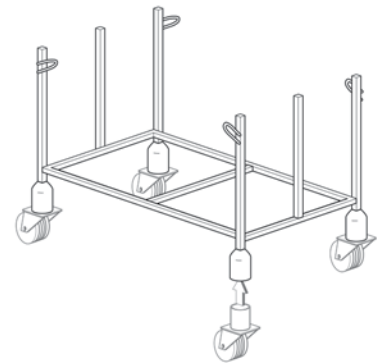
Permissible loading per castor: 4 kN

Fixed castor, part No: 01206010

Weight: 5.87 kg

Swivel castor, part No: 01206011

Weight: 5.95 kg



5.2 Typical setup

You must begin setting up the slab forming system at the starting point marked on the drawing. But you may proceed in any direction from this point.

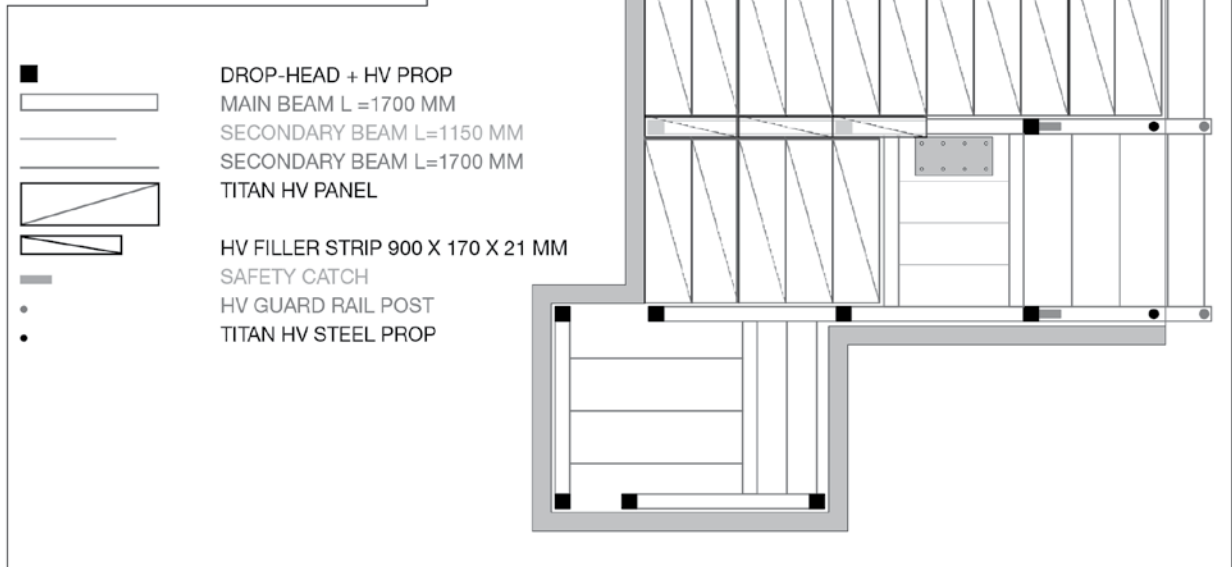


Fig. 15

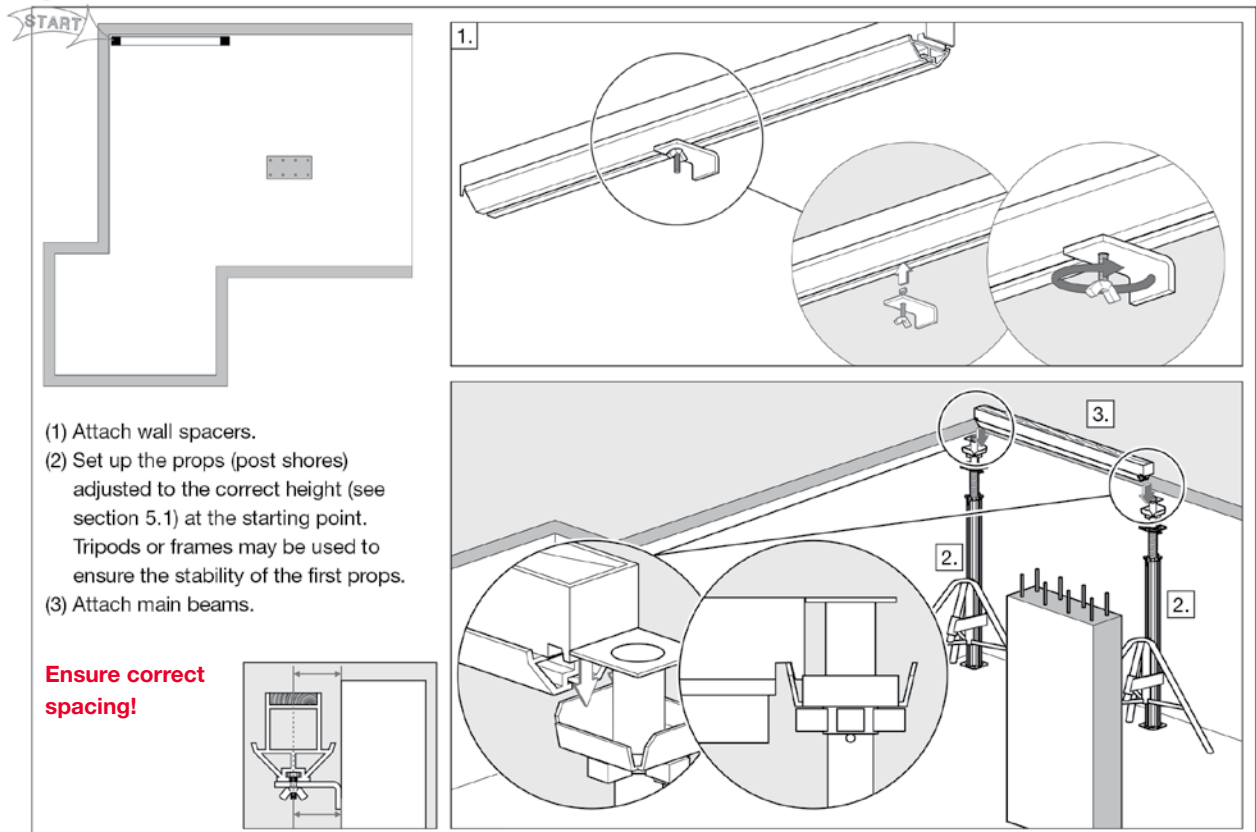


Fig. 16

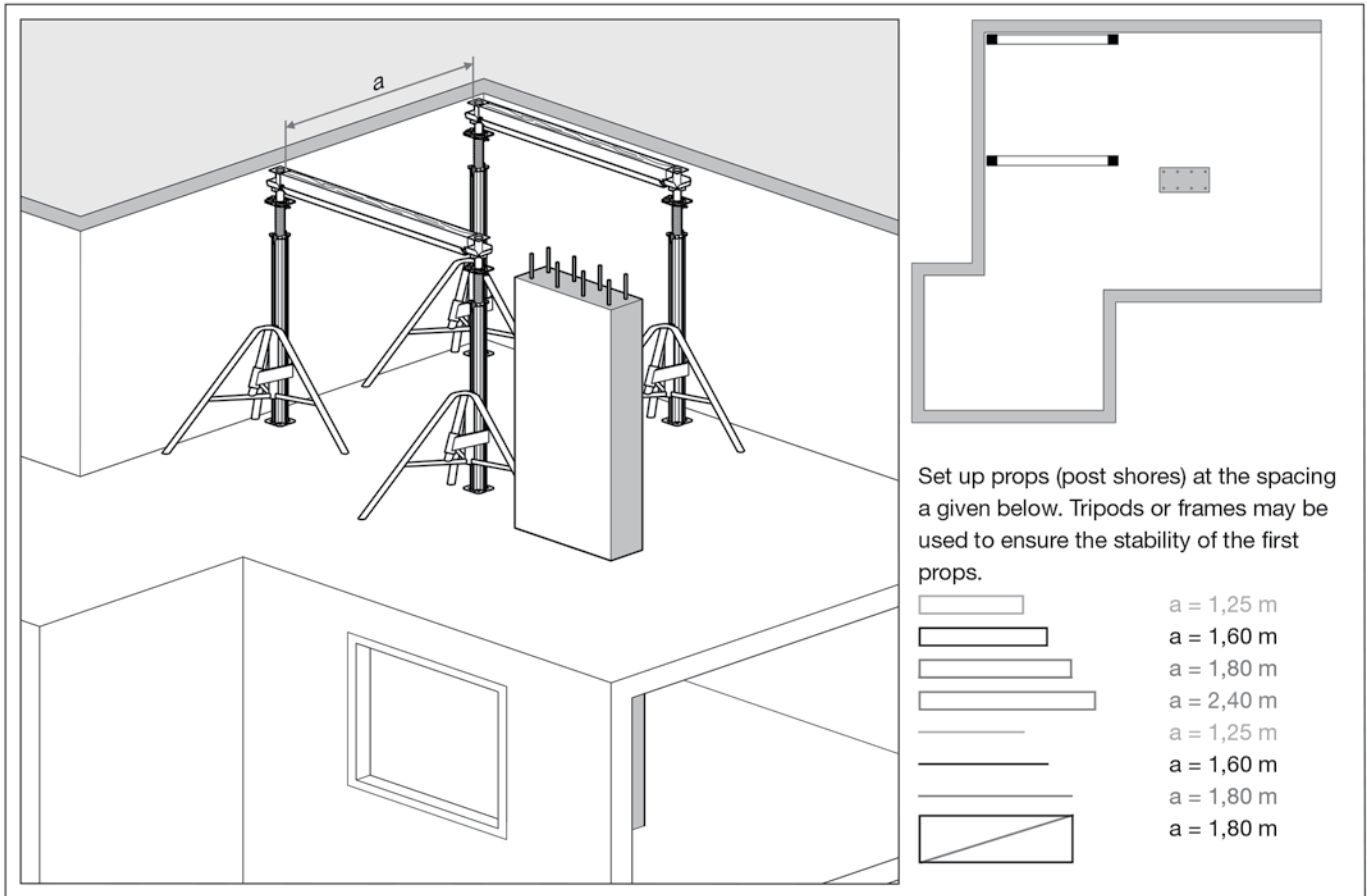


Fig. 17

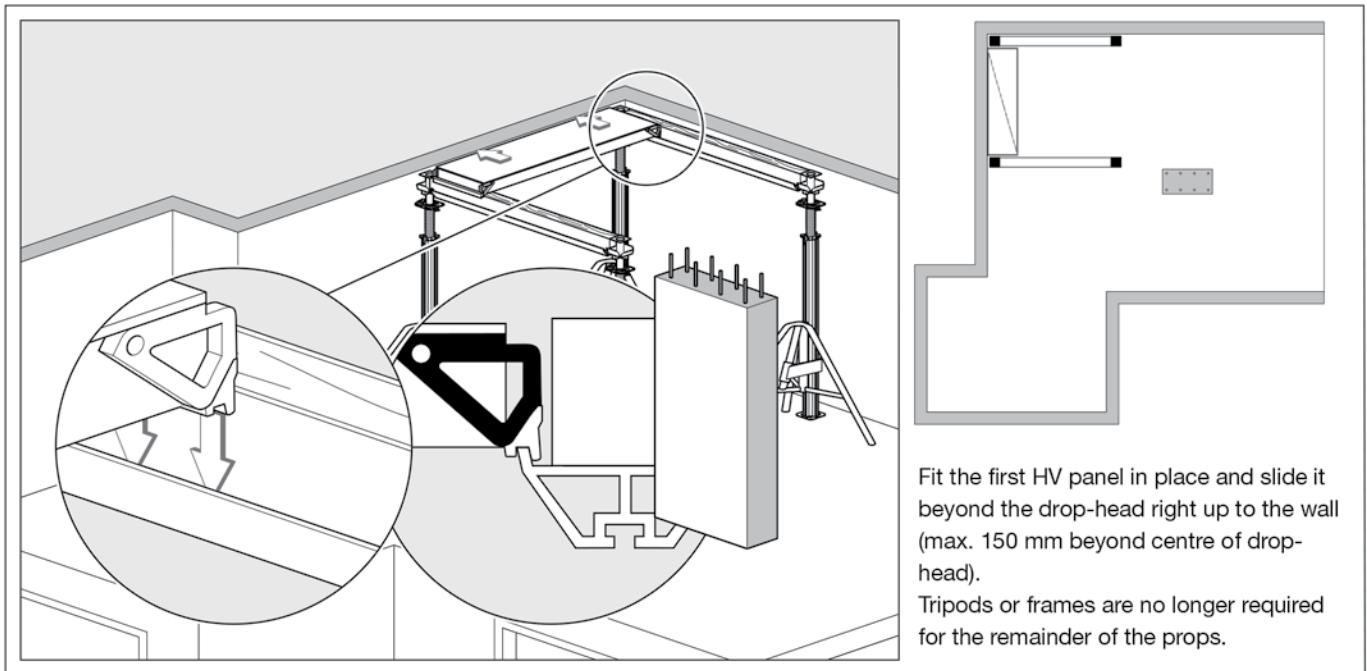
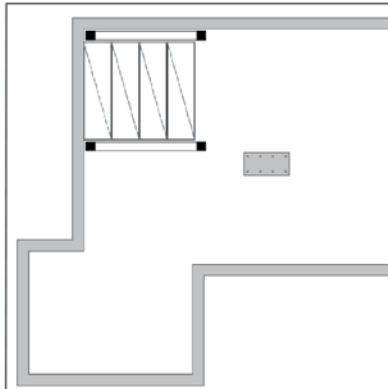


Fig. 18



Fit further HV panels until the first bay is complete.

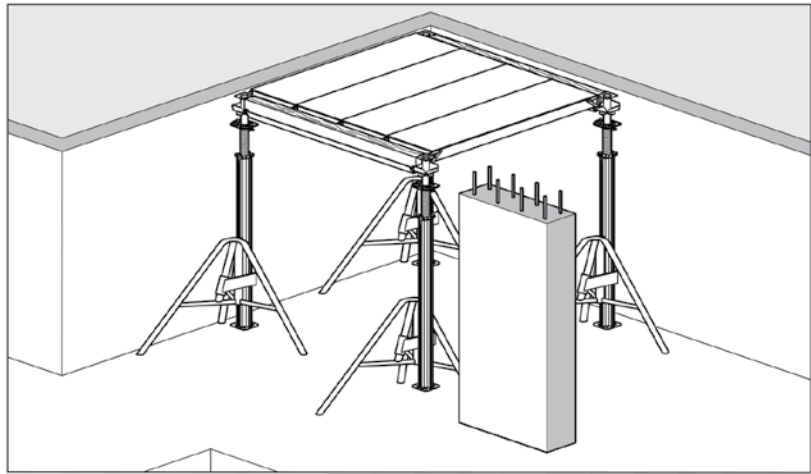
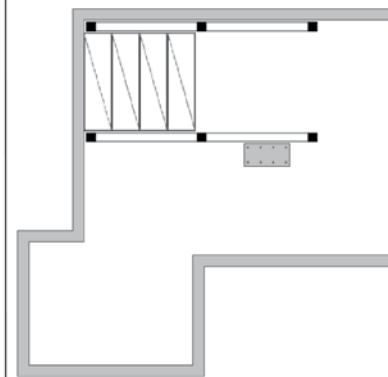


Fig. 19



Attach the next main beam to the drop-head and lift it into place with a prop (post shore). This positions the prop automatically.

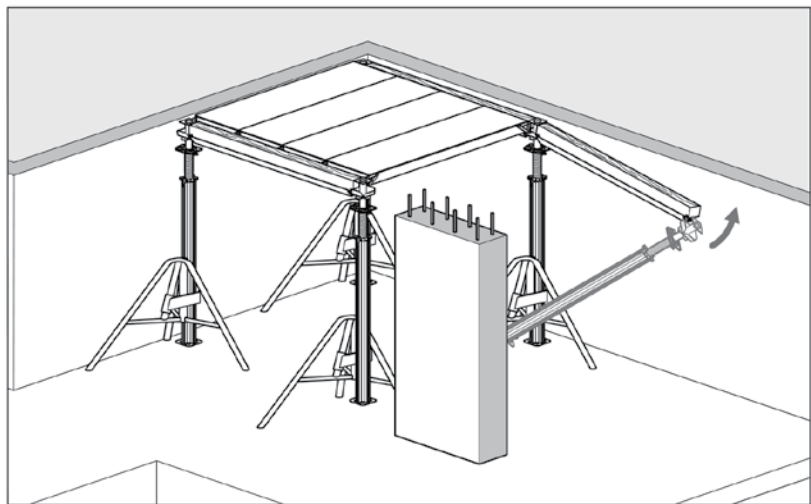
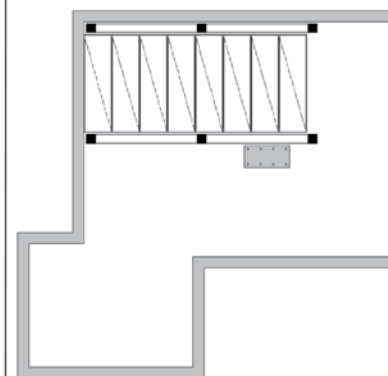


Fig. 20



Fit further HV panels until the second bay is complete.
Fit the HV panels in such a way that the quick-release supports are all on the same side. That makes striking easier.

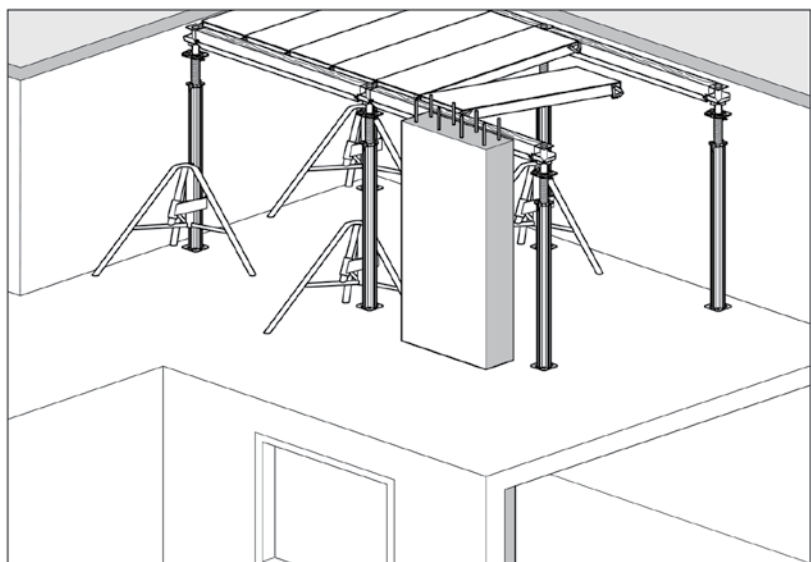


Fig. 21

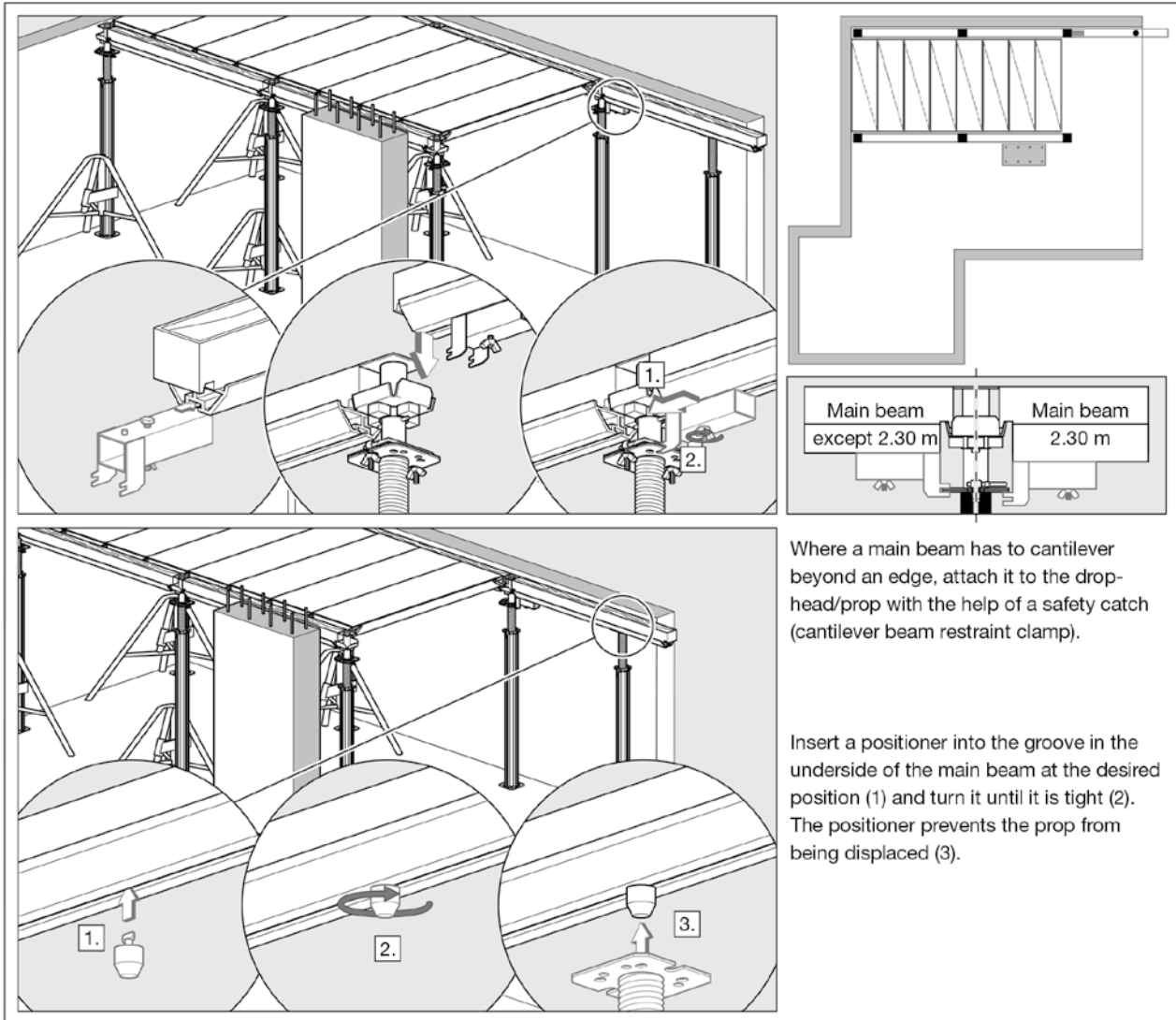


Fig. 22

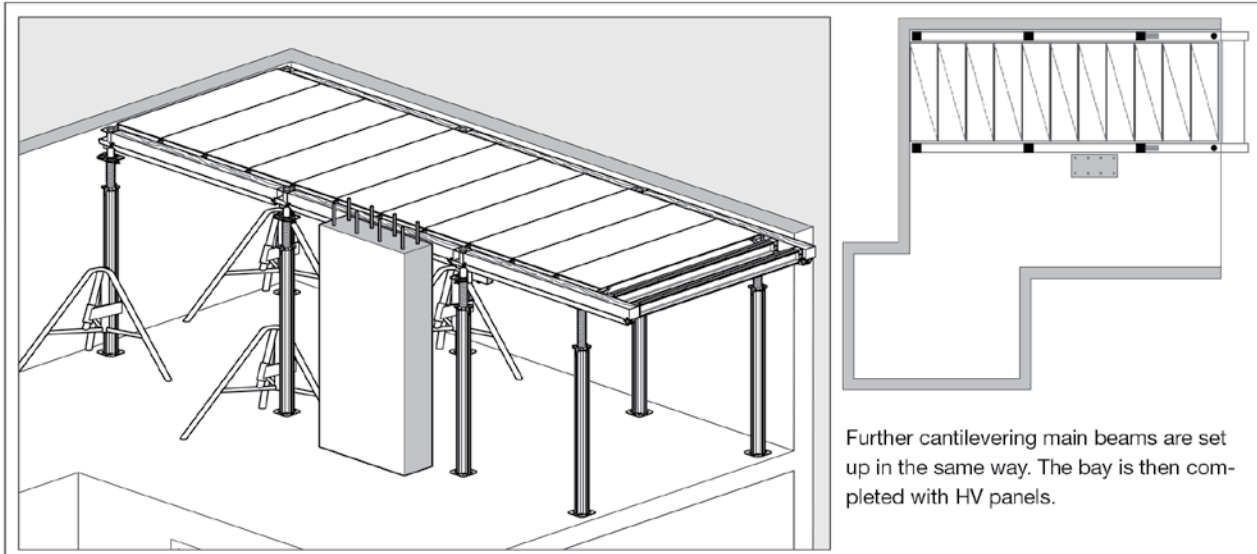


Fig. 23

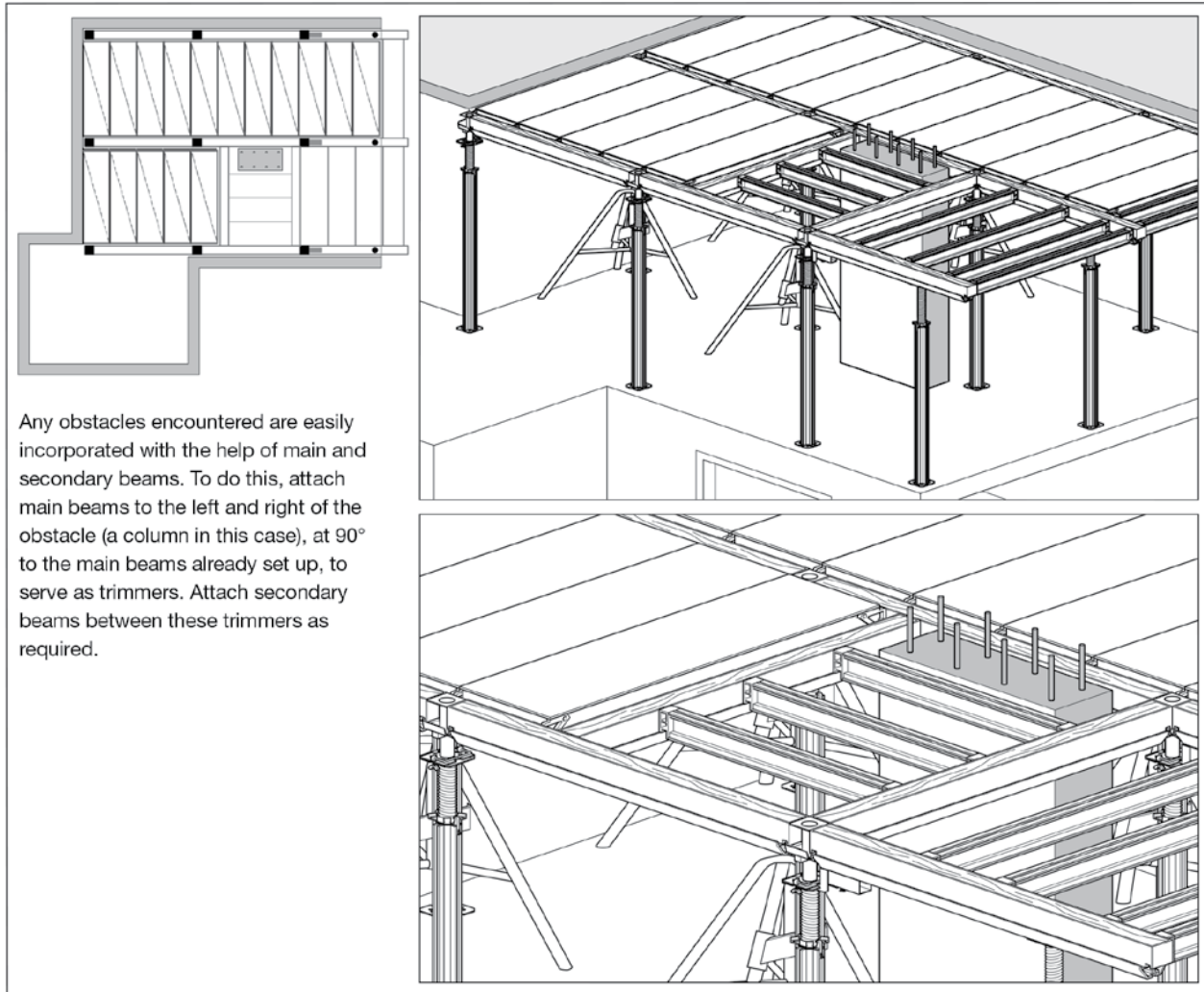


Fig. 24

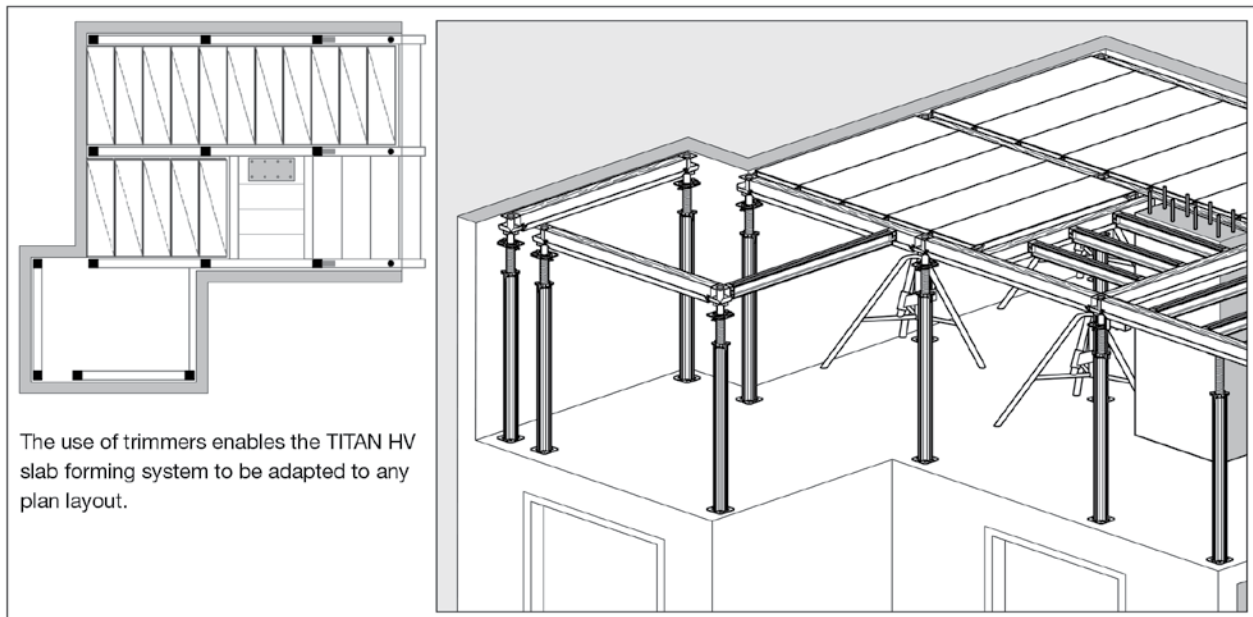
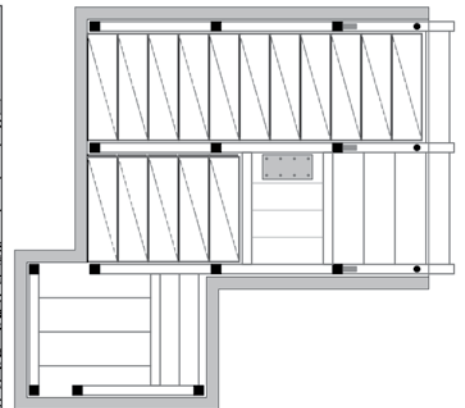
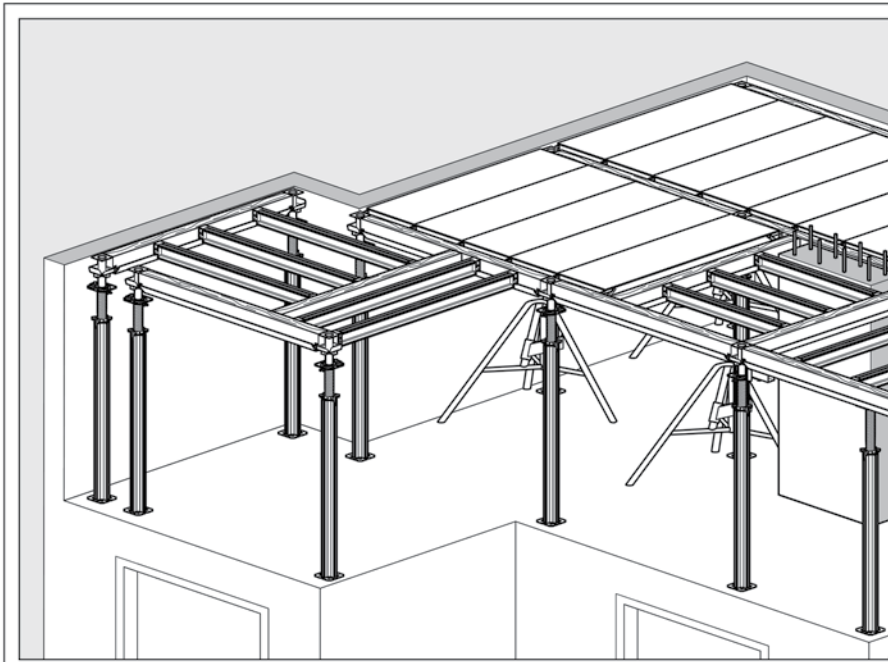
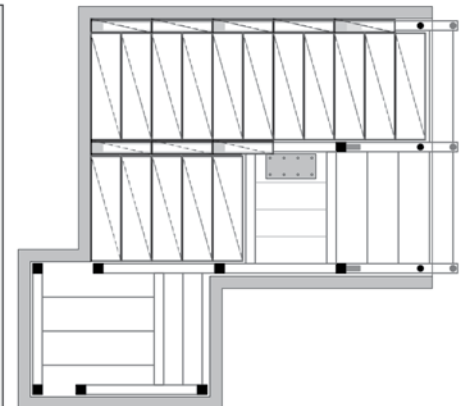
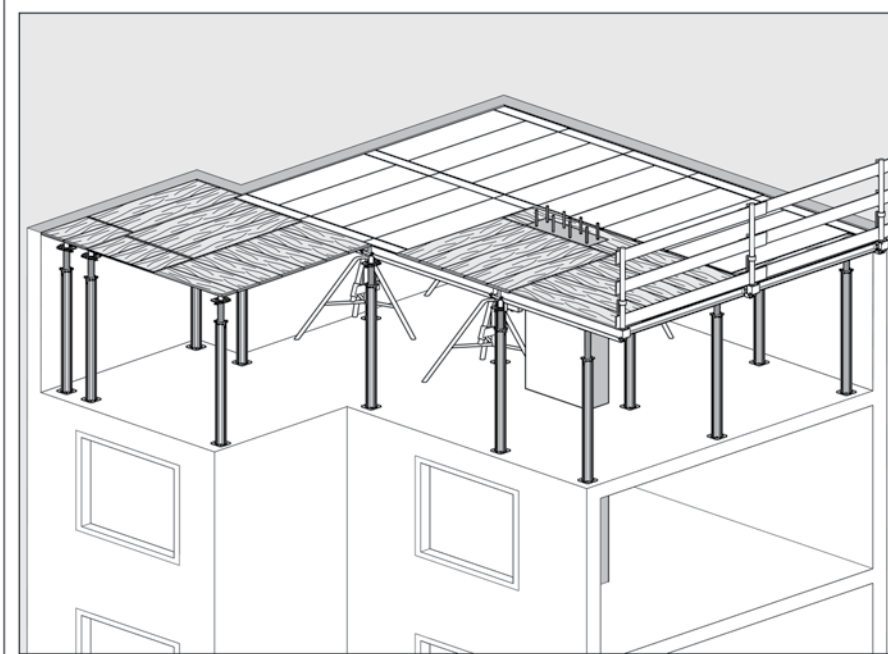


Fig. 25



Attach main and secondary beams as required to complete the corner.

Fig. 26



Once the grid of interlocking beams has been set up, insert guard rail posts around the perimeter of the area for safety. Afterwards, lay HV filler strips and formwork panels on the beams. (The formwork panels may be secured with nails, e.g. 2.2 x 40 mm, at a few places if required.) The long sides of formwork panels should not be butt-jointed directly above main beams; cut the formwork panels longitudinally if necessary. Avoiding butt joints above main beams prevents the beams from becoming coated in cement slurry and also eases striking. There may be a risk of falling during setting-up/dismantling; appropriate safety measures must be taken.



Spray release agent onto HV panels and formwork panels prior to concreting!

Fig. 27

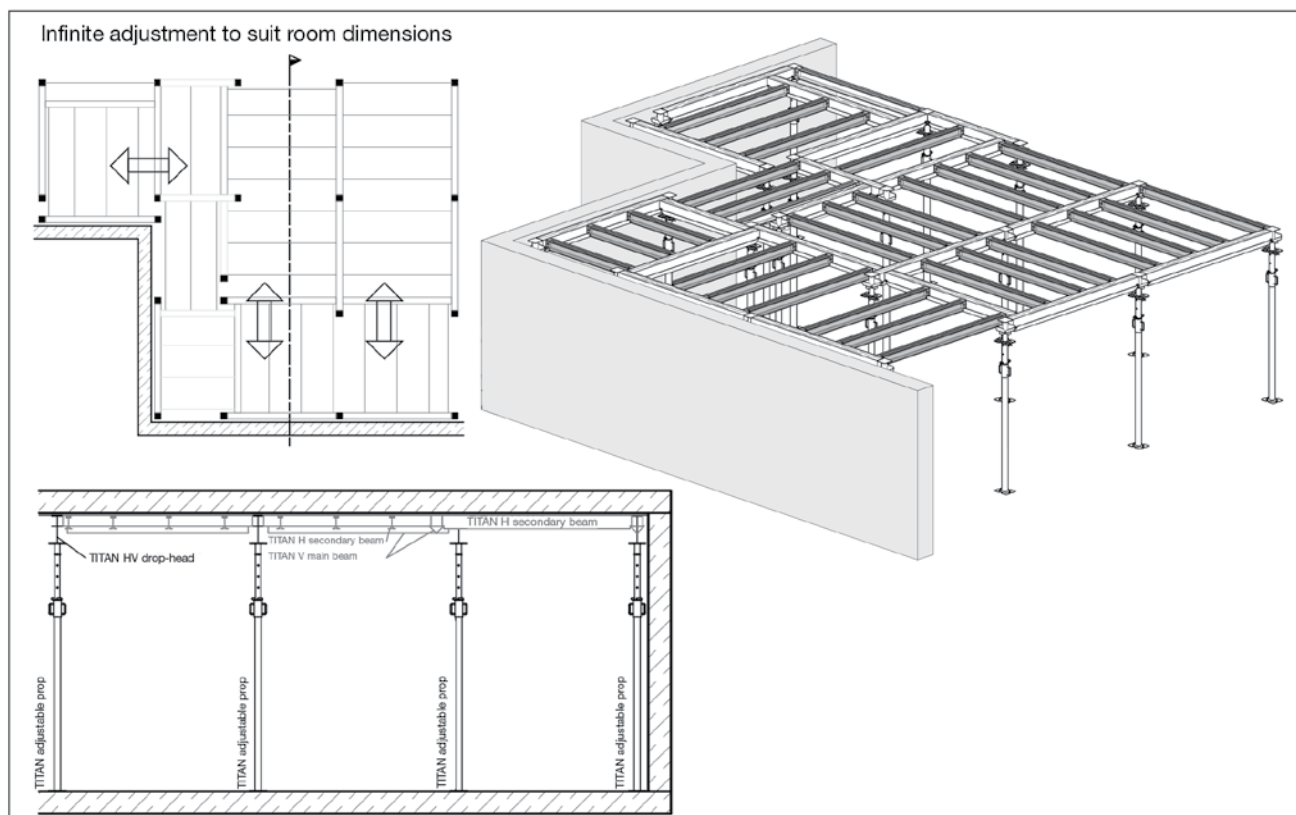


Fig. 28

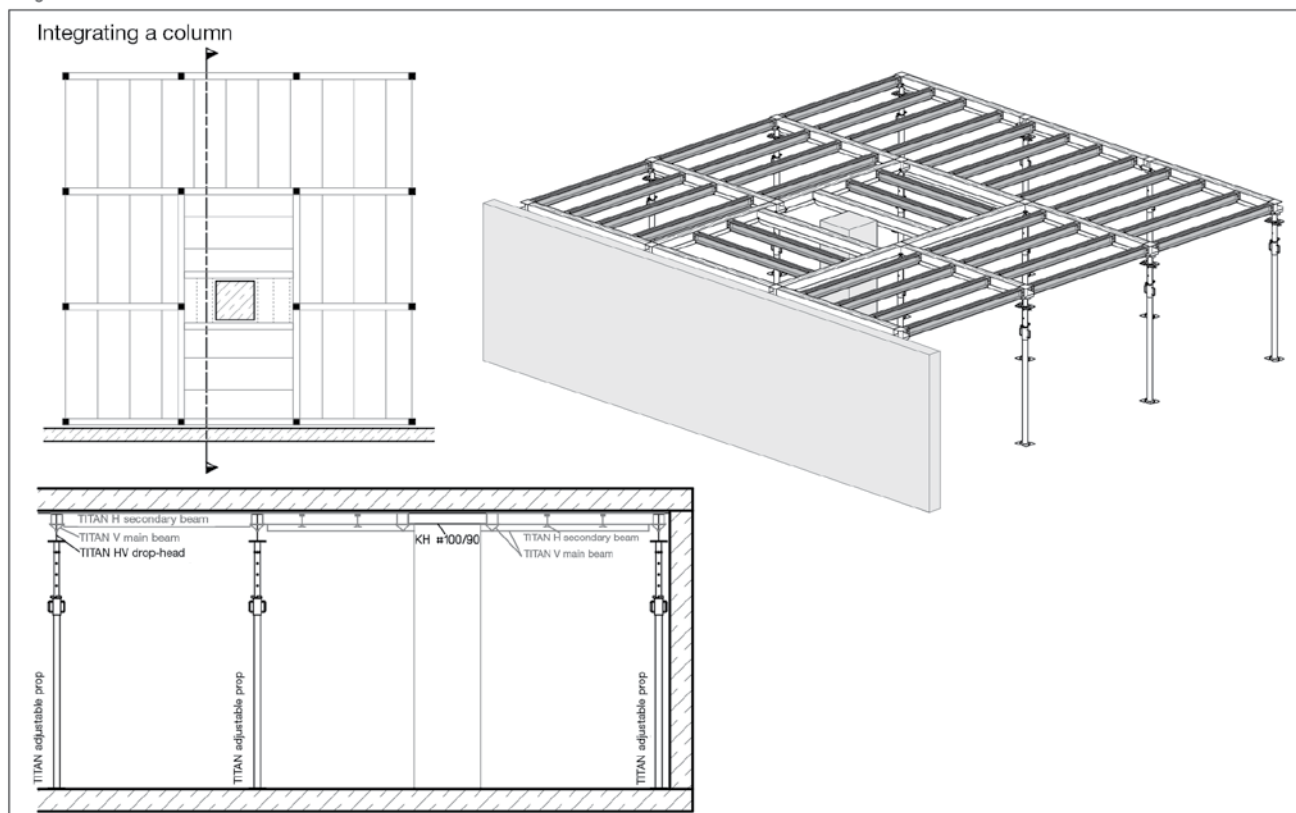


Fig. 29

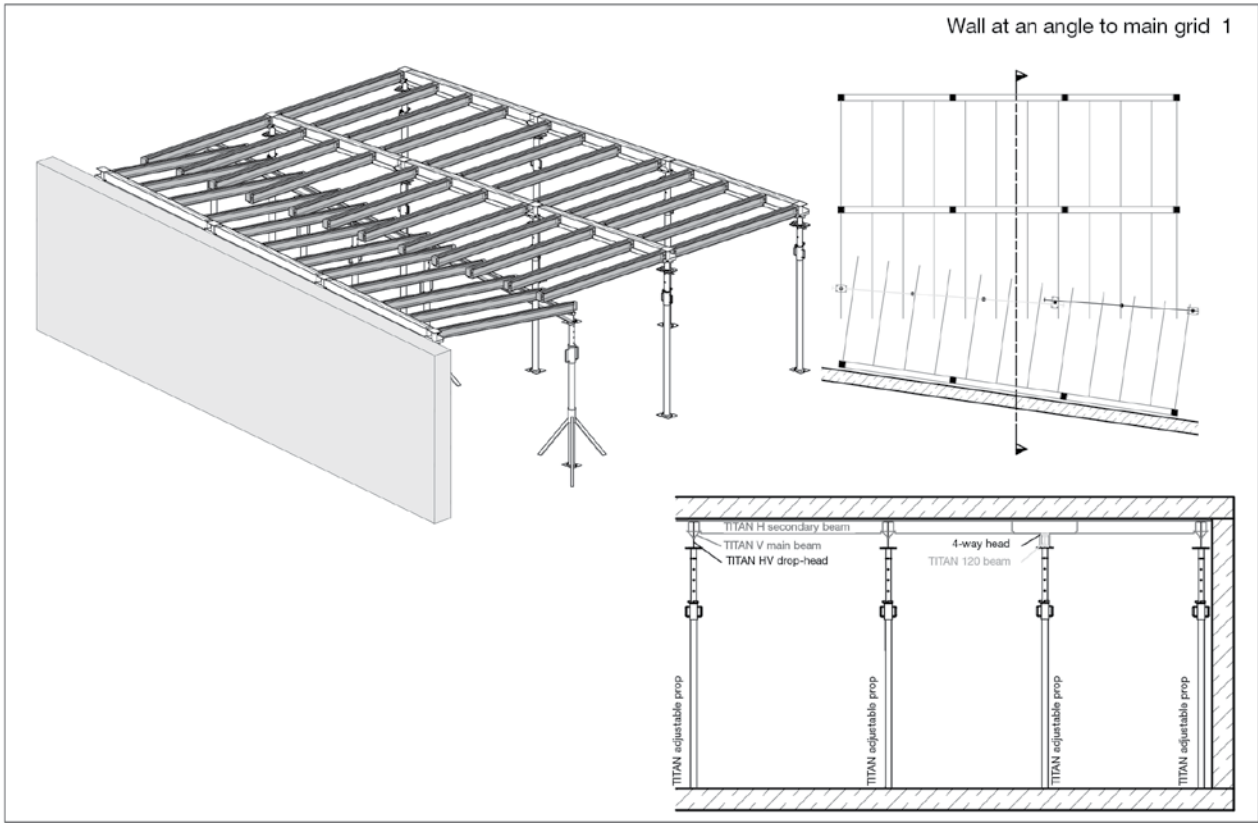


Fig. 30

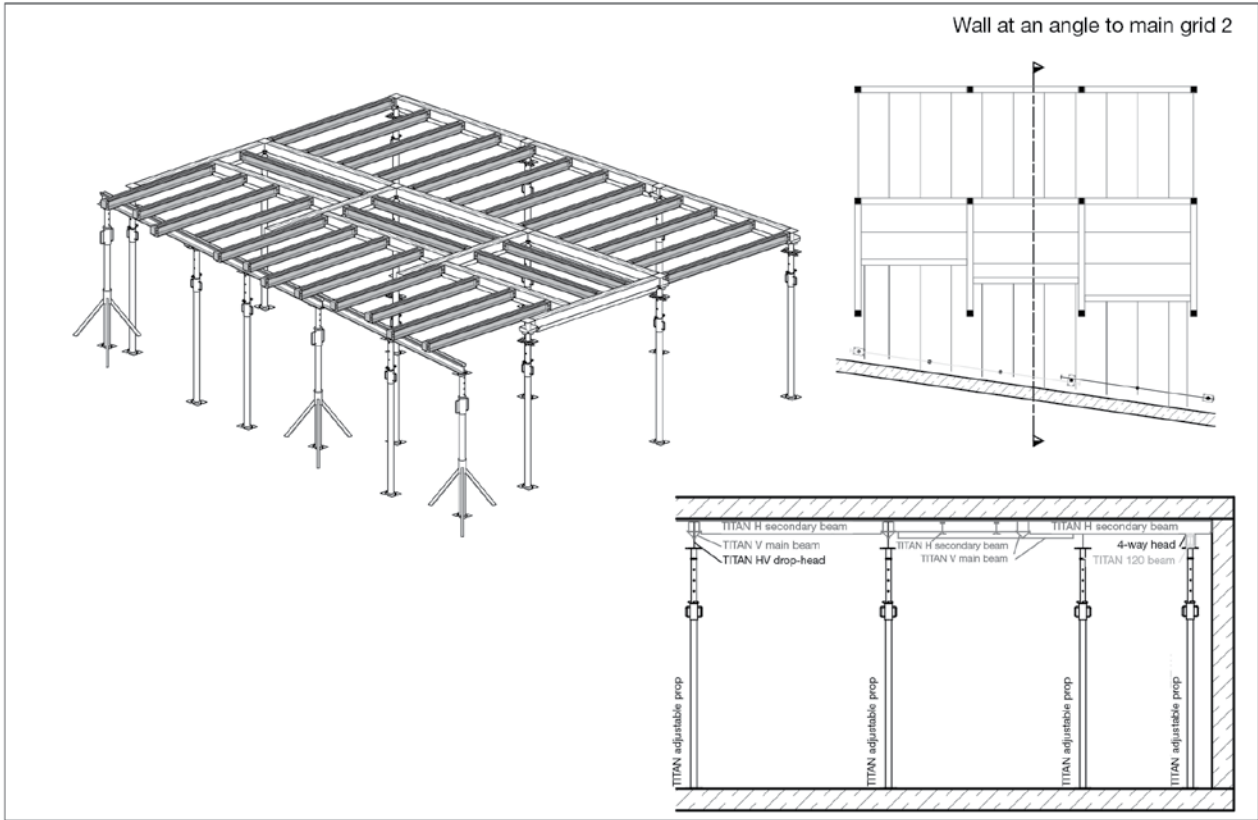


Fig. 31

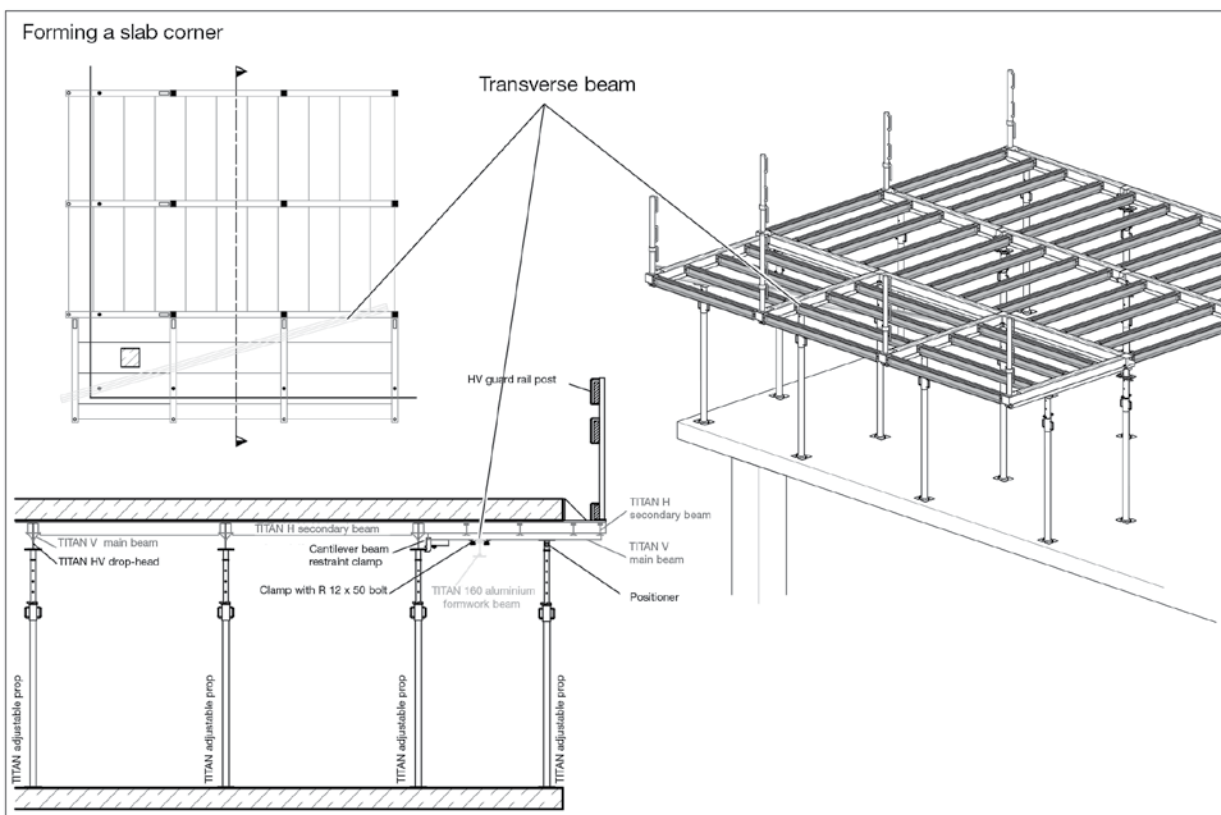


Fig. 32

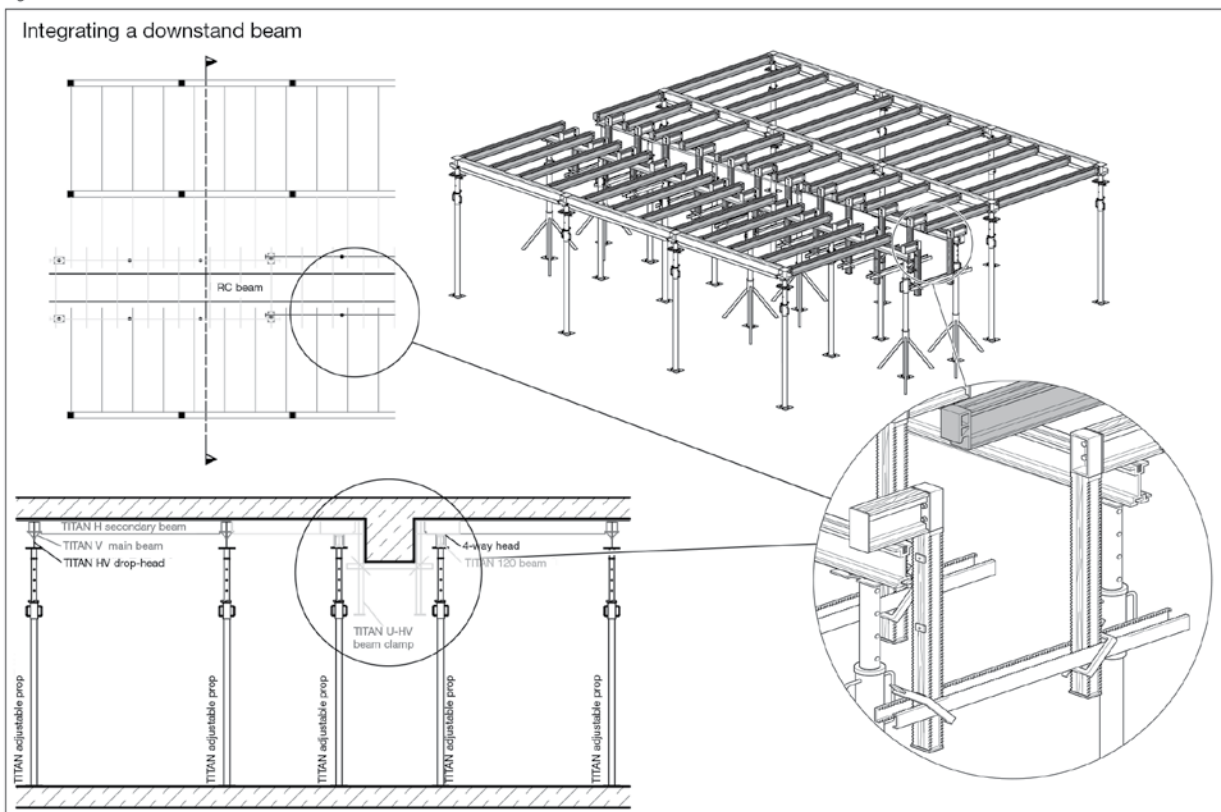


Fig. 33



Pre-Set Post Shore Height

Set the drop head to the locked position with a hammer blow to the locking nut. Adjust the post shore to the proper pin hole while the post shore is in the horizontal position. Use the post shore handle to turn cast collar nut for approximate shore height.



Setting the Main Beam

You should begin by building a four post shore tower using the DB 180 Frame, Ledger Frame 180, Tripods or Timber Wedge Clamps. Every 1600 SF of deck installed should be stabilized with a four post shore tower. Main beams should be set in parallel rows and are designed to be hung from the drop head and pushed into final position with the post shore drop head.



Setting the Secondary Beam

Secondary Beams should be installed by dragging the bottom of the beam across the top of the Main Beam until the Secondary Beam securely drops into the Secondary Beam. Avoid locating the Secondary Beam at drop head locations whenever possible, this will improve access to the quick release collar of the drop head during the stripping procedure.



Framing at Column Locations

Shore around columns and other obstacles by 'straddling' the column with Main Beams and spanning between Main Beams with lumber fillers.

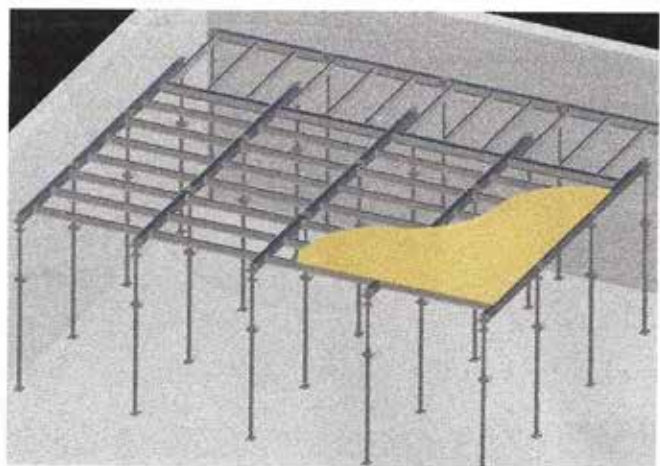


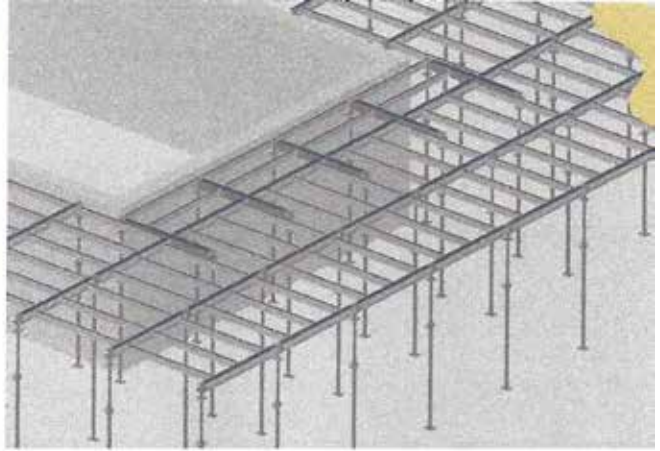
Lumber Fillers

When required it is suitable to use 4 x 4 lumber as Secondary Beams. The ledger of the Main Beam is 3 1/2" below the top of the Main Beam. The lumber should be cut so that the dimensions are +0" and - 1/32" to ensure proper bearing on the Main Beam.

Addressing Jobsite Conditions – ‘Turn and Slide’ Method

When encountering a wall perpendicular to the Main Beam direction, adjusting the length of the shoring is easily accomplished using the ‘turn and slide’ method. Stop the shoring short of the wall, turn the Main Beam direction to run parallel to the wall and slide the Main Beams up to the wall.





Addressing Jobsite Conditions

When encountering a wall parallel with the Main Beams, adjusting the shoring laterally is easily accomplished using the 'fingering-in' method. At the obstruction turn the Main Beams to run perpendicular to the obstruction and slide up to the wall.



Plywood Installation

Units of plywood are suitable to be placed on top of properly installed and stabilized shoring. Attach plywood decking to the systems Main Beam and Secondary Beam with a 6 common nail driven at a 45 degree angle.

Post Shores

- Adjust the post shores to the appropriate length when they are horizontal.
- Never place your fingers in the holes of the post shore or in the ends of the post shores.
- Never remove a pin from the post shore when the post is in the vertical position.
- Post Shores must be installed completely vertical. The use of a level is recommended for verifying if the post shore is plumb.
- Post shores used as re shore posts must be used in conjunction with spring clips or cross bracing to ensure they remain vertical and in contact with the slab surfaces.
- Post shore extensions must be secured with (4) grade 5 bolts.
- Always retighten post shores to concrete after dropping main beams.

Bracing Post Shores

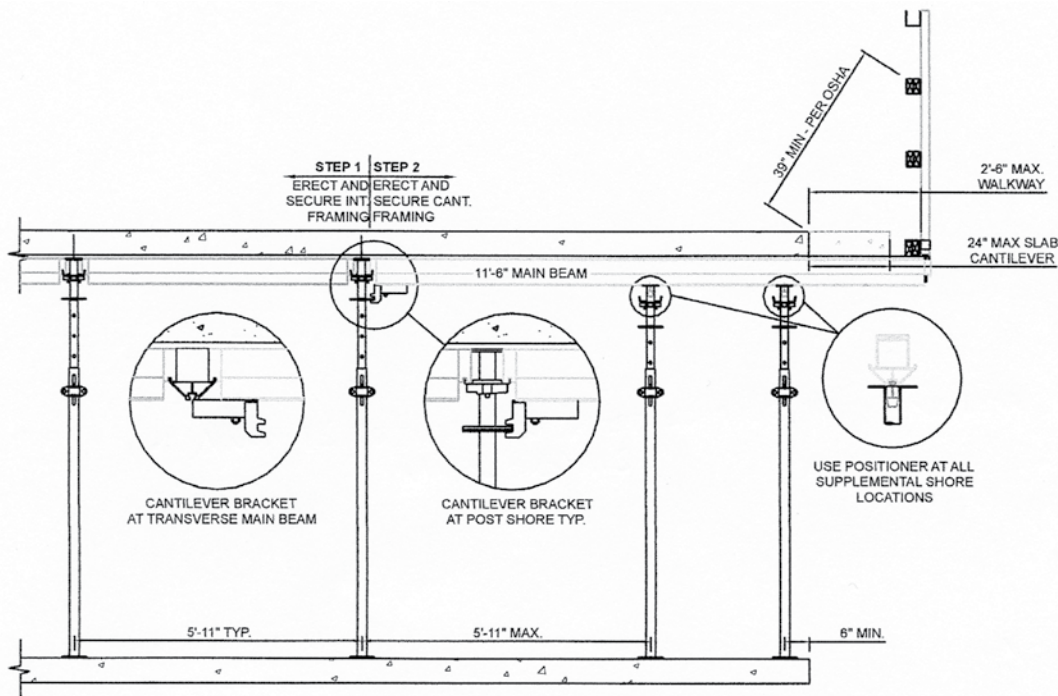
- Cross bracing (Timber Wedge Clamp or DB Frame) must be installed during the erection process.
- You can use the DB 180 frame or use 1x4 or 2x4 lumber material for bracing.
- Always connect at least three post shores together when using lumber bracing.
- Always brace the leading edge of the deck and always brace the stopping points for the day.
- Additional cross bracing is required on slopes and ramps.

Cantilever Conditions

- Extra caution must be exercised at cantilevered conditions to avoid fall hazards.
- Warn all jobsite personnel to stay off of cantilevered areas until the installation of the shoring and fall protection is complete.
- Do not load cantilevered Main Beams prior to installing all Secondary Beams, post shores, safety catches, cross bracing, lacing and plywood decking.
- Do not cantilever Main Beams where the adjacent framing and plywood decking is not sufficient to counter the cantilever loads.
- Do not load the Main Beam beyond the allowable design capacity.
- Do not place material or equipment on cantilevered framing areas.
- Always install safety catches on the cantilevered Main Beams.
- Always install adequate cross bracing to stabilize cantilevered conditions.

Handrail Posts

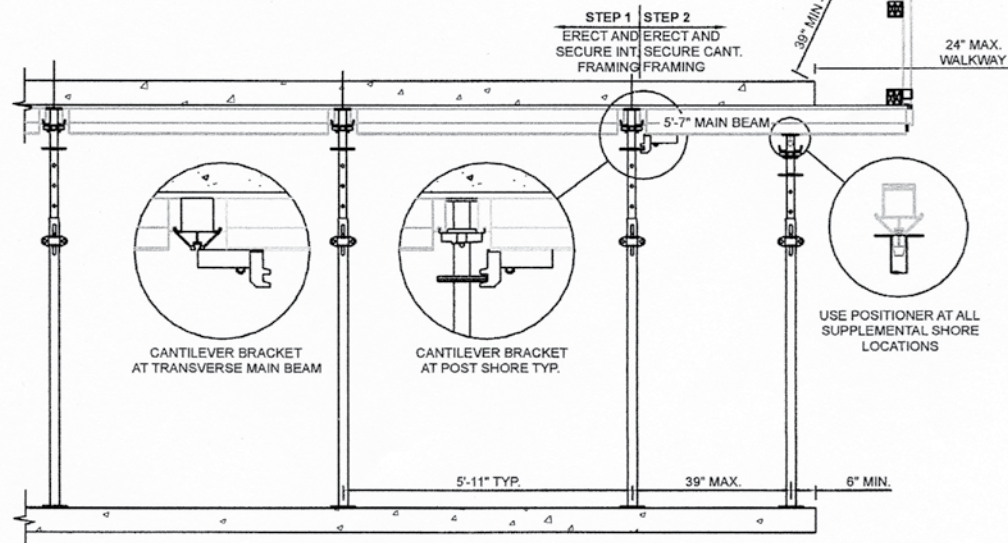
- Always take precaution while installing the handrail post and guardrail lumber to prevent fall hazards.
- Do not allow personnel on the deck until shoring installation and fall protection is complete and inspected by the site safety manager.
- Do not exceed 8' center to center spacing for handrail installation.
- Always ensure that the handrail bracket is fully seated into the Main Beam end clip.
- Always use 2 x 4's for the guardrail lumber.
- Always secure the lumber to the handrail pockets.
- Always lap the lumber at the location of a handrail upright.
- Always ensure that all fall protection installed is OSHA compliant.



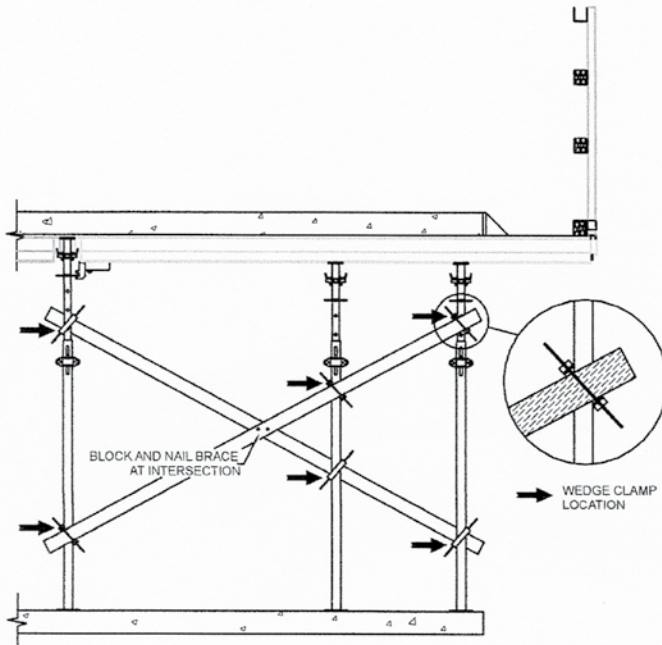
TYPICAL CANTILEVERED PERIMETER W/ 11'-6" MAIN BEAM

NOTES:

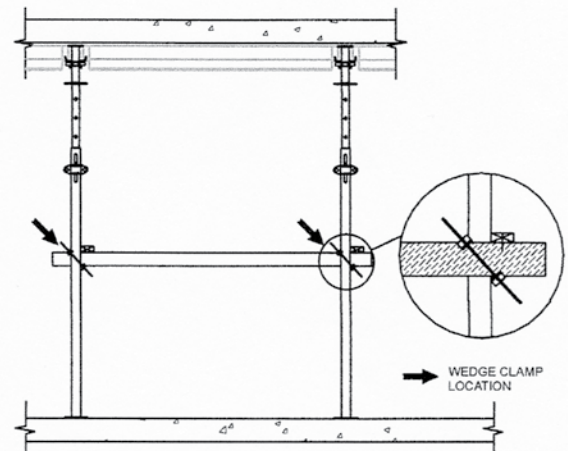
1. EXTRA CAUTION MUST BE EXERCISED AT CANTILEVERED CONDITIONS TO AVOID FALL HAZARDS. WARN ALL PERSONNEL ON JOBSITE TO STAY OFF CANTILEVERED AREAS UNTIL INSTALLATION AND FALL PROTECTION IS COMPLETE.
2. AVOID LOADING CANTILEVERED MAIN BEAM PRIOR TO INSTALLING ALL SECONDARY BEAMS, POST SHORES, POSITIONERS, SAFETY CATCHES, CROSS BRACING, LACING AND ADJACENT PLYWOOD.
3. AVOID CANTILEVERING MAIN BEAMS WHERE ADJACENT FRAMING/PLYWOOD IS NOT SUFFICIENT TO BALLAST LOADS AT CANTILEVER.
4. AVOID POST SHORES UNDER MAIN BEAMS WITHOUT POSITIONERS.
5. AVOID LOADING CANTILEVER BEYOND ITS DESIGN CAPACITY.



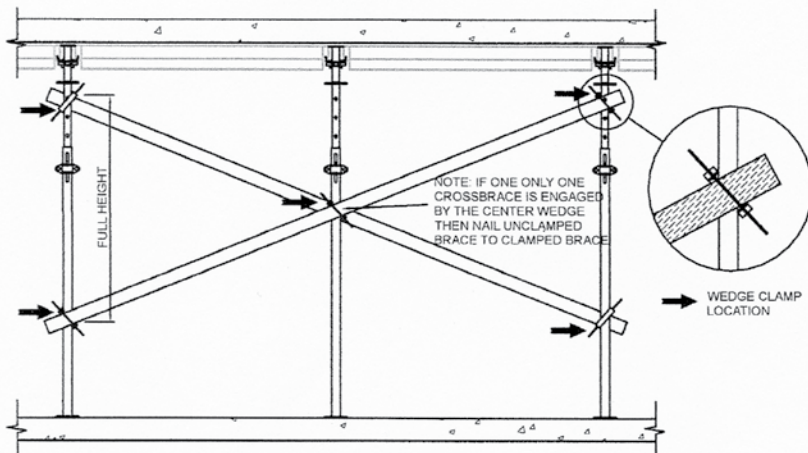
TYPICAL CANTILEVERED PERIMETER W/ 5'-7" MAIN BEAM



TYPICAL PERIMETER BRACING



TYPICAL LACING DETAIL



TYPICAL INTERIOR BRACING

NOTES:

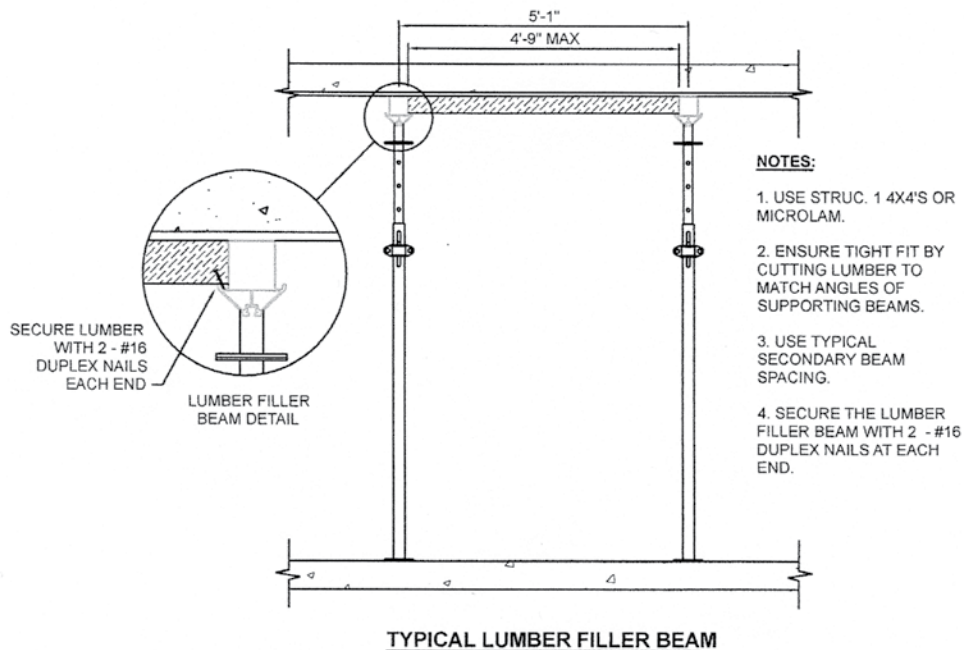
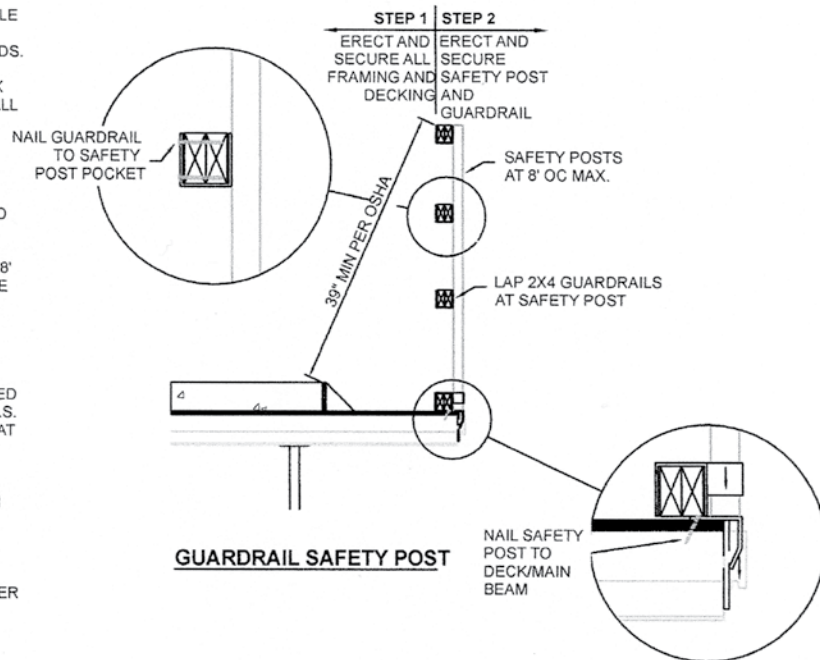
1. USE 2X4 LUMBER FOR BRACING.
2. CROSS BRACES MUST SPAN AT LEAST 3 POST SHORES.
3. CROSS BRACES MUST BE INSTALLED FULL HEIGHT - TOP OF ONE SHORE TO BOTTOM OF OTHER.
4. CROSS BRACES MUST BE SECURED WITH WEDGE CLAMPS AT ALL INDICATED LOCATIONS.
5. SEE LACING DETAIL FOR POST SHORE LACING.

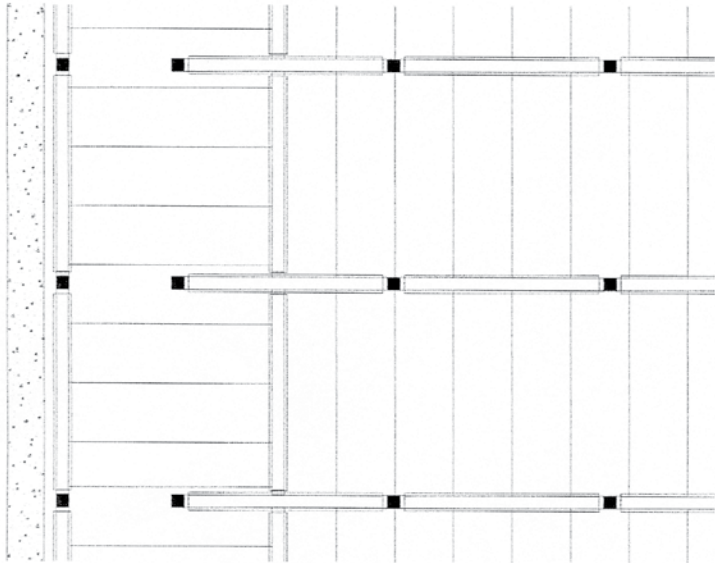
CROSS BRACE GUIDELINES:

1. SET CROSSBRACING AT ALL EXTERIOR AND INTERIOR POUR BOUNDARIES, THE PERIMETER OF LOADING AREAS, AND ALL BEAM LOCATIONS.
2. CROSSBRACING MUST BE SET EVERY OTHER ROW OF SHORES IN BOTH DIRECTIONS AT A MINIMUM.
3. CROSSBRACING ALONG WALL IS NOT A REQUIREMENT.
4. ADDITIONAL CROSSBRACING IS REQUIRED ON SLOPES AND RAMPS.

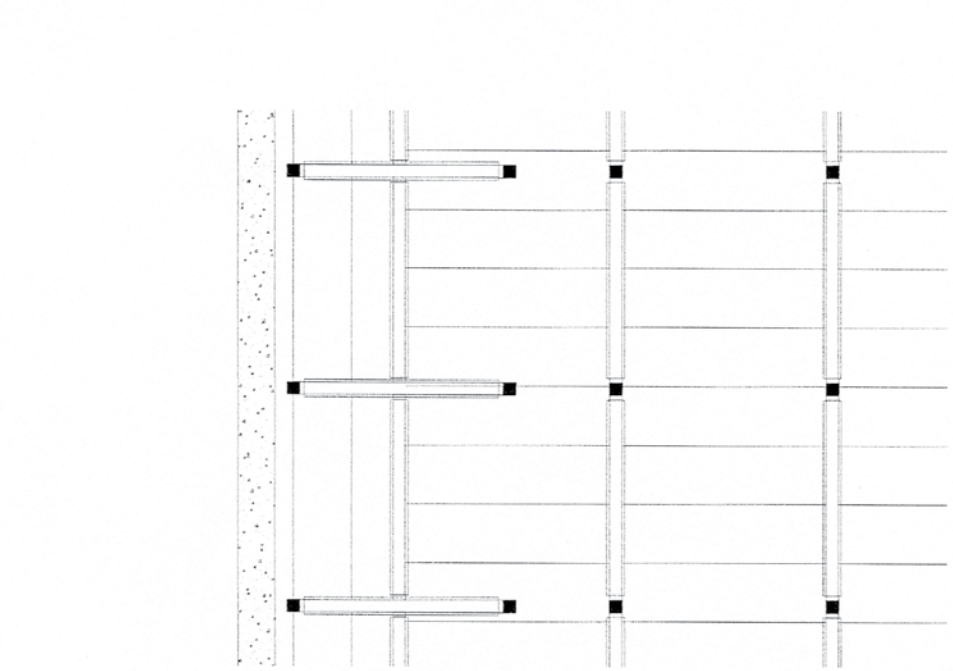
NOTES:

1. PRECAUTIONS MUST BE TAKEN WHILE INSTALLING SAFETY POST AND GUARDRAIL TO PREVENT FALL HAZARDS.
2. NO PERSONNEL ALLOWED ON DECK UNTIL SHORING INSTALLATION AND FALL PROTECTION IS COMPLETE AND INSPECTED BY A SAFETY MANAGER. COMPLETE SHORING INSTALLATION INCLUDES ALL NECESSARY CROSS BRACING/LACING, SAFETY CATCHES, POST SHORES AND POSITIONERS, AND DECKING.
3. SAFETY POSTS MUST NOT EXCEED 8' OC SPACING. SAFETY POSTS MUST BE FULLY SEATED INTO MAIN BEAM END CAP AND NAILED TO DECKING / MAIN BEAM TO PREVENT UPLIFT.
4. GUARDRAILS MUST BE MADE FROM 2X4'S. GUARDRAILS MUST BE SECURED TO SAFETY POST POCKETS WITH NAILS. LAPPING OF 2X4'S MUST TAKE PLACE AT THE SAFETY POST.
5. ALL WALKWAY AREAS MUST BE DECKED AND HAVE FALL PROTECTION INSTALLED.
6. IN THE EVENT THAT DROPSTORE SAFETY POSTS CANNOT BE USED BECAUSE OF JOB CONDITIONS, PROPER OSHA APPROVED FALL PROTECTION MUST BE INSTALLED AND USED BY CONTRACTOR.

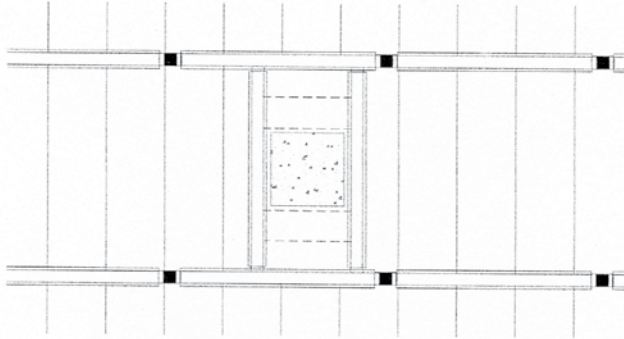




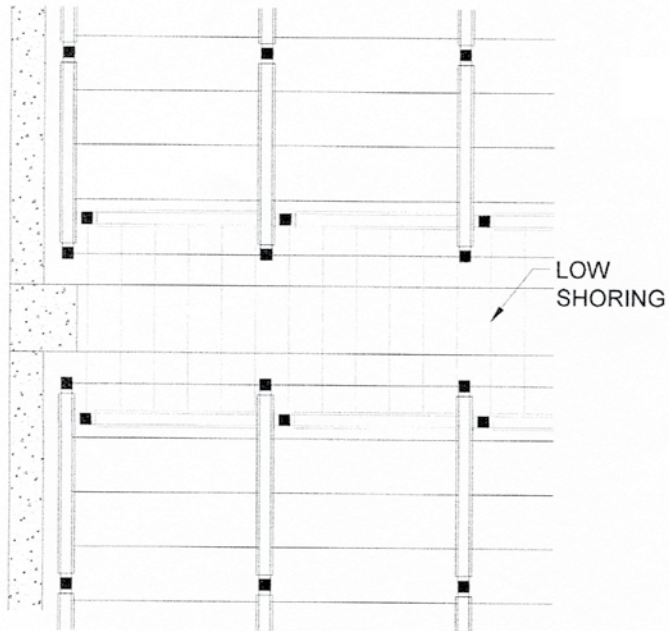
Typical Turn and Slide Detail



Typical Finger-In Detail

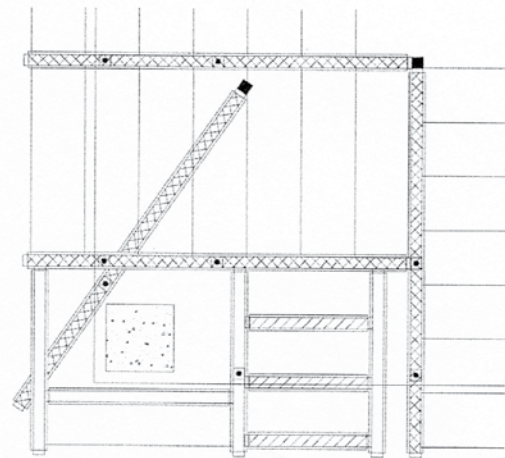


Typical Shoring Around Column



Typical Shoring Under Beam

Typical Outside Corner Detail





6. Checklist prior to concreting

Make sure that...:

☐

the system has been set up according to the formwork layout drawing.

☐

the props (post shores) have all been set up correctly and are secure.

☐

the props have been set to the correct height.

☐

the release rings on the drop-heads are all securely in position.

☐

timber sections provided on site are positioned at the correct spacing and cannot work loose.

☐

the permissible spans of the formwork panels have not been exceeded.

☐

damaged parts have been removed and replaced.

☐

the entire formwork setup is secured against overturning (e.g. due to wind or horizontal loads during operations).

☐

the relevant safety rules currently valid in the respective country of use have been complied with.

☐

a suitable release agent has been applied to the formwork panels (prior to placing the reinforcement).



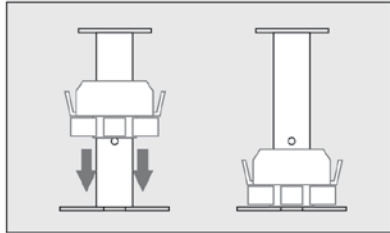
After concreting, clean off the underside of the formwork panels with a water hose!

7. Dismantling

You can start striking the formwork at any position!

7.1 Main and secondary beams

Use a hammer to undo the release ring. Turn it through approx. 45° so that it falls down together with the loadbearing plate.



Once the loadbearing plate has been lowered, the beams attached to it also drop.

Safety Note:

Once Drop Head is lowered it is important to ensure post shore is snug to concrete.

After all the drop-heads around one bay have been lowered, it is possible to remove the beams. To do this, lift one end and then lower the other end.

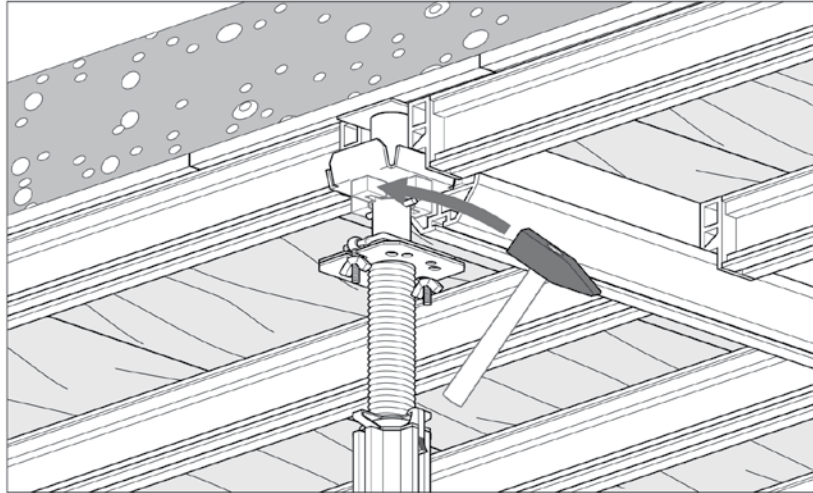


Fig. 34

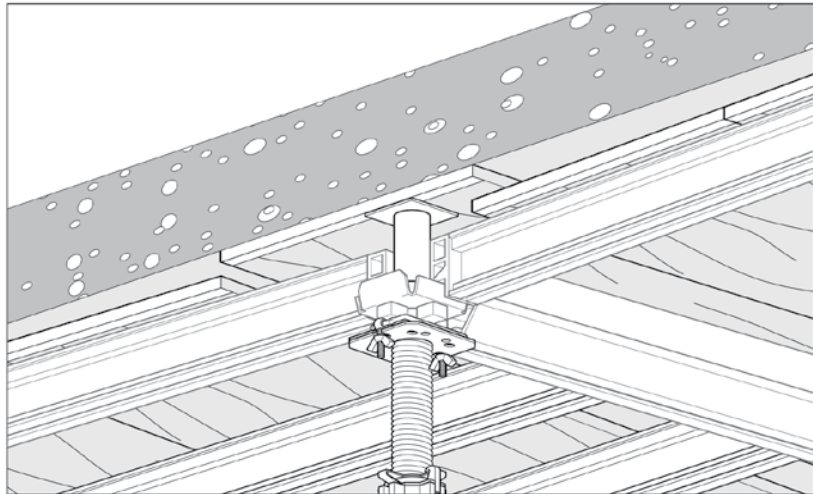


Fig. 35

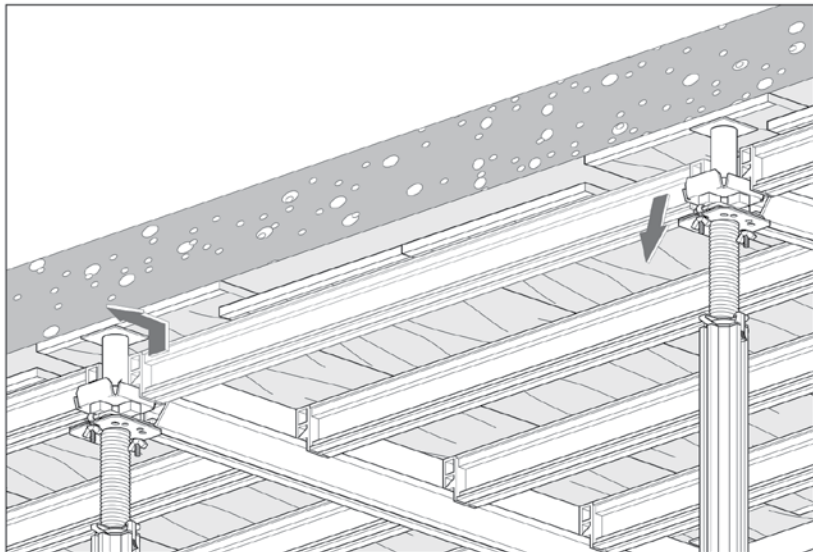


Fig. 36

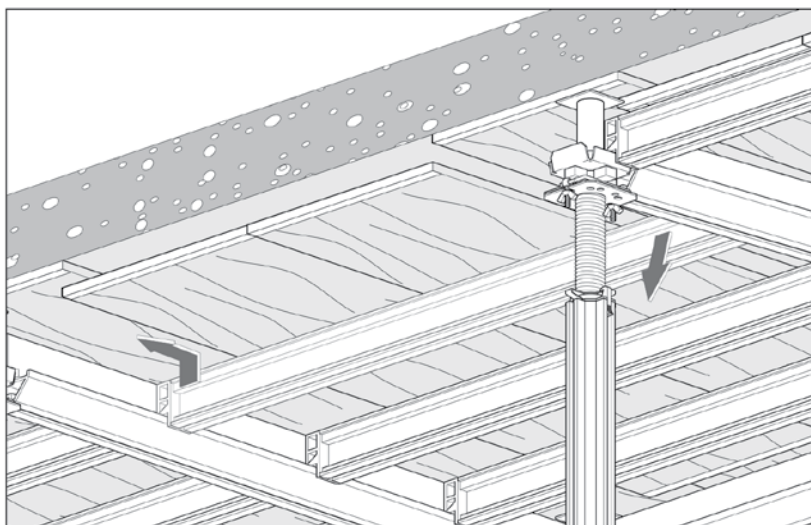


Fig. 37

All other beams can then be removed.

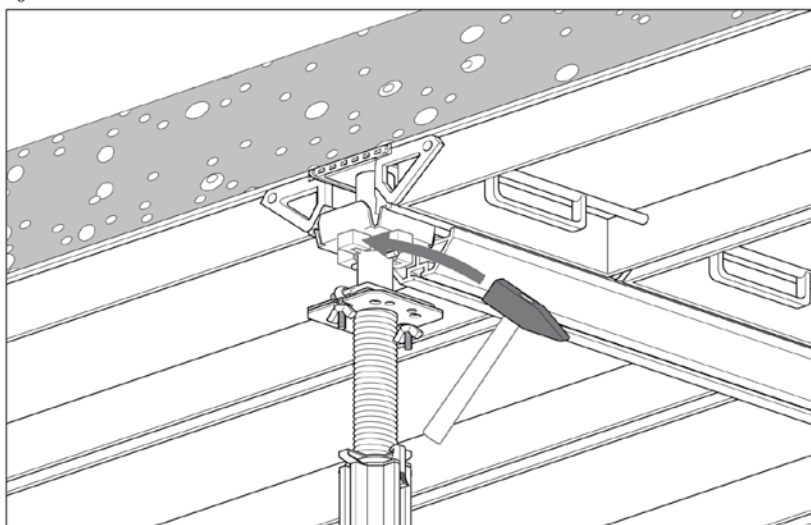


Fig. 38

7.2 HV panel and main beam

Use a hammer to undo the release ring.
Turn it through approx. 45° so that it falls
down together with the loadbearing plate.

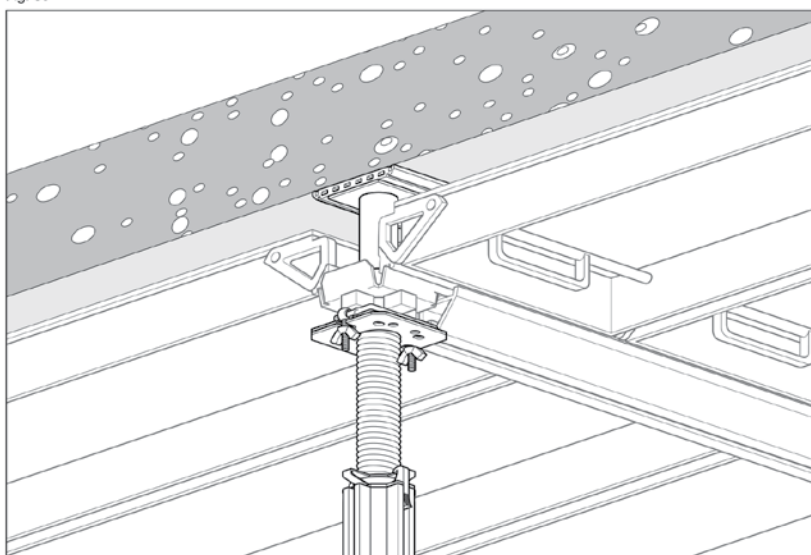


Fig. 39

Once the loadbearing plate has been
lowered, the main beams and HV panels
attached to it also drop.

Stripping the System

Lift the HV panel at the end with the quick-release handle (1) and then rotate the quick-release mechanism (2). Please note that the quick-release support is at one end only. Please lift this end!

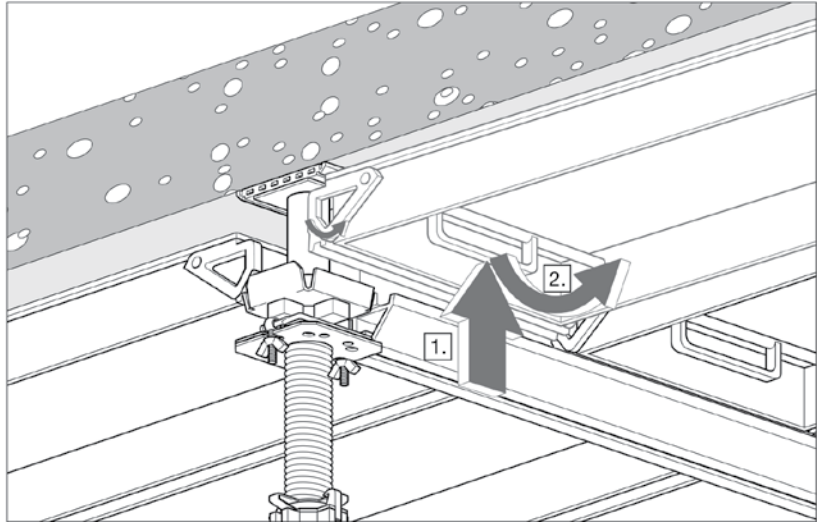


Fig. 40

Actuating the quick-release mechanism creates a space so that the HV panel can be lowered from the beam.

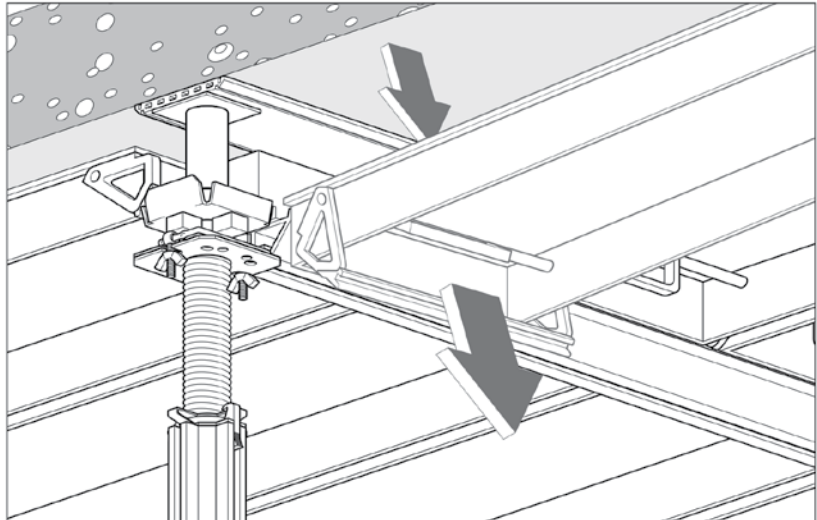


Fig. 41

Remove the HV panels one by one..

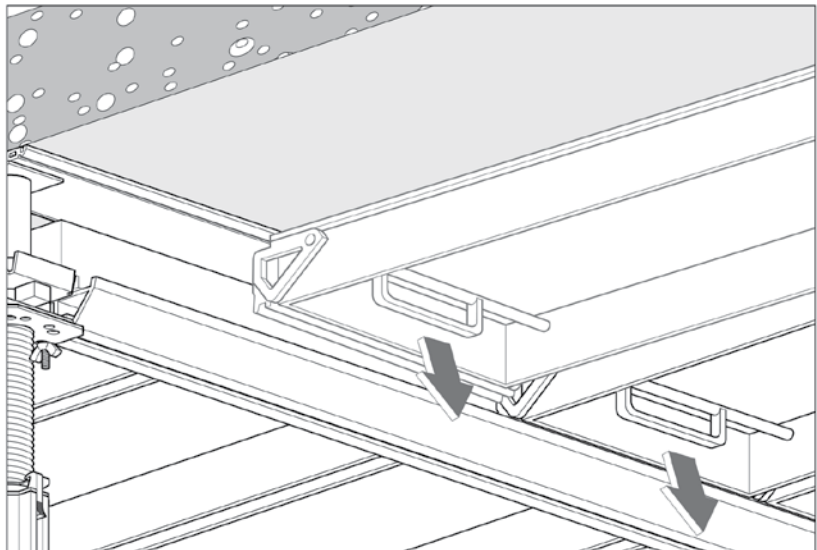


Fig. 42

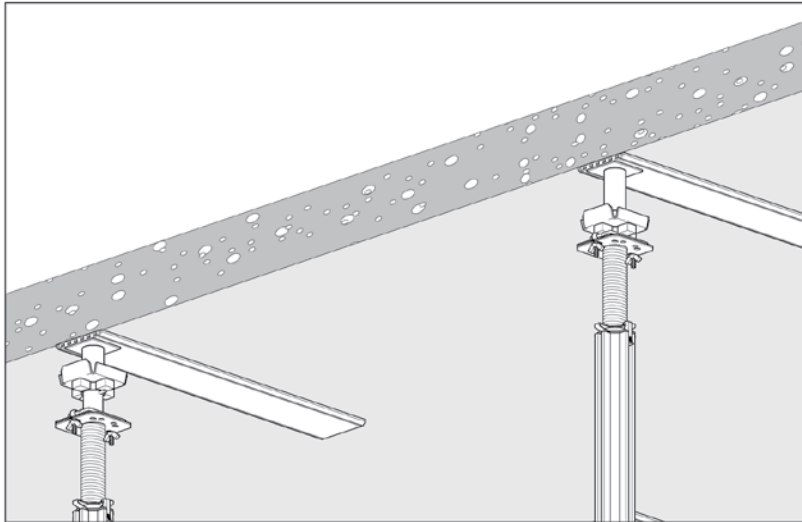


Fig. 43

Once the HV panels and/or beams have been removed, only the props (post shores) remain. Only the parts supported directly by the props, in this case HV filler strips, but sometimes formwork panels, remain in place below the newly concreted floor slab.

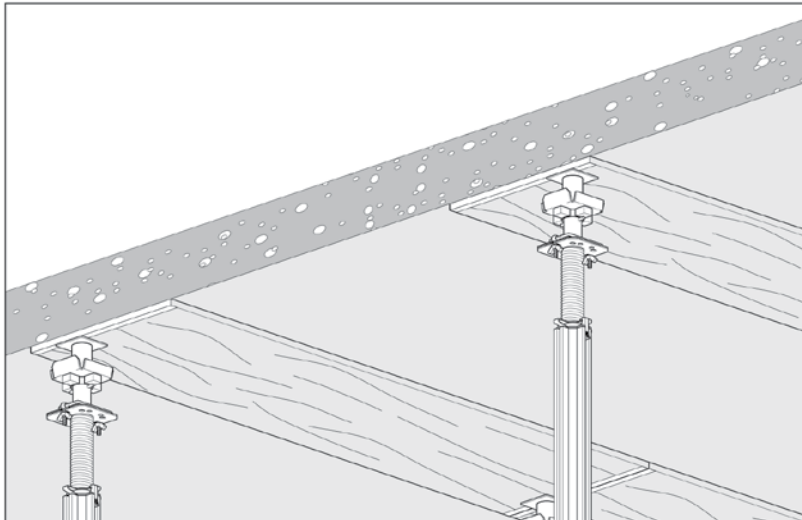


Fig. 44

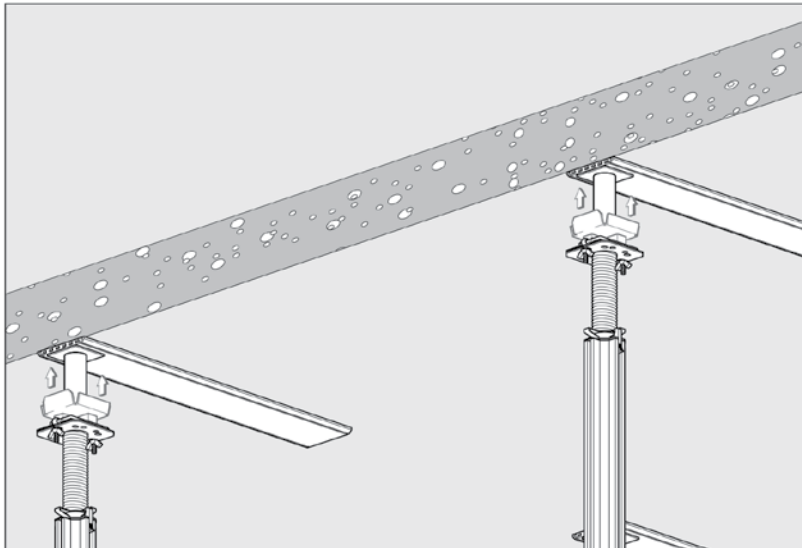


Fig. 45

Raise the release ring of the drop-head to the formwork position again and secure with a hammer-blow (see also p. 9, Fig. 12).

8. Transport and storage

8.1 Packaging units

Check the delivery of components for completeness immediately upon arrival. The packaging units should be unloaded directly where they are to be used later. It can be assumed that a complete packaging unit contains the following components upon delivery:

Drop-head:

210 pcs. in mesh box

Main beam:

1.15 m 24 pcs. stacked

1.70 m 24 pcs. stacked

3.50 m 24 pcs. stacked

Secondary beam:

1.15 m 64 pcs. in bundle

1.70 m 64 pcs. in bundle

HV panel:

30 pcs. in storage rack 30

14 pcs. in storage rack 14

HV filler strip:

160 pcs. in mesh box

Accessories:

Supplied in sack or mesh box

Wheeled storage rack ("Barelle®") filled with secondary beams. The use of such a rack enables components to be easily transported across the building site.



Fig. 46

Wheeled storage rack ("Barelle®") filled with main beams. The use of such a rack enables components to be easily transported across the building site

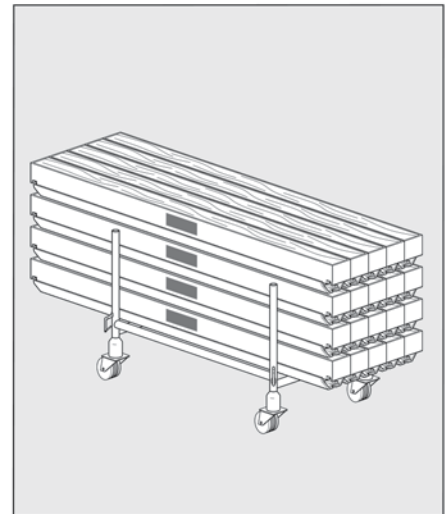


Fig. 47

A storage rack 14 holds up to 14 HV panels. A storage rack 30 holds up to 30 HV panels. Castors can be fitted to these storage racks for easy transport. Like the "Barelle®", these racks can also be lifted by a crane or transported with a fork-lift truck.

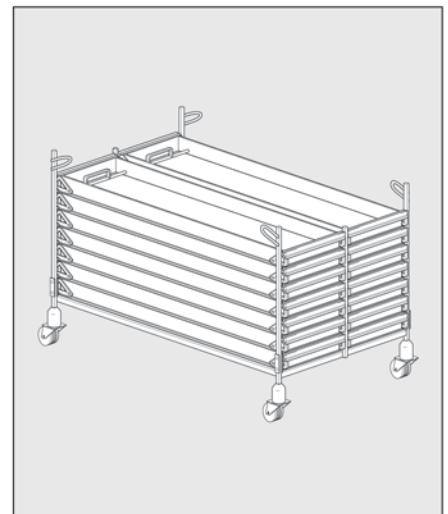


Fig. 48

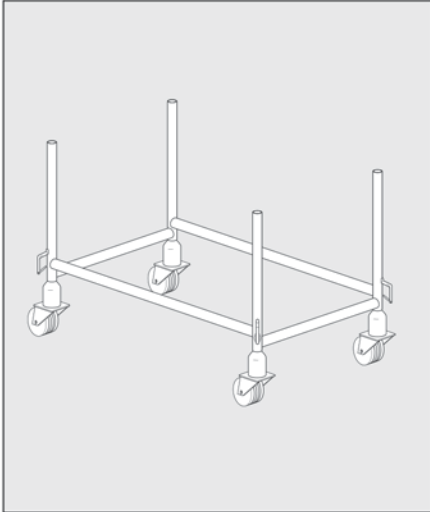


Fig. 49

“Barelles” can be used for transport on a building site. Castors can be fitted to these so that they can also be moved around manually on the building site.

8.2 Transport and storage on the building site

Every building site should include a yard for setting up, adjusting and dismantling the TITAN HV slab forming system (e.g. fixing drop-heads, setting prop heights, etc.).

Store all components neatly arranged in “Barelles” or mesh boxes, sorted according to type of product

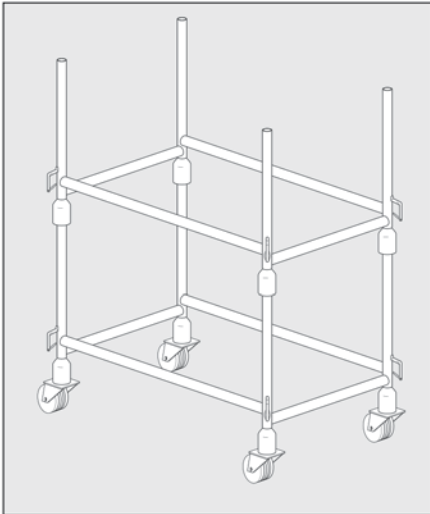


Fig. 50

“Barelles” can themselves be stacked to save space: max. 5 pcs., one above the other.

For easy transport on the building site, full “Barelles” on castors should not be stacked more than 2 high.

The permissible load on the castors may not exceed 4 x 4 kN.

Further information and details can be found in the TITAN “Barelle®” brochure.

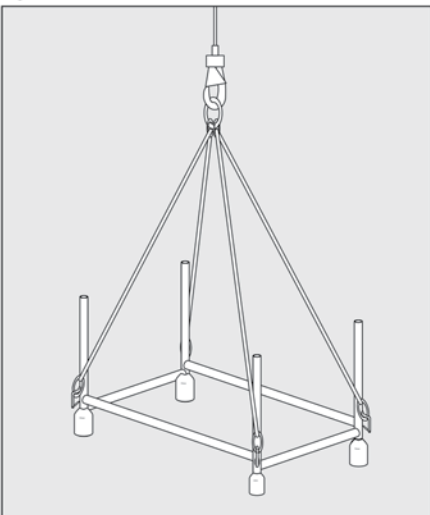


Fig. 51

A “Barelle®” can be unloaded from an HGV and transported around the building site with the help of a sling (crane) or a fork-lift truck.

Attach the hooks of the sling to the lifting eyes at the corners at the base of the “Barelle®”.

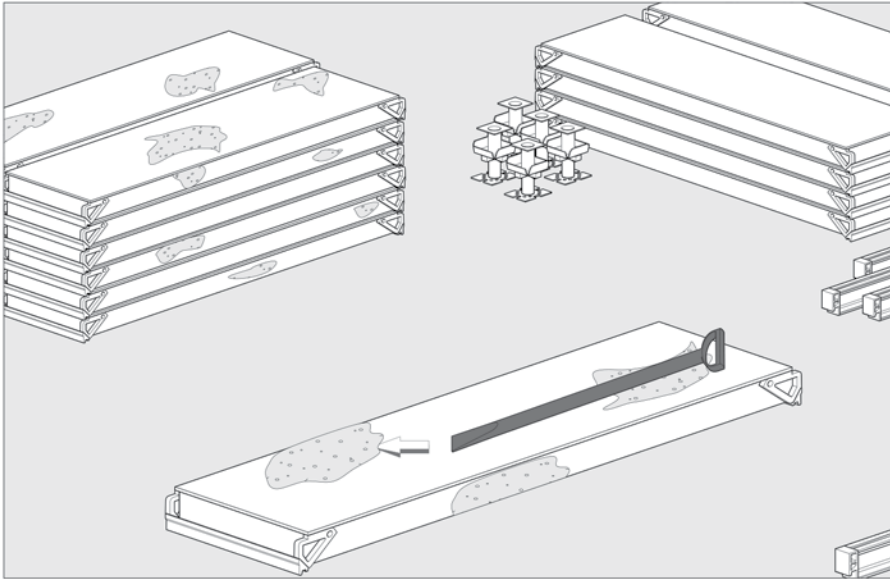


Fig. 52

9. Care, cleaning, repairs

Check and maintain all components on an ongoing basis. Store them in a clear arrangement.

Clean off any concrete residue as soon as possible with water. Clean HV panels and filler strips with a hot-water high-pressure cleaner (water pressure < 150 bar, rotating nozzle, clearance to component > 150 mm)

Clean off dried-on concrete residue carefully with a suitable scraper.

Spray HV panels with release agent prior to use.

Only use components that are in a proper functioning condition.

Reject damaged components and replace them with flawless ones.

Use only ISCHEBECK original parts for any repairs. Repairs may only be carried out by the manufacturer owing to the necessary knowledge and skills required.

10. Returning hired components

10.1 Cleaning

Clean all components as described in section 9. "Care, cleaning, repairs" before you group them into packaging units and load them onto an HGV.

Do not coat HV panels with release agent prior to returning them.

10.2 Packaging units

Group the components together as described in section 8.1 "Packaging units".

In addition, sort the components according to the following criteria:

- undamaged
- damaged
- scrap

10.3 Loading an HGV

Load the HGV in such a way that it can be unloaded with a fork lift truck.

- Stack no more than 3 "Bareilles" on top of each other and place no more than 2 next to each other on the HGV.
- Stack no more than 2 mesh boxes on top of each other and place no more than 2 next to each other on the HGV.
- Stack no more than 3 stacks of beams on top of each other (depending on height of HGV) and place no more than 2 next to each other on the HGV.
- Place no more than 2 racks of 30 panels next to each other on the HGV (do not stack on top of each other).
- Stack no more than 2 racks of 14 panels on top of each other and place no more than 2 next to each other on the HGV.



SHIPPING & RECEIVING

The purpose of this document is to provide, you the customer, a set of shipping and receiving guidelines so that all parties can effectively inspect and verify all equipment. We realize that safety and productivity are key components in the success of your business. It is imperative that any equipment shipped to or from Form Services Inc is loaded properly in an effort to reduce accidents and ensure an accurate account.

Shipping From FSI Yard:

The FSI office prepares an equipment order from the quantity survey posted on the approved shop drawing(s). The order shall include the following:

- Project Name & Description
 - Customer name, address, jobsite phone & contact name
 - Delivery dates(s)
 - Equipment quantities (including summary quantities for consecutive orders and backorders)
- The truck shall be loaded as ordered, ensuring that:
 - All equipment is bundled properly
 - All equipment is in good working order
 - All equipment is counted and recorded accurately
- The FSI yard shall prepare an accurate Shipping Report(s) and advise the FSI office of any equipment discrepancies from original order(s)
- Prior to shipment, the Logistics Manager must review all loads as follows:
 - Verify that all Barellas are bundled properly
 - Verify that all Barella counts for Beams and Post Shores
 - Take pictures of loaded truck with digital camera
 - Review Shipping Report to verify accuracy and sign report acknowledging same
- Provide copies of signed Shipping Report for driver and customer
- Forward signed Shipping Reports and digital picture files to FSI office
- Ensure loads are under the height of 13' 6" and within weight limits

Receiving Loads from Customer:

Count all equipment on the truck and provide an accurate Receiving Report. Verify quantities shown on customer's Shipping Report

- Prior to unloading, the Equipment Supervisor must review all loads as follows:
 - Verify that all Barellas are bundled properly
 - Verify all Barella counts for Beams and Post Shores
 - Take digital pictures of the following:
 - The truck prior to unloading
 - Improperly or partially loaded Barellas
 - Damaged equipment (if any)
 - Review Receiving Report to verify accuracy and sign report acknowledging same
- Forward signed Receiving Report, customers Shipping Report and digital picture files to FSI office. The Equipment Manager shall perform a thorough review of returned equipment within 10-working days of receiving the return load. Equipment designated as damaged shall be identified and placed in a holding area for a period of two weeks following notification to the customer.
- Return & Damage Notification shall be forwarded to the customer in a timely fashion following completion of the review.

- You, the customer, should implement a policy which verifies quantities shipped, both in-coming and out-going. In the event a discrepancy is found in equipment shipped to your jobsite, notify immediately.
- FSI strongly recommends taking pictures of both sides of every load of equipment shipped or received (preferably before the straps are removed).
- Returned equipment should be stacked and banded per the enclosed Bundling Standards.
- When loading trucks to return equipment, the customer should adhere to the following shipment stacking standards:
 - **Aluminum:** Place no more than three (3) Barellas high
 - **Post Shores:** Place no more than two (2) high in any case.
- Do not place Barellas of secondary beams at the end of the trailer. The secondary beams may vibrate out of the Barellas in transit if the banding is not sufficiently tight.
- The customer should provide a completed packing list and bill of lading (manifest) for the shipment. The enclosed EQUIPMENT SHIPPING REPORT may be photo copied and used for this purpose.
- In an effort to maximize freight, FSI recommends using a 48' trailer with split axle. This configuration can typically accommodate a balanced load (shores & aluminum) of 46,000 lbs. subject to the truck driver's approval.
- The height of load should be no taller than 13' 6"
- FSI equipment will not be transferred between projects without FSI's prior approval. discourages transferring equipment from job to job due to the possibility of accounting and quality control issues.

Bundling Standards: Secondary Joists 1.15m

Product Code	Beam	Qty/ Barella	Shore Weight (lbs)	Total Weight w/ Barella
1204915	Secondary 1.15m	109	8.1	966.9
1206001	2' 8" Barella	1		



**4 Rows of 22 Beams
& 1 Top Row of 21**



Band Beams & Barella at each end

Band Beams & Barella at each end

**IMPORTANT: Band Beams ONLY at center
to avoid Barella damage**

Bundling Standards: Secondary Joists 1.70m

Product Code	Beam	Qty/ Barella	Shore Weight (lbs)	Total Weight w/ Barella
1204921	Secondary 1.7m	64	12.0	852
1206001	2' 8" Barella	1		



4 Rows of 13 Beams
& 1 Top Row of 12



Band Beams & Barella at each end

Band Beams & Barella at each end

**IMPORTANT: Band Beams ONLY at center
to avoid Barella damage**

Bundling Standards: Main Beams 1.15m

Product Code	Beam	Qty/ Barella	Weight (lbs)	Total Weight w/Barella
1204904	Main 1.15m	39	18.7	814.86
1206001	Barella 2' 8"	1		



Bundling Standards: Main Beams 1.70m

Product Code	Beam	Qty/ Barella	Weight (lbs)	Total Barella Weight
1204908	Main 1.70m	24	28.0	756
1206001	Barella 2' 8"	1		



Main Beams must be nested. This is done by alternating the beams "right-side up" and then "up-side down"

Bundling Standards: Main Beams 3.5m

Product Code	Beam	Qty/ Barella	Weight (lbs)	Total Weight w/Barella
1204909	Main 3.5m	24	58.6	1490.4
1206001	Barella 2' 8"	1		



3 Rows of 8



Main Beams must be nested. This is done by alternating the beams "right-side up" and then "up-side down"

Product Code	Beam	Qty/Pallet	Weight (lbs)	Total Weight
1204912	Main 5.3m	45	88.81	3996.45



Main Beams must be nested. This is done by alternating the beams "right-side up" and then "up-side down"

Bundling Standards: Post Shores

Product Code	Post Shore	Barella Height	Qty/ Barella	Weight (lbs)	Total Weight w/Barella
41201205	DB300	3'5"	70	42.0	2940
41201206	DB350	3'5"	70	50.0	2433.8
41201207	DB550	2'8"	50	74.2	3793.8



**5 Rows of 9 Shores &
1 Top Row of 5**



**7 Rows of 9 Shores &
1 Top Row of 7**

Always follow bundling and banding standards to prevent equipment damage and ensure optimal handling



Band Shores & Barella at each end

Band Shores & Barella at each end

IMPORTANT: Band Shores ONLY at center to avoid Barella damage



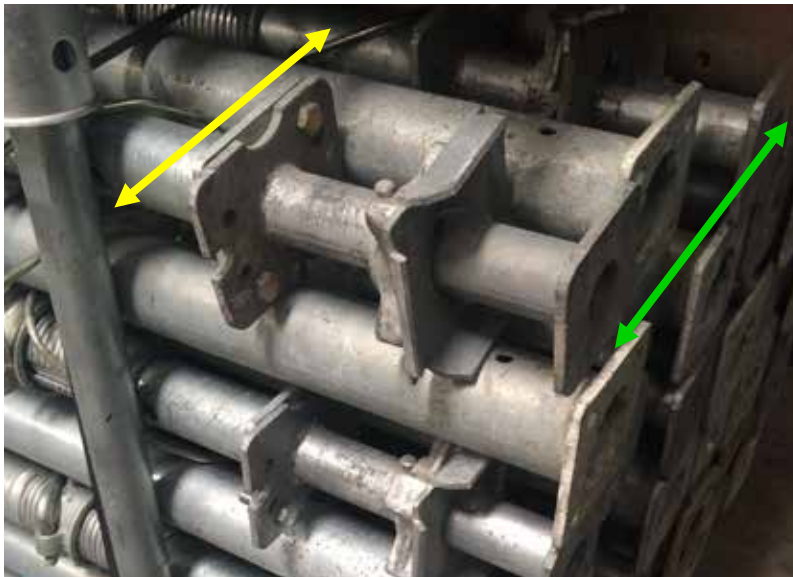
Please make sure to stack Shores lacking Dropheads, alternating so that the **Jack** is positioned behind the *neighboring Outer-Shell* of the Shore.

This is done to prevent the Jack from escaping whilst in transit!

Product Code	Post Shore w/ <i>Drophead</i>	Barella Height	Qty/ Barella	Weight w/ Drophead	Total Weight w/Barella
41201205	DB300	3'5"	56	51.9	2906.4
41201206	DB350	3'5"	56	59.9	3354.4
41201207	DB550	2'8"	40	84.1	3364



7 Rows of 8
Shores



Dropheads atop lower-base row should be turned **sideways** to allow for Bell Clearance

Post Shore/Drophead combination should be **staggered** to align with the base-end of Shores.

Bundling Standards: 2' Extensions

Product Code	Extension	Qty	Weight (lbs)	Total Weight w/ Barella
41201211	2'	140	8.5	1274
1206004	Extension Rack	1		



**8 Rows of 8 &
1 Top Row of 6**



**Use ONLY Boarded
Barellas for extensions**



Band each bundle twice; one center band excluding the Barella

Product Code	Prop	Qty/ Barella	Weight (lbs)	Total Weight w/Barella
2204927	HV Standard	30	46.3	1473.1
1204948	HV Maxi	30	34.0	1102.6

**4 Rows of 7 &
1 Top Row of 2**



DO NOT leave Dropheads installed onto any HV Props or you will be subject to incur additional labor fees.



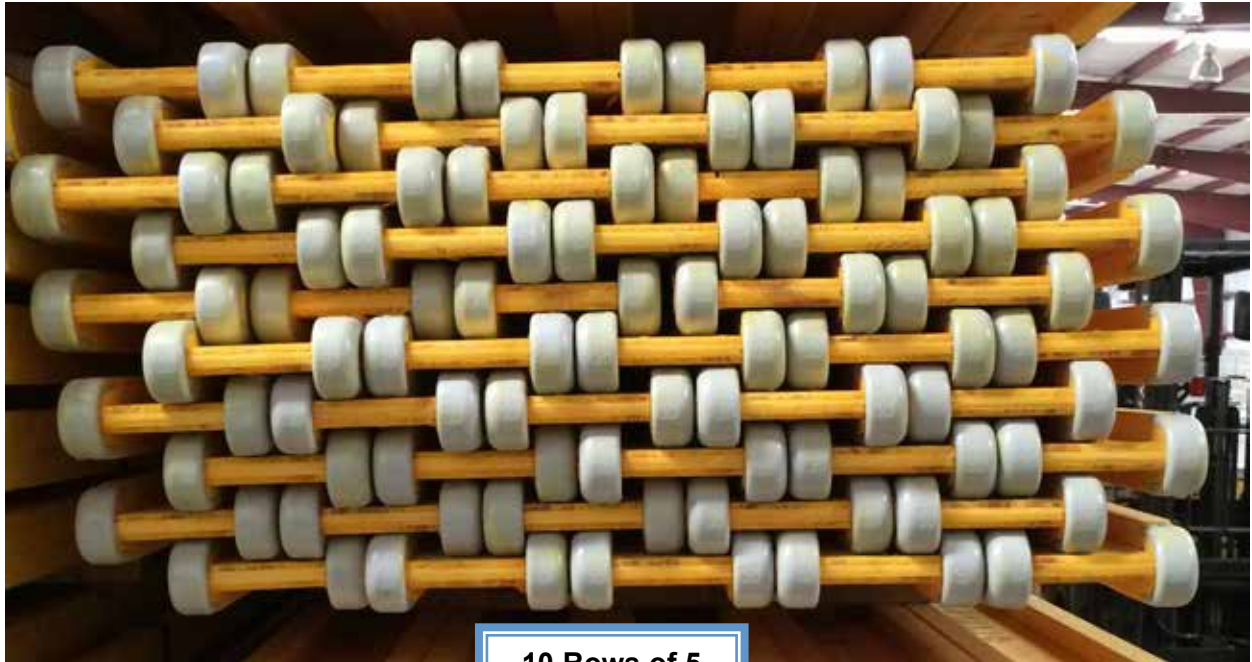
Band Props to Barella on ends

Band Props to Barella on ends

Band Props **ONLY** in the center to avoid Barella damage

Bundling Standards: H2O Girders

Product Code	Girder	Qty	Weight (lbs)	Total Weight
201.200.0390	3.90m	50	39.7	1984.5
201.200.0490	4.90m	50	49.6	2480.5
201.200.0590	5.90m	50	59.7	2985



10 Rows of 5



Band Dunnage with Girder on ends

Band Dunnage with Girder on ends

Band Girders in the Center

Bundling Standards: Ledger Frames

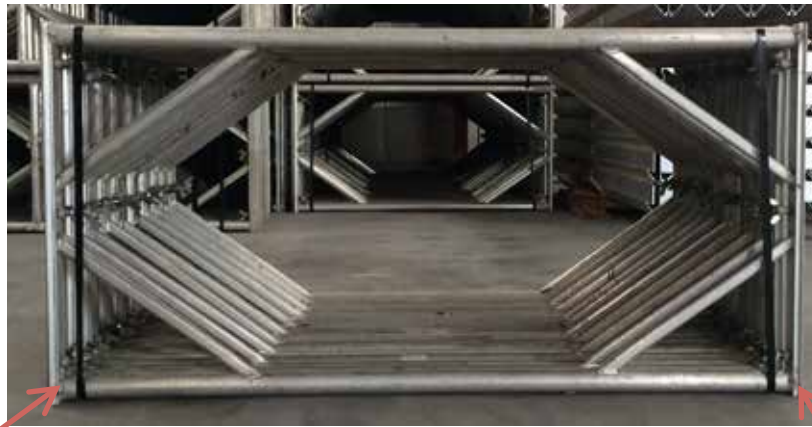
Product Code	Frame	Qty/ Bundle	Weight (lbs)	Total Bundle Weight
2201567	60m	20	12.35	247
2201568	90m	20	16.54	330.8
1201569	120m	20	17.2	344
1201572	180m	20	21.39	427.8
1201573	240m	20	29.77	595.4
1201574	300m	20	33.96	679.2



20 Frames per Bundle



Nest Frames within bundle

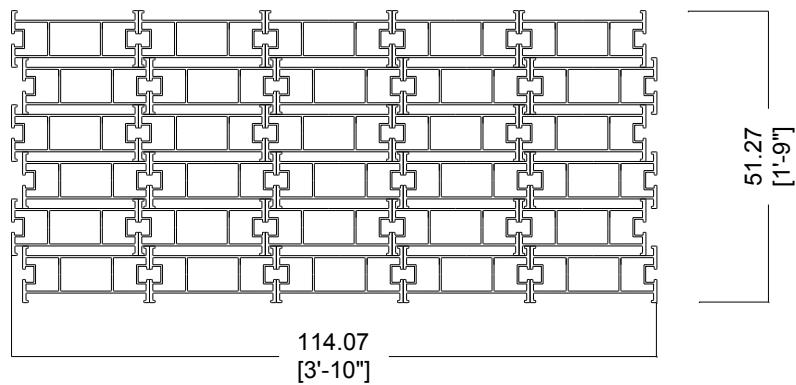


Band Frames on ends

Band Frames on ends

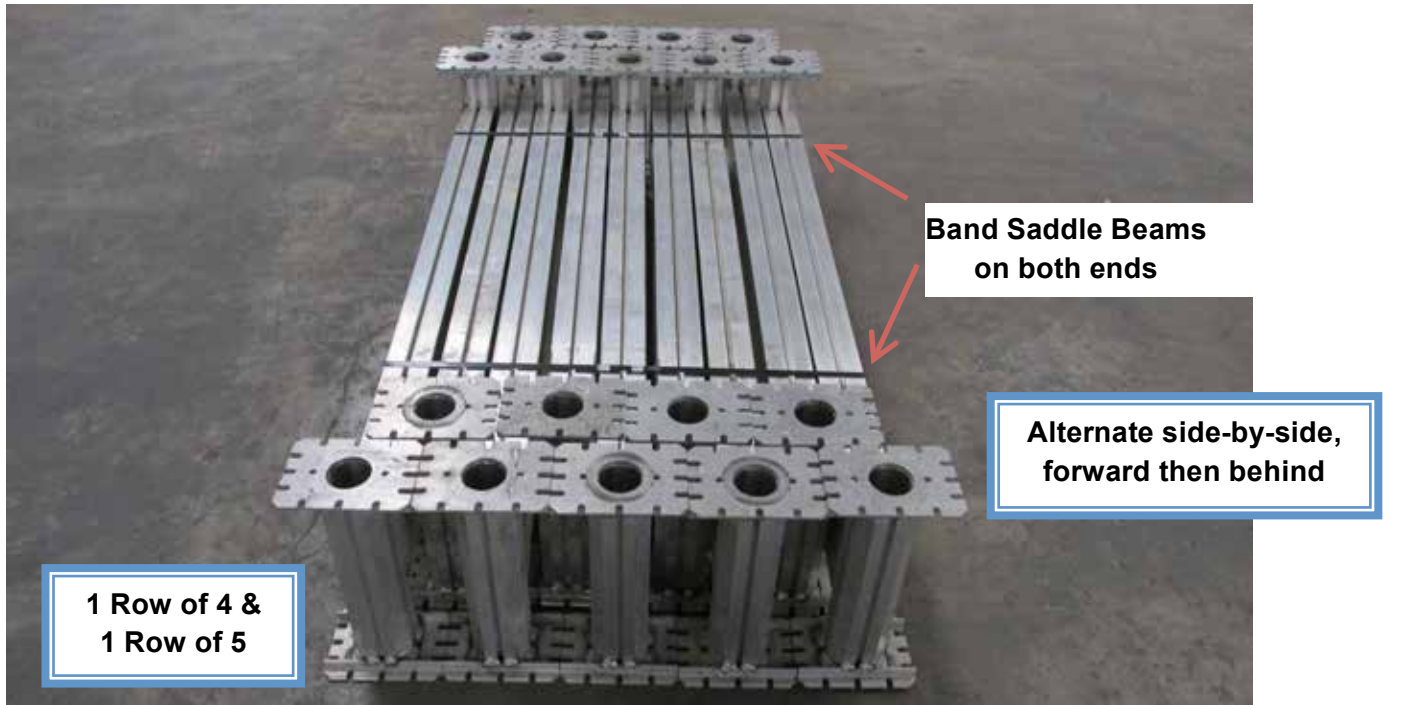
03204214	Alu Beam TITAN 225 x 1.80m 5'-11"	180
03204213	Alu Beam TITAN 225 x 2.40m 7'-11"	240
03204206	Alu Beam TITAN 225 x 3.00m 9'-10"	300
0225B390	Alu Beam TITAN 225 x 3.90m 12'-10"	390
03204218	Alu Beam TITAN 225 x 4.80m 15'-9"	480
03204209	Alu Beam TITAN 225 x 6.00m 19'-8"	600
03204227	Alu Beam TITAN 225 x 7.90m 25'-11"	790

Packaged 30 Pieces per Bundle
Package horizontal 5 x 6



Bundling Standards: Saddle Beams

Product Code	Saddle Beam	Qty/ Bundle	Weight (lbs)	Total Weight (lbs)
2042.90018	1.80m	9	53.0	477
940.033.6180	1.80m	9	53.0	477



	Name	Product Code	Weight (lbs)		Name	Product Code	Weight (lbs)
	Drophead	1204930	9.90		R12x100	6204516	0.79
	Prop Positioner 38	6204958	0.22		Safety Catch	1204955	3.53
	H20 Multi Clamp	6204539	0.77		Guardrail Post Adaptor	890.000016	3.25
	Connecting Bracket HV	1204933	3.08		Coupling Set 225 (includes 2 Plates & 6 bolts & nuts)	1204521	35.20
	R12x50	6204512	0.44		Lumber Bracing Clamp	14201420	2.42
	Guardrail Post HV	1204960	18.30		Spanner for HV Prop	2204929	6.62

Customer Return Checklist

Customer Return Checklist

Printed:
Customer: Bond Concrete

Page # 1
Job # BBOND-SO1
RESIDENTIAL SHORING
1234 SATSUMA DR
HOUSTON, TX 77072

P/C	Description	Unit	Weight Each	Returned
C3204218	AluBeam 225 L = 4.80m	EA	89.96	
I3204218	AluBeam 225 L = 4.80m	EA	89.96	
C201.200.0390	Girder H20 3.9m 12' 9"	EA	36.69	
C201.200.0590	Girder H20 5.9m 19' 4"	EA	60.04	
I201.200.0590	Girder H20 5.9m 19' 4"	EA	60.04	
I2204927	HV Prop 1.75 - 3.05m	EA	33.96	
C1204908	Main Beam HV L = 1.70m	EA	28	
C1204909	Main Beam HV L = 3.50m	EA	62.48	
C1204912	Main Beam HV L = 5.30m	EA	81	
C1204915	Sec Beam HV L = 1.15m	EA	8.14	
C1204921	Sec Beam HV L = 1.70m	EA	12.94	
I1204904	Main Beam HV L = 1.15m	EA	18.74	
C1204930	Drop head Galvanized	EA	9.9	
C1204955	Safety Catch	EA	3.53	
C6204958	Prop Positioner 38	EA	0.22	
C90.000009	Bolt 1/2 N.W f. Drophead	EA	0.04	
I1204960	Guardrail Post HV	EA	18.3	
I14201420	Lumber Bracing Clamp	EA	2.42	
I1201569	Ledger Frame 120	EA	17.2	
I1201572	Ledger Frame 180	EA	21.39	
C1206010	Fixed Wheel	EA	12.94	
C1206011	Swivel Wheel w Brake	EA	13.12	
I6204512	Mega Clamp R12x50	EA	0.44	
I6204516	Mega Clamp R12x100	EA	0.79	
C1206001	Open Shipping Pallet - Barella	EA	83.79	
C1206003	Storage Rack Barella 3.5'	EA	84	
I1206005	Closed Ship Pallet - Barella	EA	150	
C41201205	DB 300 Prop	EA	45	
C41201206	PropDB C350 1.95-3.50m G	EA	47	
Total Sqr Ft Out 0.00		Total Weight Out 84,746.62		

For Office Use Only

Driver: _____ Arrival Time: _____ Departure Time: _____

Truck Type: _____

Comments: _____



11. Checklist for returning hired components

Make sure that...



all dirt and concrete residue has been cleaned off the components.



the components are sorted according to type.



damaged and dirty components are kept separate.



the components are grouped together or packaged as described in section 8.1.



release agent has not been sprayed on the HV panels prior to their return.



no more than 3 "Barells" have been stacked on top of each other and no more than 2 placed next to each other on the HGV.



no more than 2 mesh boxes have been stacked on top of each other and no more than 2 placed next to each other on the HGV.



no more than 3 stacks of beams have been stacked on top of each other and no more than 2 placed next to each other on the HGV.



no more than 2 racks of 30 panels have been placed next to each other on the HGV. DO NOT STACK ON TOP OF EACH OTHER!



no more than 2 racks of 14 panels have been stacked on top of each other and no more than 2 placed next to each other on the HGV

Please copy and use this form

4/1/2014

Steel Post Shore Loads for USA

3:1

Outer Leg Dia.	3 in.	3 in.	3 in.	3 in.	3 in.	3 in.	
	6'5" - 11'6"	8'5" - 13'6"	10'5" - 15'6"	10'2" - 18'	12'2" - 20'	14'2" - 22'	
Eur	DB 350	DB 350	DB 350	DB 550	DB 550	DB 550	
		2ft ext	2ft ext Top+bott		2ft ext	2ft ext. Top + Bottom	
Post Length							
5'-03"							5 1/4 ft
5'-07"							5 2/4 ft
5'-11"							6 ft
6'-03"							6 1/4 ft
6'-07"	9,000 Lbs						6 2/4 ft
6'-11"	9,000 Lbs						7 ft
7'-03"	9,000 Lbs						7 1/4 ft
7'-07"	9,000 Lbs						7 2/4 ft
7'-10"	9,000 Lbs						7 3/4 ft
8'-02"	9,000 Lbs						8 1/4 ft
8'-06"	9,000 Lbs	9,000 Lbs					8 2/4 ft
8'-10"	9,000 Lbs	9,000 Lbs					8 3/4 ft
9'-02"	9,000 Lbs	9,000 Lbs					9 1/4 ft
9'-06"	9,000 Lbs	9,000 Lbs					9 2/4 ft
9'-10"	9,000 Lbs	9,000 Lbs					9 3/4 ft
10'-02"	9,000 Lbs	9,000 Lbs		9,000 Lbs			10 1/4 ft
10'-06"	9,000 Lbs	9,000 Lbs	9,000 Lbs	9,000 Lbs			10 2/4 ft
10'-10"	9,000 Lbs	9,000 Lbs	9,000 Lbs	9,000 Lbs			10 3/4 ft
11'-02"	9,000 Lbs	9,000 Lbs	9,000 Lbs	9,000 Lbs			11 1/4 ft
11'-06"	9,000 Lbs	9,000 Lbs	9,000 Lbs	9,000 Lbs			11 2/4 ft
11'-10"		8,800 Lbs	8,800 Lbs	9,000 Lbs			11 3/4 ft
12'-02"		8,600 Lbs	8,600 Lbs	8,700 Lbs	8,700 Lbs		12 1/4 ft
12'-06"		8,400 Lbs	8,400 Lbs	8,700 Lbs	8,700 Lbs		12 2/4 ft
12'-10"		8,200 Lbs	8,200 Lbs	8,700 Lbs	8,700 Lbs		12 3/4 ft
13'-01"		8,000 Lbs	8,000 Lbs	8,700 Lbs	8,700 Lbs		13 ft
13'-05"		7,800 Lbs	7,800 Lbs	8,700 Lbs	8,700 Lbs		13 2/4 ft
13'-09"			7,600 Lbs	8,700 Lbs	8,700 Lbs		13 3/4 ft
14'-01"			7,400 Lbs	8,700 Lbs	8,700 Lbs		14 ft
14'-05"			7,200 Lbs	8,200 Lbs	8,490 Lbs	8,700 Lbs	14 2/4 ft
14'-09"			7,000 Lbs	7,700 Lbs	8,280 Lbs	8,700 Lbs	14 3/4 ft
15'-01"			6,800 Lbs	7,200 Lbs	8,070 Lbs	8,450 Lbs	15 ft
15'-05"			6,600 Lbs	6,700 Lbs	7,860 Lbs	8,200 Lbs	15 2/4 ft
15'-09"				6,200 Lbs	7,650 Lbs	7,950 Lbs	15 3/4 ft
16'-01"				6,000 Lbs	7,440 Lbs	7,700 Lbs	16 ft
16'-05"				5,900 Lbs	7,120 Lbs	7,450 Lbs	16 2/4 ft
16'-09"				5,700 Lbs	6,800 Lbs	7,200 Lbs	16 3/4 ft
17'-01"				5,500 Lbs	6,480 Lbs	6,950 Lbs	17 ft
17'-05"				5,300 Lbs	6,160 Lbs	6,700 Lbs	17 2/4 ft
17'-09"				5,100 Lbs	5,840 Lbs	6,450 Lbs	17 3/4 ft
18'-01"				4,900 Lbs	5,520 Lbs	6,200 Lbs	18 ft
18'-04"					5,240 Lbs	5,950 Lbs	18 1/4 ft
18'-08"					4,960 Lbs	5,700 Lbs	18 3/4 ft
19'-00"					4,680 Lbs	5,450 Lbs	19 ft
19'-04"					4,400 Lbs	5,200 Lbs	19 1/4 ft
19'-08"					4,120 Lbs	5,000 Lbs	19 3/4 ft
20'-00"					3,840 Lbs	4,800 Lbs	20 ft
20'-04"						4,600 Lbs	20 1/4 ft
20'-08"						4,400 Lbs	20 3/4 ft
21'-00"						4,200 Lbs	21 ft
21'-04"						4,000 Lbs	21 1/4 ft
21'-08"						3,800 Lbs	21 3/4 ft
22'-00"						3,600 Lbs	22 ft

Properties (X-axis)	Main Beams		Secondary Beams	
	IMP	SI	IMP	SI
I	13.4 in ⁴	559.3 cm ⁴	4.2 in ⁴	175.0 cm ⁴
S	3.7 in ³	60.8 cm ³	1.77 in ³	29.0 cm ³
E	10.1E6lb/in ²	7.02E6 N/cm ²	10.1E6lb/in ²	7.02E6 N/cm ²
Mmax	71,472 in-lb	813,700 N-cm	28,800 in-lb	327,900 N-cm
Vmax	6,000 lb	26,900 N	3,700 lb	16,600 N

PLYWOOD SUPPORT SPACING (¾" STRUC-1 PLYWOOD)		
Secondary Beam Spacing	Max. Slab Thickness	
	Face Grain Parallel to Supports	Face Grain Across Supports
12" o.c.	> 19 to 30" ^b	> 22" to 30" ^b
16" o.c.	> 13" to 19" ^a	> 16" to 22" ^b
19.2" o.c.	> 8" to 13" ^a	> 8" to 16" ^a
24" o.c.	> 0" to 8" ^a	> 0" to 8" ^a

(a.) Secondary beam spacing limited by plywood strength.
(b.) Secondary beam spacing limited by beam strength.

LUMBER BEAM SPAN CHART (USING SPF 4x4)						
Lumber Beam Spacing (in.)	Slab Thickness					
	6"	8"	10"	12"	14"	16"
12	75"	72"	69"	67"	64"	62"
16	70"	67"	63"	61"	59"	57"
19.2	67"	62"	60"	57"	55"	53"
24	62"	59"	56"	x	x	x

Source: National Forest Products Association

5'-7" Secondary Beam Spacing Chart
Lower of Plywood or Bending governing
(ply I/360 max)(sec bm I/288 max)

Secondary Beam Loaded entire length (67")

Slab Thk	Sec 3/4" Strong	Sec 3/4" Weak	Sec 5/8" Strong	Sec 5/8" Weak
6	24	17	19.2	13
7	24	17	19.2	13
8	24	17	18	13
9	24	15	18	12
10	19.2	14	18	10
11	19.2	13	16	10
12	19.2	13	16	10
13	19.2	13	16	10
14	19.2	13	16	10
15	19.2	13	16	10
16	18	12	16	10
17	16	11	16	9
18	16	11	16	9
19	16	11	16	9
20	16	11	16	9
21	16	11	12	9
22	16	11	12	9
23	16	11	12	9
24	16	10	12	8
25	14	10	12	8
26	14	10	12	8
27	14	10	12	8
28	12	10	12	8
29	12	10	12	8
30	12	10	12	8
31	12	10	12	8
32-33	12	9	12	7
34-41	8	8	8	7
42-53	8	8	8	7
54	6	6	6	6
56	6	6	6	6
58-72	6	6	6	6

3'-9" Secondary Beam Spacing Chart
Lower of Plywood or Bending governing
(ply I/360 max)(sec bm I/288 max)

Secondary Beam Loaded entire length (45")

Slab Thk	Sec 3/4" Strong	Sec 3/4" Weak	Sec 5/8" Strong	Sec 5/8" Weak
6	24	19.2	19.2	13
7	24	17	19.2	13
8	24	17	18	13
9	24	15	18	12
10	19.2	14	18	10
11	19.2	13	16	10
12	19.2	13	16	10
13	19.2	13	16	10
14	19.2	13	16	10
15	19.2	13	16	10
16	18	12	16	10
17	16	11	16	9
18	16	11	16	9
19	16	11	16	9
20	16	11	16	9
21	16	11	12	9
22	16	11	12	9
23	16	11	12	9
24	16	10	12	8
25	14	10	12	8
26	14	10	12	8
27	14	10	12	8
28	14	10	12	8
29	14	10	12	8
30	12	10	12	8
31	12	10	12	8
32	12	10	12	8
33-41	12	9	12	7
42-53	12	9	8	7
54	12	9	8	7
56	12	9	8	7
58-72	8	8	8	6

Rev 10/22/09



SCAFFOLDING, SHORING &
FORMING INSTITUTE, INC.
1300 SUMNER AVE.
CLEVELAND, OHIO 44115

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Scaffolding, Shoring & Forming Institute, Inc.
1300 Sumner Ave., Cleveland, Ohio 44115

SH304
4/00

INTRODUCTION

Guides to contractors, architects, engineers, dealers, etc., for the proper use of this equipment are deemed necessary, and for this reason the Scaffolding, Shoring & Forming Institute has prepared this bulletin. Consult Safe Practices for Erection and Dismantling of Frame Shoring, Single Post Shore Safety Rules, Flying Deck Form Safety Rules, and Horizontal Shoring Beam Safety Rules prepared by the Institute.

NOMENCLATURE

1. **Adjustment Screw** - device composed of a threaded screw and an adjusting handle used for the vertical adjustment of the shoring and formwork.
2. **Base Plate** - a device used to distribute the leg load.
3. **Coupling Pin** - an insert device used to align lifts or tiers vertically.
4. **Cross-bracing** - system of members connecting frames to make a tower structure.
5. **Extension Device** - any device used to obtain vertical adjustment of shoring towers other than an adjustment screw.
6. **Factor of Safety** - the ratio of ultimate load to the allowable load.
7. **Formwork** - the material used to give the required shape and support of poured concrete, consisting primarily of:

Sheathing - material which is in direct contact with the concrete.

Joists - members which directly support sheathing.

Stringers or ledgers - members which directly support the joists.

8. **Frame** - the principal prefabricated structural unit in a tower.
9. **Lifts or Tiers*** - the number of frames stacked one above each other in a vertical direction.
10. **Locking Device** - a device used to secure the cross brace to the frame.
11. **Safe Leg Load** - that load which can safely be directly imposed on the frame leg.
12. **Shoring Layout** - an engineered drawing prepared prior to erection showing arrangement of equipment for proper shoring.
13. **Sill or Mud Sill** - a footing, usually wood, which distributes the vertical shoring loads to the ground or slab below.
14. **Towers** - a composite structure of frames, braces and accessories.
15. **Ultimate Load** - the maximum load which may be placed on a structure causing failure by buckling of column members or failure of some other component.

* These terms can be used synonymously

INSPECTION OF SHORING EQUIPMENT

PRIOR TO ERECTION

The three main areas of inspection are for rust, straightness of members and welds. This applies to all components of a shoring system.

1. **Rust** - Rusted shoring equipment may indicate abuse, neglect, or corrosion and, if severe, should not be used.
2. **Straightness of members** - Mishandling, trucking and storing may cause damage to shoring equipment. All members or parts of all shoring components should be straight and free from bends, kinks or dents.
3. **Welds** - Equipment should be checked before use for damaged welds and any piece of equipment showing damaged welds or rewelding beyond the original factory weld should not be used. The factory weld reference pertains to location and quality of rewelds.

While rust, straightness and welds are of primary concern, other component parts should be checked.

4. Locking devices on frames and braces shall be in good working order, and if not, must be repaired or replaced prior to use.
5. Coupling pins must effectively align the frame legs.
6. Pivoted cross braces must have the center pivot securely in place.

SAFE BEARING LOADS FOR SOILS

Considering that the allowable loads (bearing) on various soils and rock range from less than 1000 p.s.f. (47.9 kN/m²) to more than 50,000 p.s.f. (2393.7 kN/m²) care should be exercised in determining the capacity of the soil for every shoring job, realizing that weather conditions can turn an otherwise suitable ground condition into a hazardous situation. As an example, dry clay with an allowable bearing capacity of 8,000 p.s.f. (383.0 kN/m²) could become very plastic after a rainfall and drop to less than 2,000 p.s.f. (95.8 kN/m²).

Care should also be taken not to excessively disturb the soil. If fill is required in shored areas, a qualified engineer should be consulted as to materials and compaction.

FOUNDATIONS

The purpose of good foundation or mud sill is to distribute the shoring load over a suitable ground area. The size of the footing or sill is determined by the total shoring load carried over a particular ground area, and by the nature of the soil supporting these sills.

The total shoring load should be computed and the sills designed accordingly.

Suitable sills should be used on a pan or grid dome, floor, or any other floor system involving voids, where a frame leg could concentrate an undesirable load on a thin concrete section.

When shoring from earth or fill, the area should be leveled and the sills spaced in a pattern assuring adequate stability for all shoring legs.

ERECTION OF FRAMES

The work of erecting the shoring should be under the supervision of a person with proper experience and aptitude for securing a safe installation.

Shoring layouts made by a qualified shoring designer must be strictly adhered to when locating frame legs. Layouts may be obtained from your shoring supplier in most instances.

Advance planning will help the erection of frames to progress smoothly. The material should be unloaded as close to the area to be shored as possible and should be arranged in the order it is to be used. Adjustment screws should be set to their approximate final adjustment before setting up the shoring units. At this time, a person should check to see that all frames which require coupling pins have them, and that all frames which require accessories at the top do not have coupling pins. Consult safety rules as recommended by the Institute.

To expedite erection of the shoring and to be sure the loading is distributed the way the shoring is designed, the location of each tower should be marked on the floor by use of chalk line or some other simple method. If required, sills should be placed first. After the location of the shoring towers has been marked, the adjustment screws or base plates, whichever is to be used, along with the necessary braces, should be distributed to each set of marks indicating the location of the tower.

After assembling the basic unit it should be leveled so that no matter how high the final tower is to be, the additional frames will be level and plumb as they are installed. When the basic unit is leveled, it is ready to receive the next tier of frames. For higher lifts, a work platform is easily formed for erecting the shoring by using planks on the top horizontal member of the frames. Tie towers of shoring frames together with sufficient bracing to make a rigid, solid unit.

FINAL INSPECTION OF ERECTED SHORING EQUIPMENT

The following is a list of check points to be covered when making a final inspection of shoring equipment prior to the placing of concrete on the form. All points should be carefully checked to insure a safe and accident-free job.

1. Check to see that there is a sound footing, or sill, under every leg of every frame on the job. Check also for possible washout due to rain.
2. Check to make certain that all base plates or adjustment screws are in firm contact with the footing or sill. All adjustment screws should be snug against the legs of the frame.
3. Obtain a copy of the shoring layout that was prepared for this specific job. Make sure that the spacings between towers and the cross brace spacing of the towers do not exceed the spacings shown on the layout. If any deviation is necessary because of field condition consult with the qualified shoring designer who prepared the layout for his approval of the actual field setup.
4. Frames should be checked for plumbness in both directions. The maximum allowable tolerance for a frame which is out of plumb is (1/8 inch in 3 feet). If the frames exceed this tolerance the base should be adjusted until the frames are within the tolerance.
5. If there is a gap between the lower end of one frame and the upper end of another frame, it indicates that one adjustment screw must be adjusted to bring the frames in contact. If this does not help, it indicates the frame is out of square and should be removed.
6. When two or more tiers of frames are used, each shall be braced to at least one adjacent frame.
7. While checking the cross braces also check the locking devices to assure that they are all in their closed position or that they are all tight.
8. Check the upper adjustment screw or shore head to assure that it is in full contact with the formwork. If it is not in contact, it should be adjusted or shimmed until it is.
9. Check to see that the obvious mistakes of omitting joists, using the wrong size ledger or incorrectly orienting members have not been made. Check the print to see that the lumber used is equal to that specified on the shoring layout. Check the general formwork scheme to make sure that it follows good standard practice for formwork.
10. If the shoring layout shows exterior bracing for lateral stability, check to see that this bracing is in place in the locations specified on the drawing. Check to make sure that the devices which attach this bracing to the equipment are securely fastened to the legs of the shoring equipment. If tubing clamps are used, make sure that they have been

properly tightened. If devices for holding timber require nails, check to see that sufficient nails have been used to hold the bracing securely to the frame legs.

DISMANTLING OF SHORING EQUIPMENT

Premature releasing or stripping of shoring can be a cause of failure. A qualified engineer must decide when and how stripping is to proceed. Variables which enter into this phase include load transfer, weather conditions, variations in different parts of the structure and the setting qualities of the concrete.

After approval of a qualified engineer is obtained, follow approved dismantling procedure. Screw jacks should be released only far enough to remove forming member. The dismantling of the equipment can then be performed in the reverse method used in erection and moved to the next location for reuse. It is often more desirable to merely release the adjusting screws to such a point that the forming members can be pulled away from the underside of the concrete and allowed to rest in certain modules on top of the frame shoring equipment and the entire unit moved to the next location. Formwork and shoring of varying sizes are frequently moved from one pour to other pours without dismantling or removing formwork.

Lower shoring components in a safe manner. Do not drop or throw components as this could result in injury to personnel or damage to equipment.

THE RESHORING OPERATION

Reshoring is one of the most critical operations in formwork; consequently, reshoring procedure must be designed by a qualified person and approved by the architect/engineer of record.

Extreme care must be taken to release the adjustment screws to a point where the slab takes its actual permanent deflection. The adjustment screws should then be tightened until contact is again made with the underside of the slab. In this manner, the frame reshoring below will not be carrying the load of the slab that it had previously shored.

Reshoring is usually done to facilitate maximum reuse of framework and may utilize the strength of the completed construction below when such construction is fully cured and capable of supporting the loads to be imposed by the additional construction above.

While reshoring is being placed, no construction loads should be permitted on the new construction.

Extra care should be taken during a reshoring operation where an upper slab being poured is heavier than the slab being reshored.

INDEPENDENT POST SHORE SYSTEM SAFETY RULES

As Recommended by

SCAFFOLDING, SHORING AND FORMING INSTITUTE

It shall be the responsibility of all employers and users to read and comply with the following common sense guidelines, which are designed to promote safety in the erection, dismantling and use of independent post shore systems. These guidelines are not all-inclusive nor do they supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these guidelines conflict in any way with any state, provincial, local or federal statute or governmental regulation, said statute or regulation shall supersede these guidelines and it shall be the responsibility of each employee and user to comply therewith and also to be knowledgeable and understand all state, local or federal statutes or governmental regulations pertaining to independent post shore systems.

A. GENERAL GUIDELINES

1. POST THESE SHORING SAFETY GUIDELINES in a conspicuous place and be sure that all persons who erect, dismantle or use shoring are aware of them.
2. FOLLOW ALL STATE, PROVINCIAL, LOCAL AND FEDERAL CODES, ORDINANCES AND REGULATIONS pertaining to shoring.
3. SURVEY AT JOB SITE. A survey by a qualified person shall be made of the job site for hazards, such as untamped earth fills, ditches, debris, high tension wires, unguarded openings and other hazardous conditions. These conditions should be corrected or avoided as noted in the following sections.
4. PLAN SHORING ERECTION SEQUENCE in advance and obtain necessary access equipment to accomplish the work safely.
5. INSPECT ALL EQUIPMENT BEFORE USING. Never use any equipment that is structurally defective in any way. Mark it or tag it as defective, then remove it from the jobsite.
6. A SHORING LAYOUT prepared by a person qualified to analyze the intended loading consistent with the manufacturer's recommended safe working loads, shall be used on the job at all times.
7. ERECT, DISMANTLE OR ALTER SHORING only under the supervision of a competent person.
8. DO NOT ABUSE OR MISUSE THE SHORING EQUIPMENT. Do not modify equipment.
9. INSPECT ERECTED SHORING: (a) immediately prior to concrete placement; (b) during concrete placement and while vibrating concrete, and (c) after concrete placement until concrete is set.
10. NEVER TAKE CHANCES! IF IN DOUBT REGARDING THE SAFETY OR USE OF THE SHORING, CONSULT YOUR SHORING SUPPLIER.
11. USE SHORING EQUIPMENT only for the purpose or in ways for which it was intended. Use proper tools when installing equipment.
12. ERECTING AND DISMANTLING OF SHORING requires good physical condition. Do not work on shoring if you feel dizzy, unsteady in any way or are impaired in any way by drugs or any other substances.
13. DO NOT USE INDEPENDENT POST SHORE SYSTEMS for fall arrest anchorage.
- B. ALL INDEPENDENT POST SHORE SYSTEM DECKS SHALL BE Laterally Stabilized by the existing building structure and/or additional bracing as specified by the supplier/manufacturer.
- C. USE SUPPLIER/MANUFACTURER'S RECOMMENDED SAFE WORKING LOADS consistent with the deck panel configurations and height of posts used.
- D. FOLLOW SUPPLIER/MANUFACTURER'S RECOMMENDED DIRECTION for:
 - a) Location and selection of deck panel type and stringers.
 - b) Type and height of vertical shoring components.
 - c) Starting points of deck layouts.
- E. DO NOT MAKE UNAUTHORIZED CHANGES TO THE LAYOUT. Always consult the designer prior to making changes.
- F. PRIOR TO WORKING ON DECKS
 - a) All posts shall be plumb and adjusted evenly to ensure proper bearing contact.
 - b) Deck shall be laterally stabilized and proper means of fall protection installed.
- G. FALL PROTECTION SHALL BE PROVIDED ON ALL OPEN SIDES AND OPENINGS in formwork and slabs as required by applicable code.
- H. SAFE ACCESS SHALL BE PROVIDED TO ALL FORMWORK as required by applicable code.
- I. IF MOTORIZED CONCRETE PLACEMENT EQUIPMENT IS TO BE USED, ensure that lateral loads, vibration and other forces have been considered and adequate precautions taken to assure stability.
- J. PLAN DECK PANEL LAYOUT TO ENSURE AGAINST INSTABILITY AND UNSUPPORTED CANTILEVERS. Take all necessary precautions to avoid uplift of cantilevered panels during and after construction. Make certain that form panels intended to be cantilevered are tied down to prevent tipping.
- K. PANELS EXPOSED TO UPLIFTING WIND FORCES SHALL BE LOCKED OR TIED DOWN TO PREVENT PANEL UPLIFT.
- L. PLAN CONCRETE PLACEMENT METHODS AND SEQUENCES TO ENSURE BALANCED LOADING of shoring equipment and panels, including cantilevered panels.
- M. BRACING SHALL BE FASTENED SECURELY. Check to see that clamps, screws, pins and all other components are in a closed or engaged position.
- N. FOLLOW SPECIAL PRECAUTIONS RECOMMENDED BY THE SUPPLIER/MANUFACTURER WHEN SHORING FROM OR TO SLOPED SURFACES.
- O. PROVIDE AND MAINTAIN A SOLID FOOTING to distribute maximum loads properly.
- P. WINDLOAD: Erector must analyze the forming/shoring system for additional loads imposed from wind loading and provide adequate anchorage to resist these forces, including uplifting wind forces.
- Q. RESHORING is one of the most critical operations in formwork; consequently, the reshoring procedure shall be designed by a qualified person and should be approved by the architect/engineer of record.

SH306 – 5/03

HORIZONTAL SHORING BEAM SAFETY RULES

As Recommended by

SCAFFOLDING, SHORING AND FORMING INSTITUTE, INC.

It shall be the responsibility of all employers and users to read and comply with the following common sense guidelines which are designed to promote safety in the erection, dismantling and use of horizontal shoring beams. These guidelines are not all inclusive nor do they supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these guidelines conflict in any way with any state, provincial, local or federal statute or governmental regulation, said statute or regulation shall supersede these guidelines and it shall be the responsibility of each employee and user to comply therewith and also to be knowledgeable and understand all state, local or federal statutes or governmental regulations pertaining to horizontal shoring beams.

A. GENERAL GUIDELINES

1. POST THESE SHORING SAFETY GUIDELINES in a conspicuous place and be sure that all persons who erect, dismantle or use shoring are aware of them.
2. FOLLOW ALL STATE, PROVINCIAL, LOCAL AND FEDERAL CODES, ORDINANCES AND REGULATIONS pertaining to shoring.
3. SURVEY THE JOB SITE. A survey by a qualified person shall be made of the job site for hazards, such as untamped earth fills, ditches, debris, high tension wires, unguarded openings and other hazardous conditions. These conditions should be corrected or avoided as noted in the following sections.
4. PLAN SHORING ERECTION SEQUENCE in advance and obtain necessary access equipment to accomplish the work safely.
5. INSPECT ALL EQUIPMENT BEFORE USING. Never use any equipment that is structurally defective in any way. Mark it or tag it as defective, then remove it from the jobsite.
6. A SHORING DRAWING prepared by a person qualified to analyze the loading intended and consistent with the manufacturer's recommended safe working loads, shall be used on the job at all times.
7. ERECT, DISMANTLE OR ALTER SHORING only under the supervision of a qualified person.
8. DO NOT ABUSE OR MISUSE THE SHORING EQUIPMENT.
9. INSPECT ERECTED SHORING: (a) immediately prior to concrete placement; (b) during concrete placement and while vibrating concrete, and (c) after concrete placement until concrete is set.
10. NEVER TAKE CHANCES! IF IN DOUBT REGARDING THE SAFETY OR USE OF THE SHORING, CONSULT YOUR SHORING SUPPLIER.
11. USE SHORING EQUIPMENT only for the purposes or in ways for which it was intended. Use proper tools when installing equipment.
12. ERECTING AND DISMANTLING OF SHORING requires good physical condition. Do not work on shoring if you feel dizzy, unsteady in any way or are impaired in any way by drugs or any other substances.
13. DO NOT USE SHORING SYSTEMS for fall protection.

B. USE MANUFACTURER'S RECOMMENDED SAFE WORKING LOADS AND PROCEDURES FOR:

1. Span, spacing, and types of shoring beams.
2. Types, sizes, heights, and spacing of vertical shoring supports.

C. USE LUMBER EQUIVALENT TO THE STRESS, species, grade and size used on the layout. Use only lumber that is in good condition. Do not splice between supports.

D. DO NOT MAKE UNAUTHORIZED CHANGES OR SUBSTITUTION OF EQUIPMENT; always consult your supplier prior to making changes necessitated by jobsite conditions.

E. PROVIDE AND MAINTAIN ADEQUATE SUPPORT TO properly distribute shoring loads. When supporting horizontal shoring beams on:

1. Masonry walls, insure that masonry units have adequate strength. Brace walls as necessary.
2. Ledgers supported by walls using bolts, or other means, they should be properly designed and installed per recommendation of supplier or job architect/engineer.
3. Formwork, such formwork should be designed for additional loads imposed by the shoring beams.

4. Structural Steel Framework, the ability of the steel to support this construction loading should be checked and approved by the responsible project architect/engineer.
 5. When supporting horizontal beams on steel hangers, be sure that the bearing ends fully engage on the hangers. The hangers shall be designed to conform to the bearing end and shall have a rated strength to safely support the shoring loads imposed. (Follow hanger manufacturers' recommendations.)
 6. Do not bear adjustable horizontal beams on other adjustable horizontal beams.
- F. **SPECIAL CONSIDERATION MUST BE GIVEN TO THE INSTALLATION OF HORIZONTAL SHORING:**
1. When sloped or supported by sloping ledgers (stringers).
 2. When ledger (stringer), including blocking, height/width ratio exceeds 2 ½ to 1. Under no circumstances shall horizontal shoring beams bear on a single "two by" ledger (stringer).
 3. When eccentric loading conditions exist.
 4. When ledger (stringer) consists of multiple members. (i.e., double 2x6, 2x8, etc.)
- G. **ASSURE THAT BEARING ENDS OF SHORING BEAMS ARE PROPERLY SUPPORTED** and that locking devices are properly engaged before placing any load on beams.
- H. **IF MOTORIZED CONCRETE PLACEMENT EQUIPMENT IS TO BE USED**, be sure that lateral and other forces have been considered and adequate precautions taken to assure stability.
- I. **HORIZONTAL SHORING BEAMS SHOULD NOT** be supported other than at the bearing prongs unless recommended by supplier.
- J. **DO NOT NAIL BEAM BEARING PRONGS TO LEDGER.**
- K. **PLAN CONCRETE POURING METHODS AND SEQUENCES TO** insure against unbalanced loading of the shoring equipment. Take all necessary precautions to avoid uplift of shoring components and formwork.
- L. **AVOID SHOCK OR IMPACT LOADS FOR** which the shoring was not designed.
- M. **DO NOT PLACE ADDITIONAL, TEMPORARY LOADS** (such as rebar bundles) on erected formwork or poured slabs, without checking the capacity of the shoring and/or structure to safely support such additional loads.
- N. **DO NOT RELEASE ANY PART OF THE FORMWORK OR SHORING** until proper authority has been obtained. Particular consideration must be given to reshoring procedures.
- O. **WINDLOAD:** Erector must analyze the forming/shoring system for additional loads imposed from wind loading and provide adequate anchorage to resist these forces, including uplifting wind forces.
- P. **RESHORING** is one of the most critical operation in formwork; consequently, reshoring procedure must be designed by a qualified person and approved by the architect/engineer of record.

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SINGLE POST SHORE SAFETY RULES

As Recommended by

SCAFFOLDING, SHORING AND FORMING INSTITUTE

It shall be the responsibility of all employers and users to read and comply with the following common sense guidelines which are designed to promote safety in the erection, dismantling and use of single post shoring. These guidelines are not all inclusive nor do they supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these guidelines conflict in any way with any state, provincial, local or federal statute or governmental regulation, said statute or regulation shall supersede these guidelines and it shall be the responsibility of each employee and user to comply therewith and also to be knowledgeable and understand all state, local or federal statutes or governmental regulations pertaining to single post shoring.

A. GENERAL GUIDELINES

1. POST THESE SHORING SAFETY GUIDELINES in a conspicuous place and be sure that all persons who erect, dismantle or use shoring are aware of them.
2. FOLLOW ALL STATE, PROVINCIAL, LOCAL AND FEDERAL CODES, ORDINANCES AND REGULATIONS pertaining to shoring.
3. SURVEY THE JOB SITE. A survey by a qualified person shall be made of the job site for hazards, such as untamped earth fills, ditches, debris, high tension wires, unguarded openings and other hazardous conditions. These conditions should be corrected or avoided as noted in the following sections.
4. PLAN SHORING ERECTION SEQUENCE in advance and obtain necessary access equipment to accomplish the work safely.
5. INSPECT ALL EQUIPMENT BEFORE USING. Never use any equipment that is structurally defective in any way. Mark it or tag it as defective, then remove it from the jobsite.
6. A SHORING DRAWING prepared by a person qualified to analyze the loading intended and consistent with the manufacturer's recommended safe working loads, shall be used on the job at all times.
7. ERECT, DISMANTLE OR ALTER SHORING only under the supervision of a qualified person.
8. DO NOT ABUSE OR MISUSE THE SHORING EQUIPMENT.
9. INSPECT ERECTED SHORING: (a) immediately prior to concrete placement; (b) during concrete placement and while vibrating concrete, and (c) after concrete placement until concrete is set.
10. NEVER TAKE CHANCES! IF IN DOUBT REGARDING THE SAFETY OR USE OF THE SHORING, CONSULT YOUR SHORING SUPPLIER.
11. USE SHORING EQUIPMENT only for the purposes or in ways for which it was intended. Use proper tools when installing equipment.
12. ERECTING AND DISMANTLING OF SHORING requires good physical condition. Do not work on shoring if you feel dizzy, unsteady in any way or are impaired in any way by drugs or any other substances.
13. DO NOT USE SHORING SYSTEMS for fall protection.

B. USE MANUFACTURER'S RECOMMENDED SAFE WORKING LOADS consistent with the height from supporting sill to formwork.

C. PROVIDE AND MAINTAIN A SOLID FOOTING to distribute maximum loads properly.

D. PLUMB ALL POST SHORES AS THE ERECTION PROCEEDS. Check plumb of post shores JUST PRIOR TO POUR.

E. CHECK TO SEE THAT ALL CLAMPS, SCREWS, PINS and all other components are in a **CLOSED OR ENGAGED POSITION**.

F. MAKE CERTAIN THAT ALL BASE PLATES AND SHORE HEADS ARE IN FIRM CONTACT with **THE FOOTING SILL AND FORM MATERIAL**.

G. IF MOTORIZED CONCRETE EQUIPMENT IS TO BE USED, be sure that post shores are **SPACED AND BRACED WITH THIS FACT IN MIND**.

H. FOR STABILITY, SINGLE POST SHORES SHALL HAVE ADEQUATE BRACING provided in the longitudinal, transverse and diagonal directions. Bracing shall be installed as the shores are being erected.

- I. **DEVICES WHICH ATTACH THE STABILITY BRACING** shall be securely fastened to the single post shores.
- J. **DO NOT USE SINGLE POST SHORES MORE THAN ONE TIER HIGH.** Where greater shore heights are required consult the supplier.
- K. **ADJUSTMENT OF SINGLE POST SHORES TO RAISE FORMWORK** shall not be made after concrete is in place.
- L. **AVOID ECCENTRIC LOADS ON U-HEADS, AND TOP PLATES** by centering stringers on those members.
- M. **USE SPECIAL PRECAUTIONS** when shoring from or to sloped surfaces.
- N. **WINDLOAD:** Erector must analyze the forming/shoring system for additional loads imposed from wind loading and provide adequate anchorage to resist these forces, including uplifting wind forces.
- N. **RESHORING** is one of the most critical operations in formwork; consequently, reshoring procedure must be designed by a qualified person and approved by the architect/engineer of record.
- O. **DO NOT BACK-OFF OR STRIP POST SHORES** until proper authority is given.
- P. **USE LUMBER STRESSES** consistent with age, type and condition of available lumber to be used. Use only lumber that is in good condition.

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**SAFE PRACTICES FOR
ERECTING & DISMANTLING OF FRAME SHORING**
As Recommended by
SCAFFOLDING, SHORING AND FORMING INSTITUTE, INC.
AND
SCAFFOLD INDUSTRY ASSOCIATION

It shall be the responsibility of all employers and users to read and comply with the following common sense guidelines which are designed to promote safety in the erection, dismantling and use of frame shoring. These guidelines are not all inclusive nor do they supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these guidelines conflict in any way with any state, provincial, local or federal statute or governmental regulation, said statute or regulation shall supersede these guidelines and it shall be the responsibility of each employee and user to comply therewith and also to be knowledgeable and understand all state, local or federal statutes or governmental regulations pertaining to frame shoring.

I. GENERAL GUIDELINES

- A. POST THESE SHORING SAFETY GUIDELINES in a conspicuous place and be sure that all persons who erect, dismantle or use shoring are aware of them.
- B. FOLLOW ALL STATE, PROVINCIAL, LOCAL AND FEDERAL CODES, ORDINANCES AND REGULATIONS pertaining to shoring.
- C. SURVEY THE JOB SITE. A survey by a qualified person shall be made of the job site for hazards, such as untamped earth fills, ditches, debris, high tension wires, unguarded openings and other hazardous conditions. These conditions should be corrected or avoided as noted in the following sections.
- D. PLAN SHORING ERECTION SEQUENCE in advance and obtain necessary access equipment to accomplish the work safely.
- E. INSPECT ALL EQUIPMENT BEFORE USING. Never use any equipment that is structurally defective in any way. Mark it or tag it as defective, then remove it from the jobsite.
- F. A SHORING DRAWING prepared by a person qualified to analyze the loading intended and consistent with the manufacturer's recommended safe working loads, shall be used on the job at all times.
- G. ERECT, DISMANTLE OR ALTER SHORING only under the supervision of a qualified person.
- H. DO NOT ABUSE OR MISUSE THE SHORING EQUIPMENT.
- I. INSPECT ERECTED SHORING: (a) immediately prior to concrete placement; (b) during concrete placement and while vibrating concrete, and (c) after concrete placement until concrete is set.
- J. NEVER TAKE CHANCES! IF IN DOUBT REGARDING THE SAFETY OR USE OF THE SHORING, CONSULT YOUR SHORING SUPPLIER.
- K. USE SHORING EQUIPMENT only for the purposes or in ways for which it was intended. Use proper tools when installing equipment.
- L. ERECTING AND DISMANTLING OF SHORING requires good physical condition. Do not work on shoring if you feel dizzy, unsteady in any way or are impaired in any way by drugs or any other substances.
- M. DO NOT USE SHORING SYSTEMS for fall protection.

II. GUIDELINES FOR ERECTION AND USE OF SHORING

- A. PROVIDE AND MAINTAIN A SOLID FOOTING. The sills or cribbing for shoring shall be sound, rigid and capable of carrying the maximum design load without settling or moving.
- B. ALWAYS USE BASE PLATES. When sills or cribbing are used, base plates must be centered on them.
- C. ADJUSTING SCREWS SHALL BE USED to adjust to uneven grade conditions. Maintain all screw adjustments within the recommended height for the design load.
- D. PLUMB AND LEVEL ALL SHORING FRAMES as the erection proceeds. DO NOT force braces on frames - level the shoring towers until proper fit can be made. Maintain all shoring towers plumb and level.
- E. MAINTAIN THE SHORE FRAME SPACINGS OR TOWER HEIGHTS as shown on the shoring drawing. Where job site conditions require deviations from the shoring drawing, consult a qualified person.
- F. IF MOTORIZED CONCRETE EQUIPMENT is to be used, be sure that the shoring layout has been designed for use with this equipment and such fact is noted on the layout.
- G. USE CAUTION WHEN ERECTING FREE-STANDING TOWERS. Prevent tipping by guying or bracing when height exceeds 4 times the minimum base dimension.
- H. GIVE SPECIAL CONSIDERATION TO TEMPORARY LOADING. Areas where re-bar, material or equipment is to be stored temporarily may need to be strengthened to meet those loads.

- I. DO NOT CLIMB CROSS BRACES. Use proper access equipment.
- J. USE SPECIAL PRECAUTIONS when shoring from or to sloped surfaces.
- K. USE ADJUSTMENT DEVICE ON TOP OF LEG to position the falsework - not the bottom adjusting screw.
- L. SHORING LOADS ARE INTENDED TO BE CARRIED BY VERTICAL LEGS. Horizontal loading may require special consideration. Consult your shoring supplier for allowable loads on horizontal members.
- M. AVOID ECCENTRIC LOADS on U-Heads, top plates and similar members by centering stringer loads on those members.

III. GUIDELINES FOR DISMANTLING SHORING

- A. DO NOT REMOVE BRACES OR BACK OFF ON ADJUSTMENT SCREWS until proper authority is given.
- B. DISMANTLED EQUIPMENT should be stockpiled in a planned manner and distributed to avoid concentrated loads on the partially cured concrete.
- C. USE PROPER ACCESS EQUIPMENT in the dismantling process.
- D. LOWER SHORING COMPONENTS in a safe manner. Do not drop or throw components as this could result in injury to personnel or damage to equipment.

IV. RESHORING –Reshoring is one of the most critical operations in formwork; consequently, reshoring procedure must be designed by a qualified person and approved by the architect/engineer of record.

V. WINDLOAD – Erector must analyze the forming/shoring system for additional loads imposed from wind loading and provide adequate anchorage to resist these forces, including uplifting wind forces.

These safety guidelines set forth some common sense procedures for safely erecting, dismantling and using frame shoring equipment. Since equipment and shoring systems differ, reference must always be made to the instructions and procedures of the supplier and/or manufacturer of the equipment. Since field conditions vary, and are beyond the control of the Scaffolding, Shoring & Forming Institute and the Scaffold Industry Association, safe and proper use of equipment is the sole responsibility of the employer and user.

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FLYING DECK FORM SAFETY RULES

As Recommended by

THE SCAFFOLDING, SHORING AND FORMING INSTITUTE

It shall be the responsibility of all employers and users to read and comply with the following common sense guidelines which are designed to promote safety in the erection, dismantling and use of flying deck forms. These guidelines are not all inclusive nor do they supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these guidelines conflict in any way with any state, provincial, local or federal statute or governmental regulation, said statute or regulation shall supersede these guidelines and it shall be the responsibility of each employee and user to comply therewith and also to be knowledgeable and understand all state, local or federal statutes or governmental regulations pertaining to flying deck forms.

A. GENERAL GUIDELINES

1. POST THESE SHORING SAFETY GUIDELINES in a conspicuous place and be sure that all persons who erect, dismantle or use shoring are aware of them.
2. FOLLOW ALL STATE, PROVINCIAL, LOCAL AND FEDERAL CODES, ORDINANCES AND REGULATIONS pertaining to shoring.
3. SURVEY THE JOB SITE. A survey by a qualified person shall be made of the job site for hazards, such as untamped earth fills, ditches, debris, high tension wires, unguarded openings and other hazardous conditions. These conditions should be corrected or avoided as noted in the following sections.
4. PLAN SHORING ERECTION SEQUENCE in advance and obtain necessary access equipment to accomplish the work safely.
5. INSPECT ALL EQUIPMENT BEFORE USING. Never use any equipment that is structurally defective in any way. Mark it or tag it as defective, then remove it from the jobsite.
6. A SHORING DRAWING prepared by a person qualified to analyze the loading intended and consistent with the manufacturer's recommended safe working loads, shall be used on the job at all times.
7. ERECT, DISMANTLE OR ALTER SHORING only under the supervision of a qualified person.
8. DO NOT ABUSE OR MISUSE THE SHORING EQUIPMENT.
9. INSPECT ERECTED SHORING: (a) immediately prior to concrete placement; (b) during concrete placement and while vibrating concrete, and (c) after concrete placement until concrete is set.
10. NEVER TAKE CHANCES! IF IN DOUBT REGARDING THE SAFETY OR USE OF THE SHORING, CONSULT YOUR SHORING SUPPLIER.
11. USE SHORING EQUIPMENT only for the purposes or in ways for which it was intended. Use proper tools when installing equipment.
12. ERECTING AND DISMANTLING OF SHORING requires good physical condition. Do not work on shoring if you feel dizzy, unsteady in any way or are impaired in any way by drugs or any other substances.
13. DO NOT USE SHORING SYSTEMS for fall protection.

B. **DO NOT EXCEED** manufacturer's recommended safe working load.

C. **ALL FLYING DECK FORMS SHALL BE** assembled, moved and maintained in accordance with the supplier's recommended procedures.

D. **IF MOTORIZED CONCRETE EQUIPMENT** is to be used, be sure that the shoring layout has been designed for use with this equipment and such fact is noted on the layout.

E. **METHOD OF ADJUSTMENT** should be provided on all flying deck form supporting members, for form leveling, vertical positioning, ease of stripping, and to adjust to uneven grade conditions where applicable.

F. **MAKE CERTAIN THAT ALL SUPPORTING MEMBERS** are in firm contact with the flying form stringer/ledger, and that supports are located in positions as shown on the shoring layout.

G. **USE SPECIAL PRECAUTIONS** when shoring from or to sloped surfaces.

H. **RESHORING** is one of the most critical operation in formwork; consequently, reshoring procedure must be designed by a qualified person and approved by the architect/engineer record.

I. **USE DECK FORM MATERIALS WITH PROPERTIES** as stated on the shoring layout drawing. Do not splice joists or ledgers between supports unless details are given on the shoring layout.

- J. **DO NOT RELEASE FORMS** until proper authority is given.
- K. **FIELD OPERATIONS SHALL BE**, at all times, under the direct supervision of a supervisor who is qualified and familiar with the procedures for assembly, erection, flying, and horizontal movement of the flying deck form system being used.
- L. **MAKE CERTAIN** that a positively controlled method of tieback or braking is used when moving the deck form. The system must never be allowed to have free or uncontrolled horizontal movement.
- M. **LEDGERS/STRINGERS AND JOISTS MUST BE** stabilized and laterally braced to assure that the deck form system is stable against any foreseeable lateral loads.
- N. **THE CRANE USED TO FLY** the deck form must not pull the deck form out of the building bay. A controlled and independent device or force must provide for horizontal movement of the deck form.
- O. **SLINGS AND RIGGING** used in flying the deck form system must comply with all safe practices and applicable governmental regulations governing their use.
- P. **AVOID SHOCK OR IMPACT LOADS.**
- Q. **DO NOT MAKE UNAUTHORIZED CHANGES OR** substitutions of equipment; always consult your supplier prior to making changes necessitated by jobsite conditions.
- R. **SAFETY MEASURES** shall be taken for all personnel involved in the rigging of the flying deck form for flying. No personnel shall be allowed to “ride” the deck form or rigging during flying.
- S. **DURING CONCRETE PLACEMENT AND DECK FORM RIGGING, THE FREE END CANTILEVER OF A DECK FORM** shall not exceed the amount as recommended by the supplier. Follow the recommended flying procedure as given by the supplier.
- T. **ANY AND ALL LOOSE COMPONENTS OF THE** deck form system (i.e., bulkheads, beam sides, filler strips, etc.), if flown with the form, must be securely fastened to the deck form prior to moving.
- U. **CONSULT YOUR SUPPLIER IF** weatherproof covering, etc., is to be attached to the flying system.
- V. **ALL PERSONNEL IN THE AREA** shall be advised and protected during all flying operations. Do not stand under the deck form during the flying operation.
- W. **ALL ATTACHED PERIMETER GUARDRAILS, MIDRAILS AND TOEBOARDS** shall conform to applicable codes and regulations.
- X. **THE WEIGHT OF THE FLYING DECK FORM SHALL NOT** exceed the capacity of the crane for each application.

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