



FlyForms International L.L.C.

Formwork Solutions ■ Supply ■ Design & Engineering
■ Technical Consultation ■ Training & Supervision



Single Sided Support Frame - HD

Assembly and Application Guide

Product Information & Features

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Product Features

FFI Single Sided Support Frame consist of basic items such as Single Sided Support Frame 500, Lower Part 200 and Base Frame 200/2 enables height extension of up to 8.6 m. The system is designed for a permissible concrete pressure of up to 60 kN/m². The distance between the support frames is calculated and designed according to the wall height and concrete pressure.

The Single Sided Support Frame can support the Wall formwork up to 9.00m max. in height.

The vertical double U steel profile of the system allows usage of any type of the wall formwork system. The support frames are equipped with integrated Base Jacks which allows the alignment of the structure.

The loads resulting from the pouring of the walls are transferred by the frames into the base structure through the cast-in Curved Tie Rod anchors at the front base of the formwork and through the compressive jacks at the rear of the Single Sided Support Frames. Therefore, it is essential to determine whether the structural components such as base slabs or foundations are capable to carry these loads. Moreover, the opposite side of the single sided wall formwork (either existing structural parts or shoring) must be able to carry the concrete pressure as well.

The arrangement of the Curved Tie Rods and distances between the permanent anchors must be determined based on the calculated statical values and the anchors must be positioned as accurately as possible prior to pouring the floor slab.

Please note that Dywidag Tie Rods which are used for anchoring the FFI Single Sided Support Frames must never be welded or heated at all.

Important Remarks

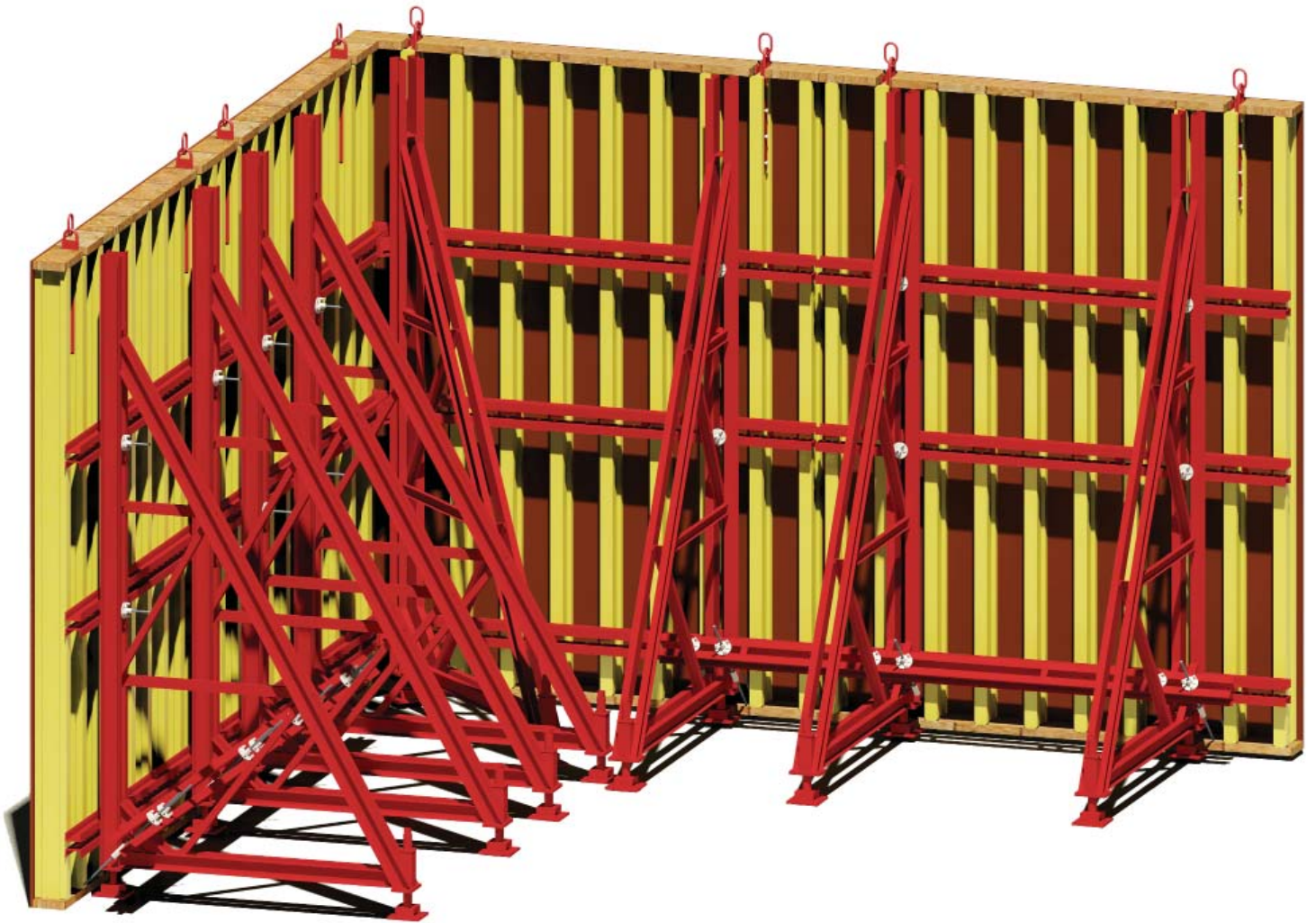
The succeeding instructions for assembly and application has to be carefully read as it contains detailed information on the proper application and handling of the FFI Single Sided Support Frame. All instructions concerning technical operation and function have to be observed carefully. Please note that exceptional use of the FFI Single Sided Support Frame requires a separate design calculation.

In order to ensure a technical and safe use of our product, all relevant national safety rules and regulations and safety instructions of national institutes and/or local authorities have to be observed. In general, only undamaged material and components which are in proper condition must be used.

It is important that damaged components are sorted out and removed from the construction site. In case of repairs, only original spare parts of FFI must be used.



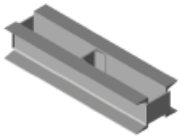

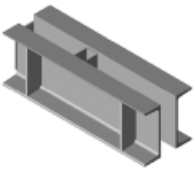
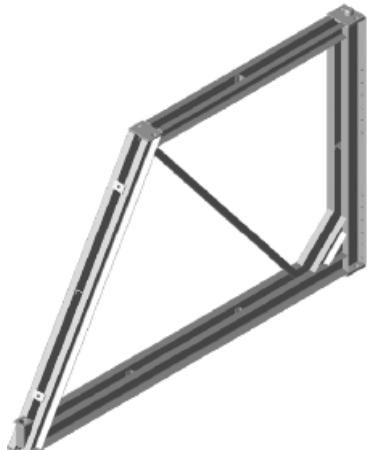
The use of FFI formwork systems combined with other supplier's materials may involve certain dangers and therefore require an additional inspection and quality check by our formwork specialist.

Due to technical development of our system, we would like to emphasize that FFI reserves the right to revise, change, or modify any of the product's components at any time without prior notice.


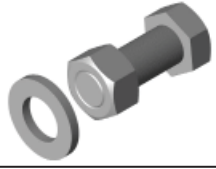


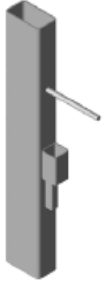
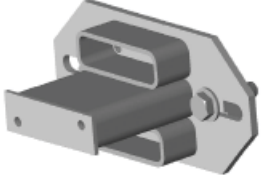



Single Sided Supporting System - HD

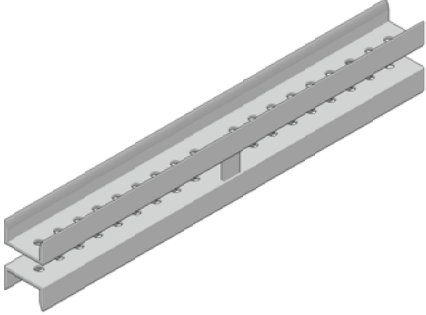
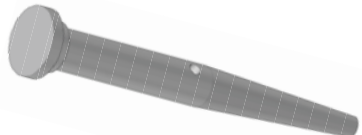
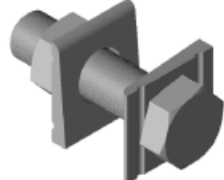
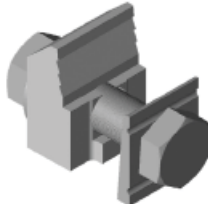


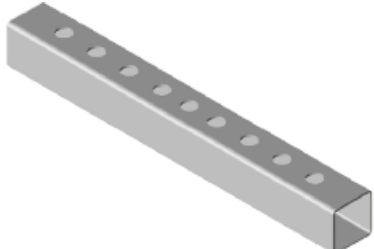
Components

	Art. No	Weight Kg/pc.	
Supporting Frame UVR	103FU350	196.10	
<p>Water Holder Hook U</p> <p>Connects the Formwork to the Single Sided Supporting Frame.</p> <p>(For UVR Supporting Frame details refer Single Sided Support Frame catalogue)</p>	101FH014	1.62	
<p>Tying Bar 12/60</p> <p>The loads arising during concreting using the Single Sided Support Frame 325 are transferred via the tying bar into the ground.</p>	104TB126	18.2	
<p>Single Sided Support Frame 500</p> <p>With maximum height of 5.00m</p>	104SF500	304.9	
<p>Tying Bar 24/75</p> <p>The loads arising during concreting using the Single Sided Support Frame 500 are transferred via the tying bar into the ground.</p>	104TB247	59.4	
<p>Lower Part 200</p> <p>Used in connection with the Single Sided Support Frame 500 for Single Sided wall formwork up to a maximum height of 6.60m.</p> <p>The Base Jacks of the Single Sided Support Frame 500 are fixed to the Base Frame 200 and both parts are connected to each other with four Bolts M27 X 70 and A29 Washers.</p>	104LP200	308.5	

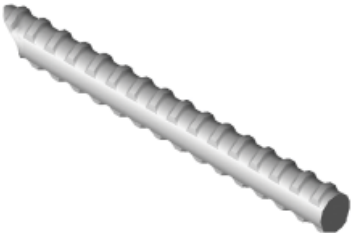
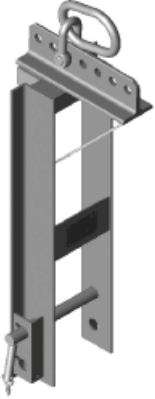


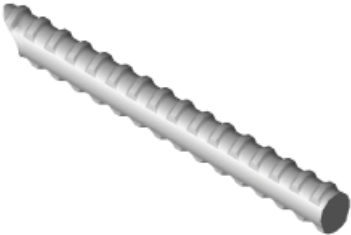
Components

	Art. No	Weight Kg/pc.	
<p>Base Frame 200/2</p> <p>Used in connection with the Single Sided Support Frame 500 and the Lower Part 200 for formwork heights of up to 8.60 m. Please note that a special proof of the structural strength is required for determining the distance between the Single Sided Support Frame and anchoring loads.</p>	104BF200	511.5	
<p>Bolt M27x70 with Nut and A29 Washer</p> <p>Used for fixing Support Frame 500 to Lower part 200 and Base Frame 200/2. Four Bolts and Nuts for each connection and two w.a.f. 41 wrenches are required.</p>	104BM277 104WA291	0.6 0.1	
<p>Tie Bearing</p> <p>Using the tie bearing, the loads are always accurately transferred into the Anchor Bars, with the anchor angle between 35°-55°.</p>	104BF200	3.0	
<p>Half Coupler 48 / M20x30</p> <p>Fixed to the single sided supporting frame, the half couplers allow bracing by tubes and couplers in order to stiffen the formwork structure. For this, w.a.f. 22 socket wrench or ratchet wrench with extension is required</p>	104BF200	0.9	
Component for Fixing the Formwork			
<p>Extension Bar</p> <p>Used for extending the Single Sided Support Frame 500 to support a 5.40m high Vito formwork unit (2 x 2.70m). Please note that Single Sided Support Frame must always be placed on the joint of formwork panels and fastened with one tension Nut.</p>	104EB235	23.5	
<p>Distance Keeper</p> <p>Provide distance between the steel frame panel formwork and Single Sided Support Frame. A10 cm water profile (with a profile gap of 50 mm) can also be fixed so that the arrangement of the Single Sided Support Frame is independent from the formwork system.</p>	104DK055	5.5	
<p>Corner part</p> <p>Fastens the Steel Waler 240 together in 90° angled corners and allows the arrangement of a diagonal Single Sided Support Frame</p>	104DK055	7.6	

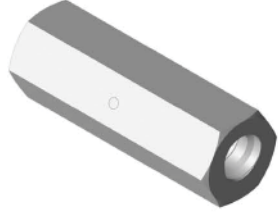
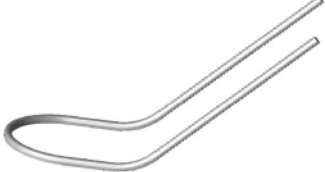

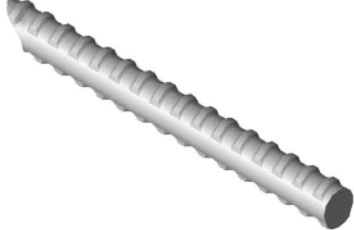
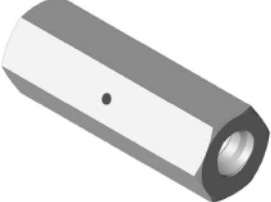

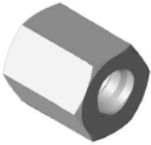
Components

Steel Walers	Art. No	Weight Kg/pc.	
<p>Steel Waler-100/050</p> <p>Steel Waler-100/075</p> <p>Steel Waler-100/100</p> <p>Steel Waler-100/125</p> <p>Steel Waler-100/150</p> <p>Steel Waler-100/200</p> <p>Steel Waler-100/250</p> <p>Steel Waler-100/300</p> <p>Steel Waler-100/375</p> <p>Steel Waler-100/500</p> <p>Steel Waler-100/600</p>	<p>101SW050</p> <p>101SW075</p> <p>101SW100</p> <p>101SW125</p> <p>101SW150</p> <p>101SW200</p> <p>101SW250</p> <p>101SW300</p> <p>101SW375</p> <p>101SW500</p> <p>101SW600</p>	<p>10.26</p> <p>15.39</p> <p>20.55</p> <p>25.77</p> <p>31.09</p> <p>41.63</p> <p>52.04</p> <p>62.58</p> <p>78.31</p> <p>104.34</p> <p>125.42</p>	
<p>Connecting Pin U 20x190</p> <p>Used for various types of connections.</p>	<p>101PE190</p>	<p>0.40</p>	
<p>Connection Bolt</p> <p>Used for fixing the Steel Walers 240 to the Single Sided Support Frame 500 and to the Base Frame 200 through the holes in the vertical profile by means of Bolt M16 x 60 MuZ with two 18 DIN 434 washers.</p>	<p>104CB166</p>	<p>0.2</p>	
<p>Clamping Bolt</p> <p>Used for Clamping the Steel Walers 240 to the front of the vertical steel profile of the support frames by means of Bolt M16 x 60 with Nut and one 18 DIN 434 Washer, one 18 Z DIN 126 Washer and one clamping element with matching washer.</p>	<p>104CLB16</p>	<p>0.3</p>	
<p>Waler Spanner 50</p> <p>Can be hooked into the holed vertical profiles of the Vito framework formwork in order to connect the formwork to the Single Sided Support Frames. One Tension Nut to be ordered additionally.</p>	<p>110153</p>	<p>1.1</p>	
<p>Flange Nut 3 Wing 100 V</p> <p>Used for stopends and other tying and connecting purposes. With a max. permissible load of 90 KN.</p>	<p>315FN120</p>	<p>0.59</p>	
<p>Centre Tube 50</p> <p>Used as a cross member behind the support frame profile to enable fastening to the wall formwork.</p>	<p>110351</p>	<p>3.4</p>	


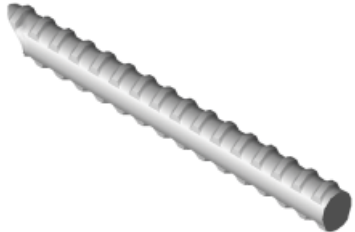
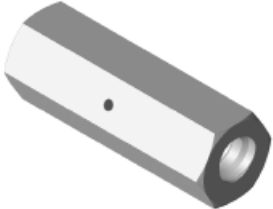

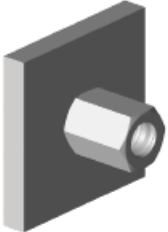
Components

	Art. No	Weight Kg/pc.	
<p>Tie Rod 60 Used in combination with the Center Tube 50 for the same purpose. Two Tie Rods for Center Tube 50 are required.</p>	315TR060	0.9	
<p>SF Shifting Hook Used for shifting the pre-assembled units with the ideal center of gravity. It fits both Single Sided Support Frames 325 and 500. Two SF Shifting Hooks per job site are required.</p>	104SH288	28.8	
<p>Plate Washer Nut 15 U Equipped with base plate and nut and allows an incline of up to 10°. With max. permissible load of 90 kN.</p>	315PW119	1.40	
<p>Vito Tie Nut Used as a substitute to Wing Nut 15 and Galvanized Plate 12/12. This is only one-piece and is quick to release.</p>	110241	1.4	
<p>Tie Rod 50 15mm dia./D&W Tie Rod 75 15mm dia./D&W Tie Rod 100 15mm dia./D&W Tie Rod 130 15mm dia./D&W Tie Rod 175 15mm dia./D&W</p> <p>Used for extending the cast-in anchor stirrup element to the Tie Nut.</p>	315TR050 315TR075 315TR100 315TR130 315TR175	0.70 1.05 1.40 1.82 2.45	

Components

	Art. No	Weight Kg/pc.	
<p>Hexagonal Coupler Galv. SW30 L=100 Fastens the cast-in and re-usable anchor elements.</p>	901HC100	0.43	
<p>Curved Tie Rod Is cast-in in the concrete and transfers the tensile forces into the building structure. The maximum allowable load is 2 x 90 kN.</p>	315TR012	1.87	
DW 20 anchor materials with maximum allowable tensile load to DIN 18216 = 150 kN			
<p>Tie Nut 150 One-piece and quick to release (w.a.f. 36).</p>	110252	1.4	
<p>Tie Rod 20/100 For extending the cast-in anchor stirrup element to the Tie Nut.</p>	320TR100	2.6	
<p>Hexagon Nut 20/130 with Pin Fastens cast-in (anchor loop) and re-usable anchor elements (Tie Rod).</p>	320HC130	0.7	
<p>Curved Tie Rod 20/60 Is cast-in and transfers the tensile loads into the building structure with maximum allowable load of 2x150 kN.</p>	320TR060	4.0	
Dywidag 26.5 anchor materials with maximum allowable tensile load to DIN 18216=250 kN			
<p>Hexagon Nut 26.5 / 60 Used jointly with Galvanized Plate 12/12/2 w.a.f. 46.</p>	326TR060	0.5	

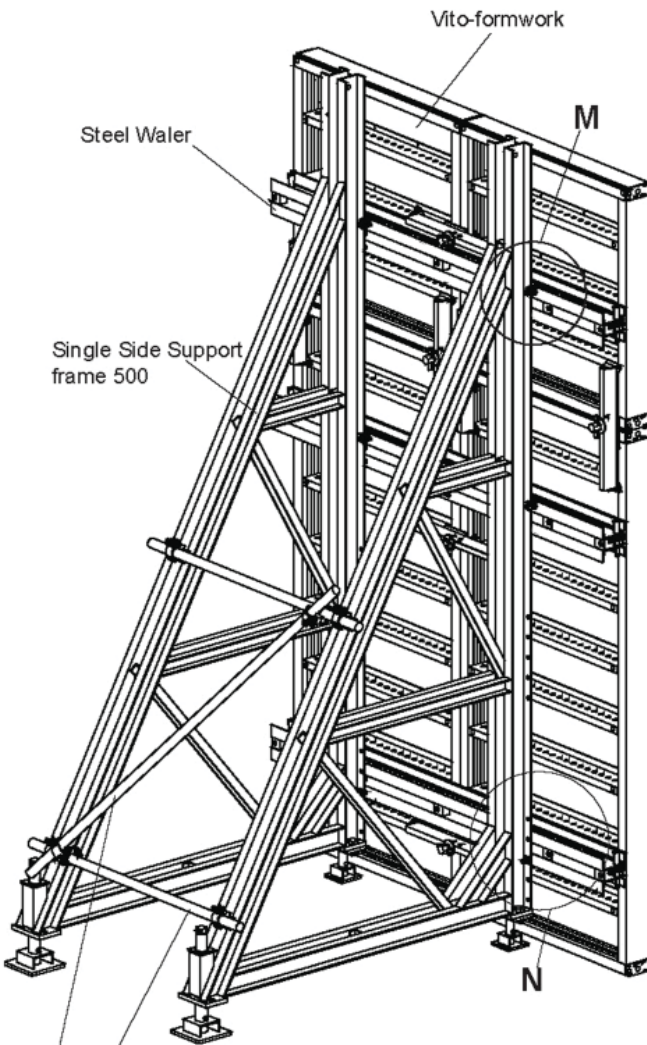
Components

	Art. No	Weight Kg/pc.	
<p>Galvanized Plate 12/12/2</p> <p>Used as an anchor plate together with the Hexagon Nut 26/60.</p>	104GP122	2.2	
<p>Tie Rod 26.5 / 40</p> <p>Tie Rod 26.5 / 100</p> <p>Can be cast-in and re-used for anchor elements of the Single Sided Support Frames.</p>	326TR040 326TR100	1.8 4.5	
<p>Hexagon Nut 26.5 / 120</p> <p>Fastens cast-in element to the re-usable anchor elements w.a.f. 46.</p>	410038	1.1	
<p>Curved Tie Rod 26.5/80</p> <p>Is cast-in and transfers the tensile loads into the building structure with maximum allowable load of 2 x 250 kN.</p>	326TR080	9.2	
<p>Tie Plate with Nut 26.5</p> <p>Transfers tensile loads into the building structure and is left permanently in the concrete with a Tie Rod.</p>	410039	3.6	

Application Samples

The Illustration below shows a formwork unit consisting of:

- A. 2 Single Sided Support Frames
- B. Steel Walers
- C. Two 1.20 m wide Vito formwork panels with a height of 3.9 m (2.7 m high x 1.2 m wide and 1.2 m high x 1.2 m wide)
- D. Single Sided Support Frame 500

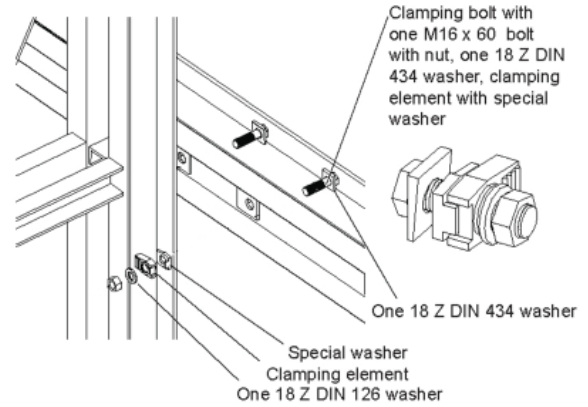


Bracing by Tubes and Couplers include 48.3 dia. x 3.2 mm Scaffold Tubes which are connected by Half-Couplers to the Single Sided Support Frame. Diagonal Scaffold Tubes have to be fixed by means of 2 Swivel Couplers.

Detail "M"

Other Steel Walers are connected to the Single Sided Support Frame 500 or Base Frame 200/2 by means of 2 Clamping Bolts at each connection point.

The Clamping Bolt is comprised of 1 M16 x 60 Bolt with Nut, one 18 mm Washer and clamping element with special washer

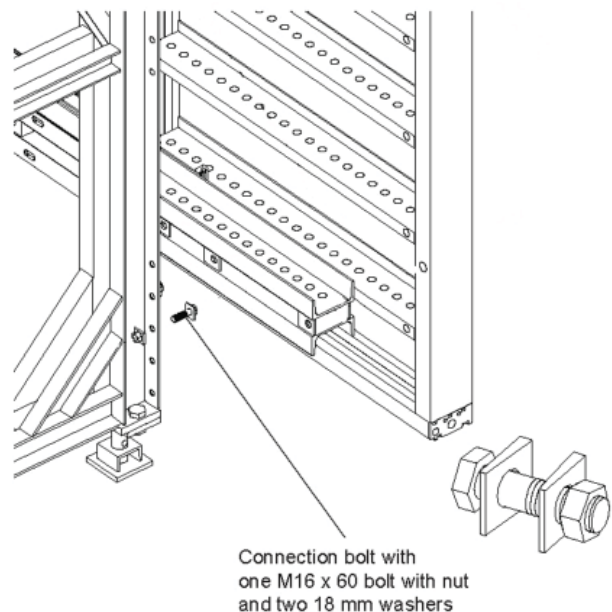


Detail "N"

The Steel Waler is fixed to the Vito wall formwork panels with the Waler Bolt which is passed through the tie holes of the Vito Panel and fixed with the Wedge.

The Wedge must be inserted in the hole at the end of the Waler and into the Waler Bolt. The Steel Waler at the bottom is connected to the Single Sided Support Frame by 2 Connection Bolts per fixing point. Always insert the third last hole in the vertical double profile of the Single Sided Support Frame 500 or Base Frame 200/2.

The Steel Waler must be fixed according to the below illustrated position.



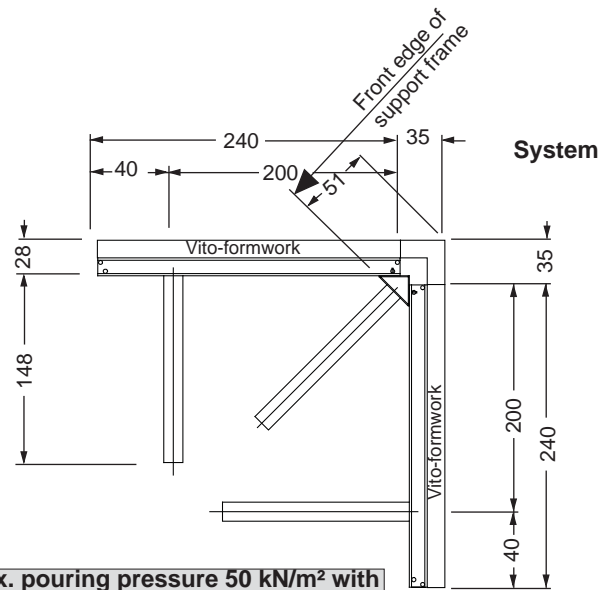
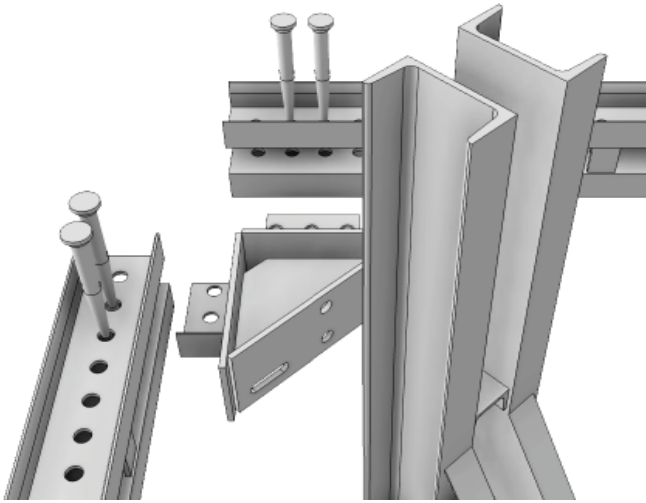
Corner Applications

Using Single Sided Support Frame 500 with Steel Walers, and the specially designed Corner Part, the Single Sided Wall with an inner corner can be arranged.

The special Corner Part fastens the Steel Walers in the corner and provides the required supporting point for a diagonal arrangement of the Support Frame.

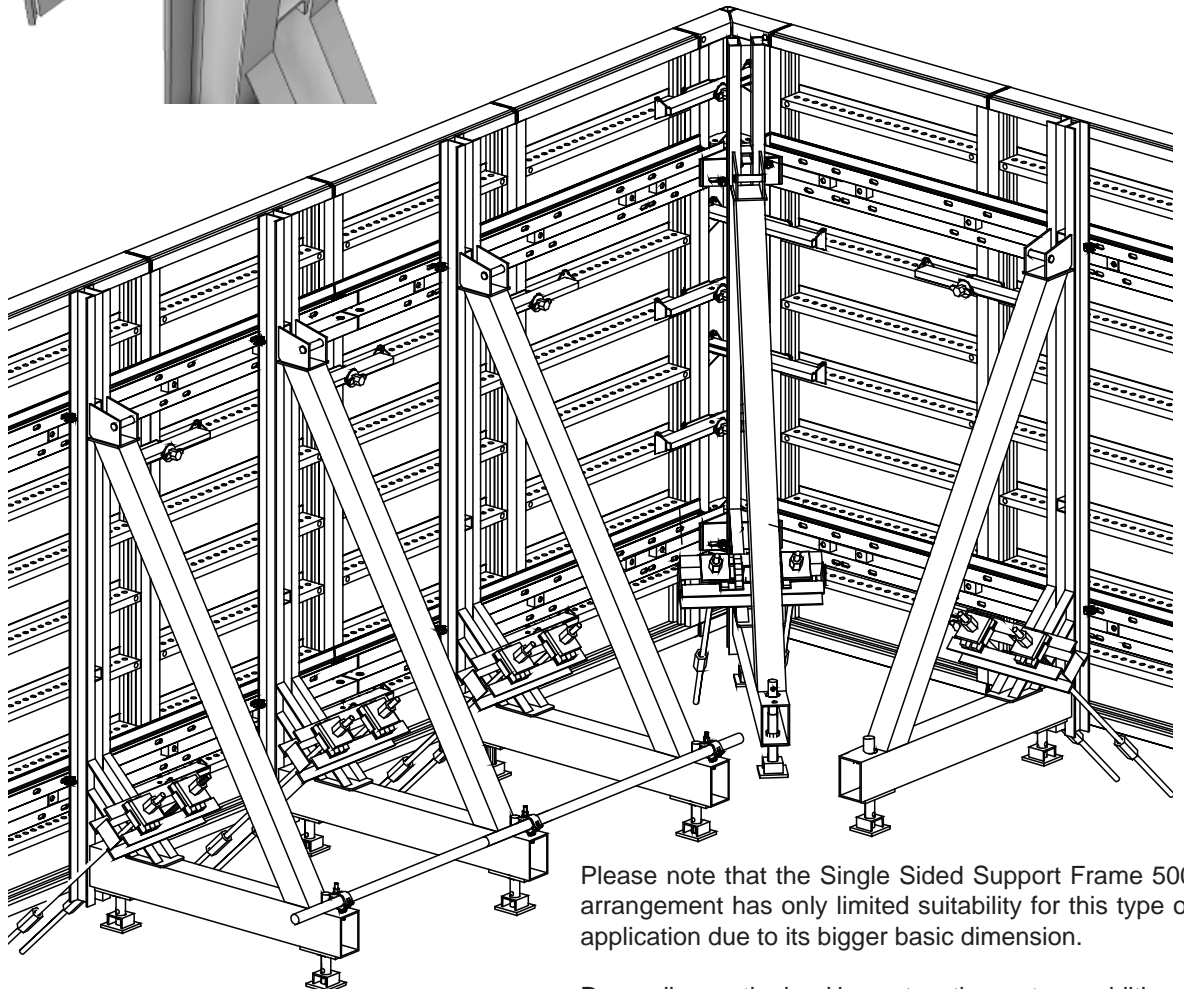
The maximum concrete pressure for this type of Support Frame arrangement is 50 kN/m².

Principal Arrangement of a Typical Inner Corner



Max. pouring pressure 50 kN/m² with this support frame arrangement

When positioning the cast-in anchoring components (Tie Rods with Anchor Plates or Curved Tie Rods), the increased distance between Single Sided Support Frames have to be considered due to the diagonal support frame in the corner.



Please note that the Single Sided Support Frame 500 arrangement has only limited suitability for this type of application due to its bigger basic dimension.

Depending on the load impact on the system, additional rows of Walers may be required due to larger spans.

Anchoring Details

The Single Sided Support Frame is anchored by the Tying Bar which transfers the tensile loads into the cast-in Curved Tie Rod using two Tie Rods. The Tying Bar position on the Single Sided Support Frame may vary. Using the Tie Bearing, tensile loads can be efficiently transferred with anchor angles varying from 35° to 55°. Furthermore, the position of the Tie Bearings may also differ on the Tying Bar. For Single Sided Support Frame, two Tie Bearings are required.

The cast-in Curved Tie Rod is selected according to the statical calculation and expected corresponding tensile loads. The following three Dywidag anchor systems are available:

As illustrated, the cast-in anchor components may either be Curved Tie Rods or Tie Rods with screwed-on anchor plates.

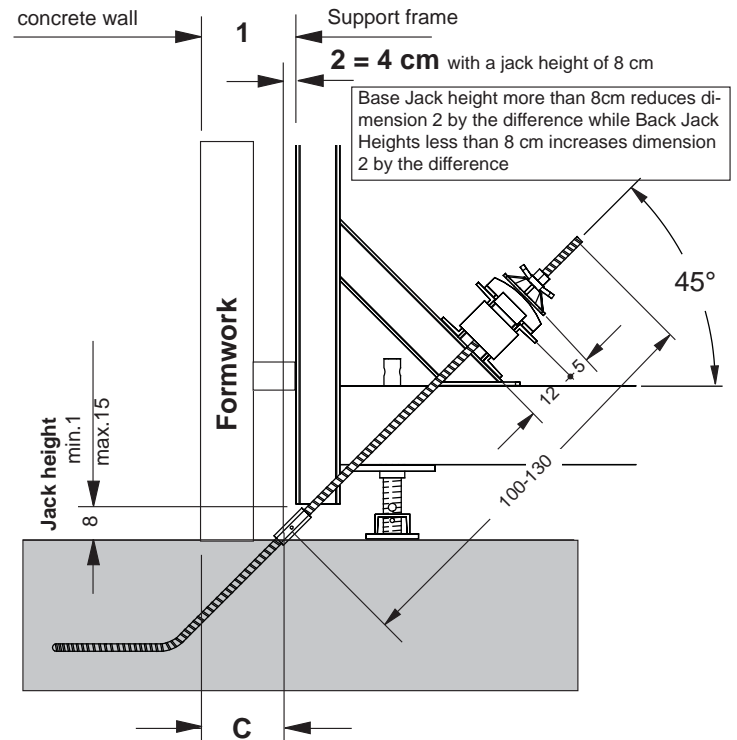
D&W 15mm dia. with 2 x 90 kN = 180 kN allowed tensile load

D&W 20mm dia. with 2 x 150 kN = 300 kN allowed tensile load

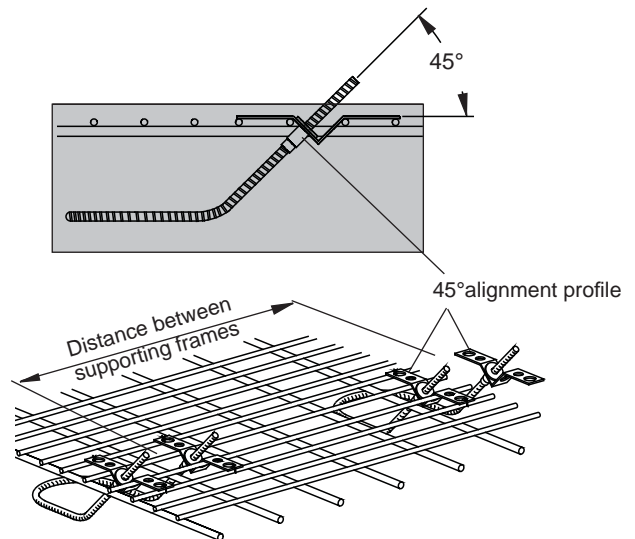
D&W 26.5mm dia. with 2 x 250 kN = 500 kN allowed tensile load

- A. Thickness of formwork + Steel Waler or Distance Keeper.
- B. Horizontal projected distance of anchor components from the edge of the formwork panel.
- C. 1-2 = Horizontal projected distance of anchor components from edge of concrete wall.

Support frame 325

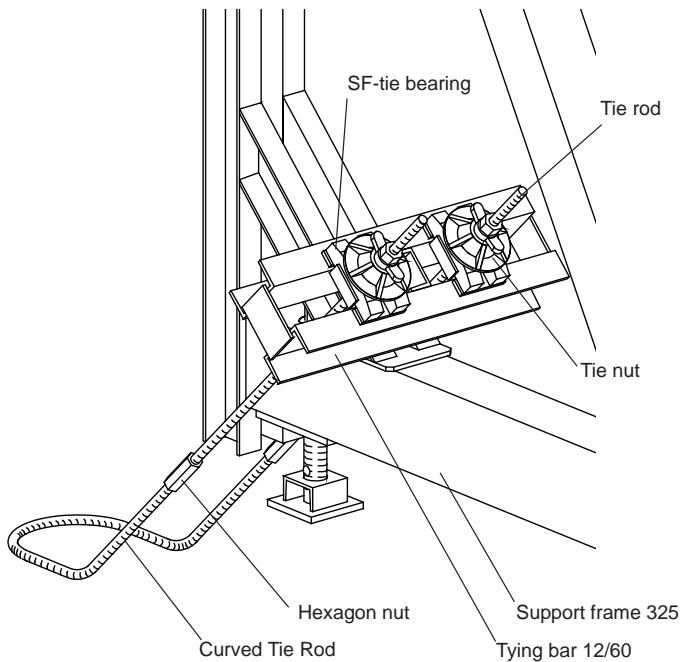


The exact position of the cast-in Curved Tie Rod which remains in the concrete must be determined based on the principle as shown in the drawing.



To prevent the selected anchor components from moving, it should be properly fixed to the reinforcing mesh. Arrange them based on length 3 which is the spacing between the Single Sided Support Frame and the projection angle.

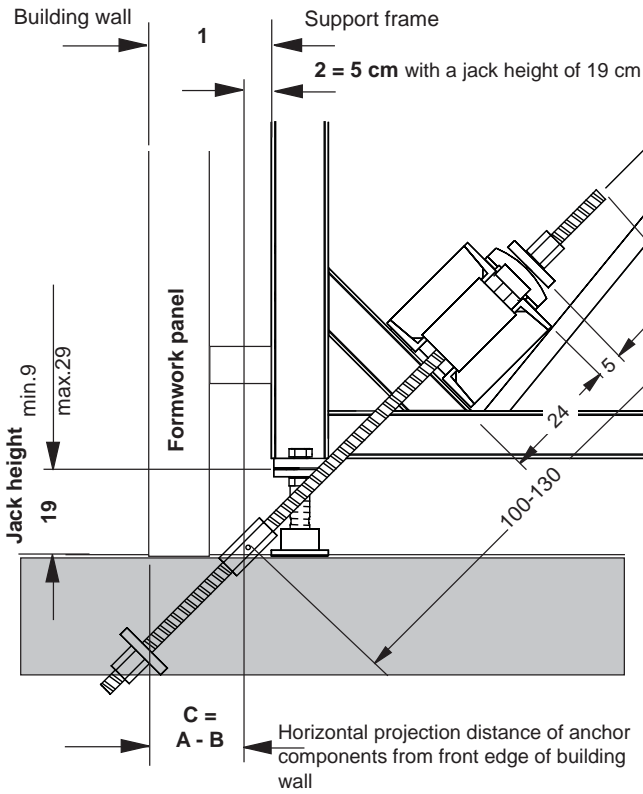
A 45° alignment profile for anchor components with the D&W 15 thread is used to fasten these parts in the reinforcing mesh and also aligns the Curved Tie Rod at a 45° angle.



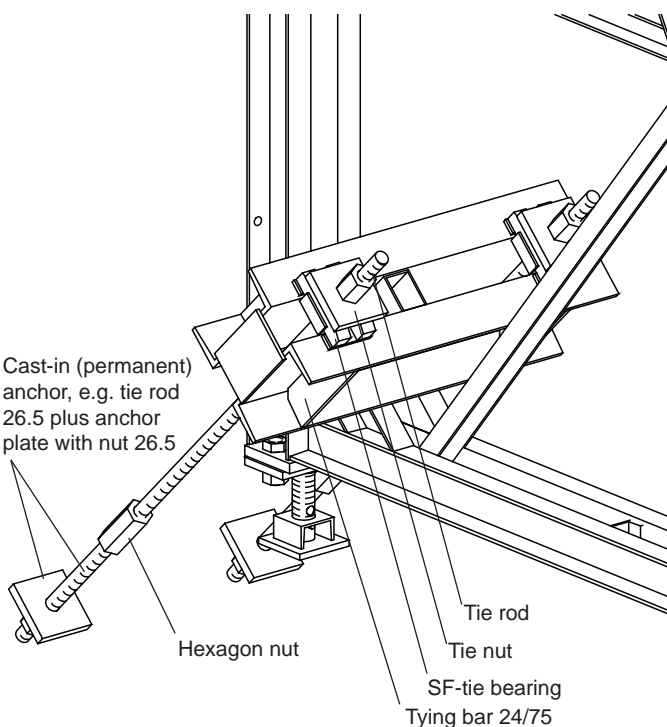
Anchoring Details

Anchor Details for Single Sided Support Frame 500 in Combination with Lower Part 200

The Tying Bar 24/75 is used to anchor the Single Sided Support Frame 500, Lower Part 200 and Base Frames 200/2.



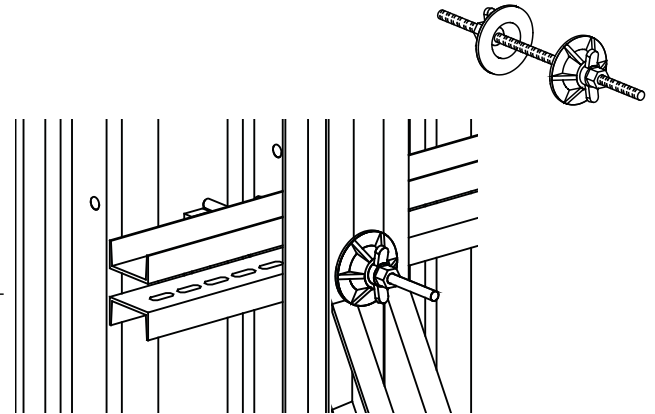
Base jack height more than 19 cm reduce dimension 2 by the difference while base jack heights less than 19cm increases dimension 2 by the difference.



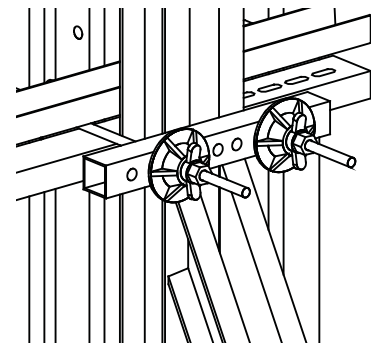
Timber Beam Formwork Connection

The vertical profile of the Single Sided Support Frames allows an independent grid connection to the horizontal water profiles of the H20 beam formwork system.

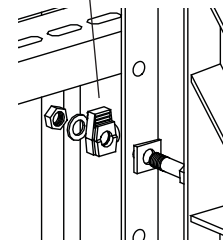
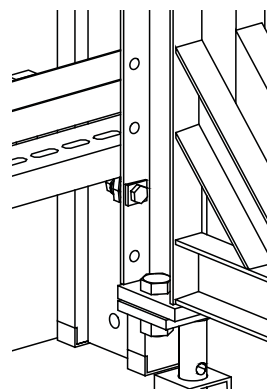
For example, a Tie Rod 60 cm with 2 Vito Tie Nuts are sufficient for this type of connection.



In case the H20 Timber Beams do not allow a threaded connection through the profile of the Single Sided Support Frame, connection can be made by the perforated Center Tube 50 with two Tie Rod 60.



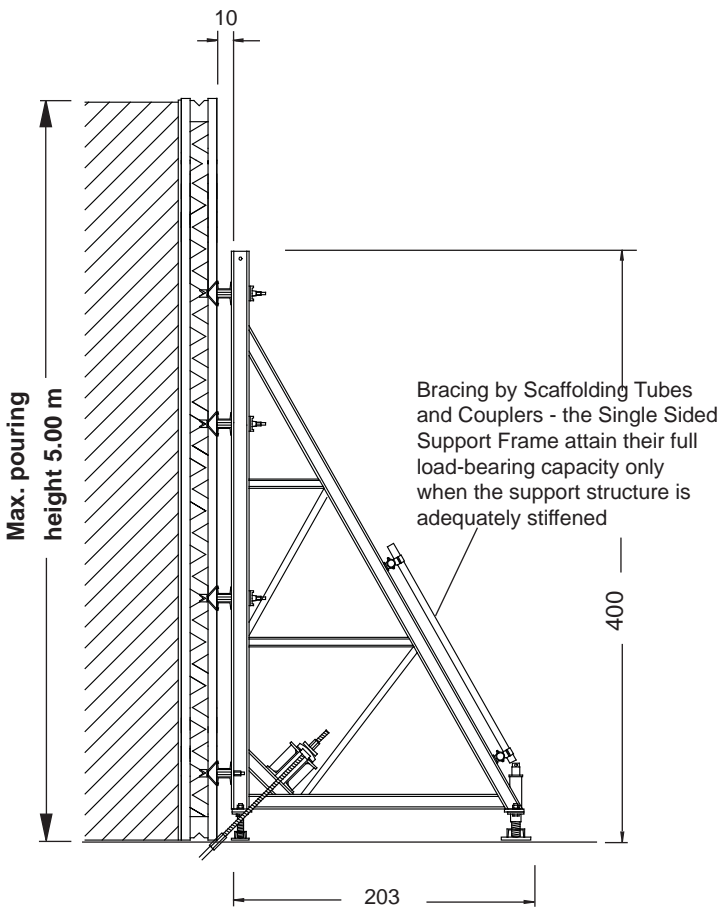
Clamping bolt consisting of one M16 x 60 bolt and nut, one 18 Z DIN 434 washer, clamping element with special washer



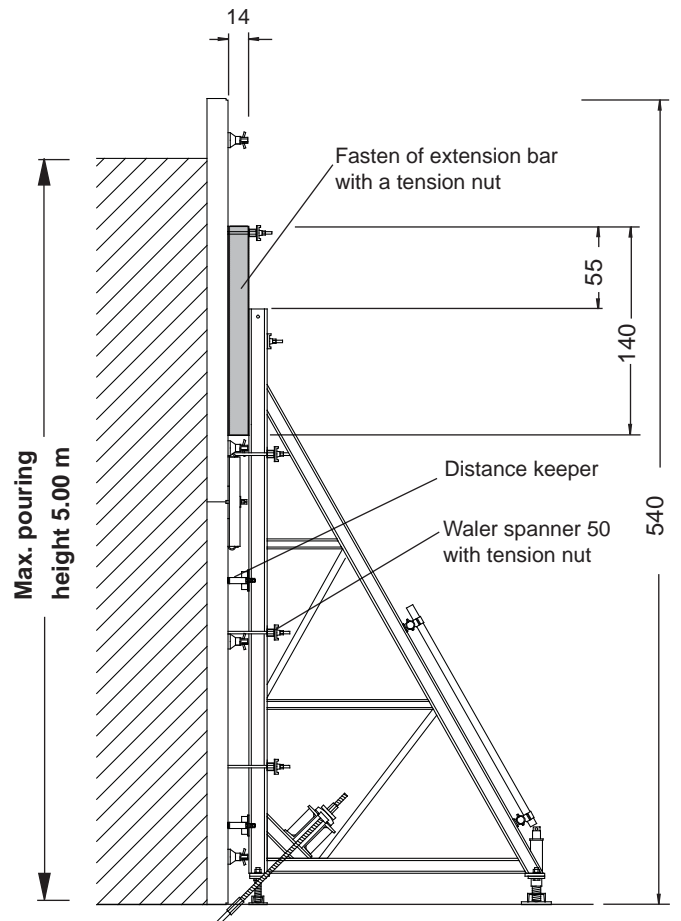
The Clamping Bolt holds in place the bottom Water profile of the H20 Timber Beam formwork. The clamping element of the Clamping Bolt must be aligned resting on the bottom Water profile.

Maximum Pouring Height

Single Sided Support Frame 500



Arrangement of Single Sided Support Frame 500 behind a lattice girder formwork element fastened by Tie Rods and Tie Nuts.

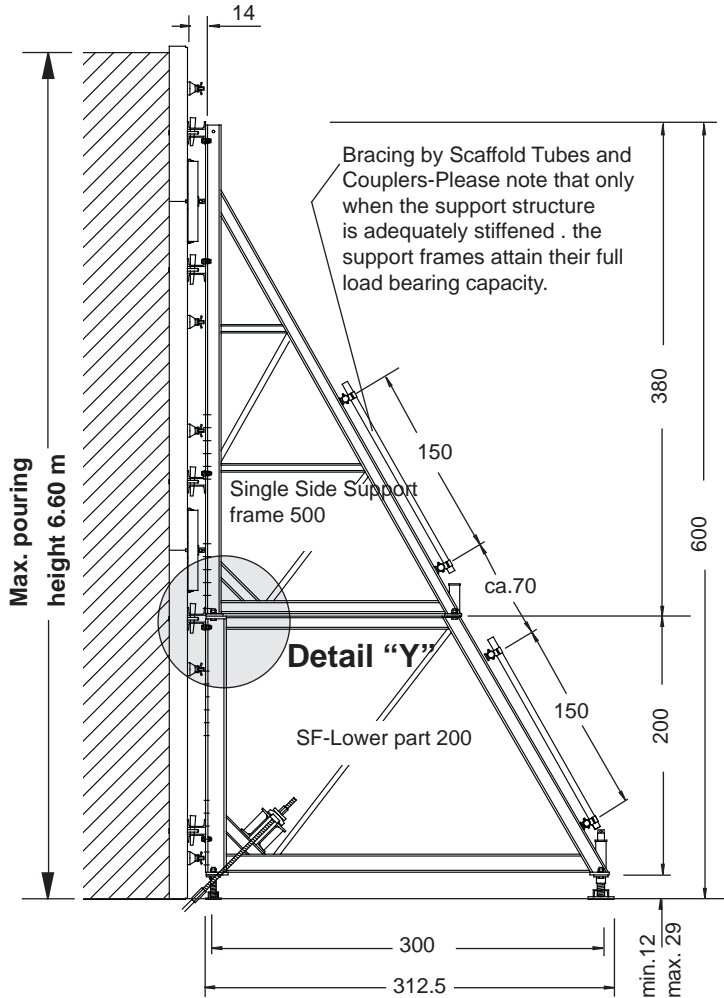


Using the Single Sided Support Frame 500 in combination with the Extension Bar, it is possible to support a 5.40 m height Vito wall formwork. In this case, the Single Sided Support Frames must always be placed at the joint of the formwork panels. Please note that the maximum pouring height is limited to 5.00 m.

Maximum Pouring Height

Single Sided Support Frame 500 with Lower Part 200

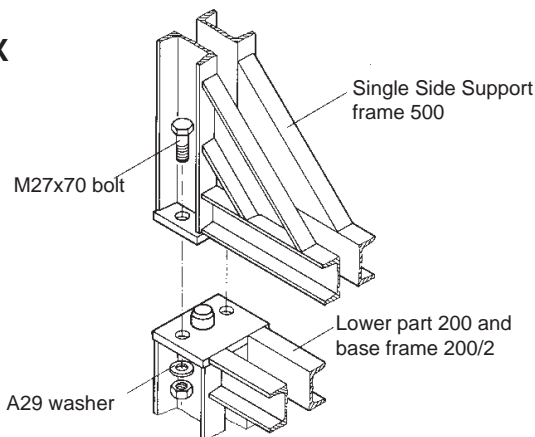
Shown below is the Single Sided Support Frame 500 with the height extended by means of the Lower Part 200. Between the support frame and the Vito steel framed panels, Steel Walers 240 are horizontally secured in alignment with the tie holes of the formwork system.



The maximum allowable concrete pouring height of 6.60 m is achievable due to extension using the Lower Part 200. The Base Jacks of the Single Sided Support Frame 500 are fixed to the Lower Part 200.

The Single Sided Support Frame 500 and Lower Part 200 are connected by four extra Bolts M27 x 70 with Nuts, A29 Washers and two w.a.f. 41 wrenches.

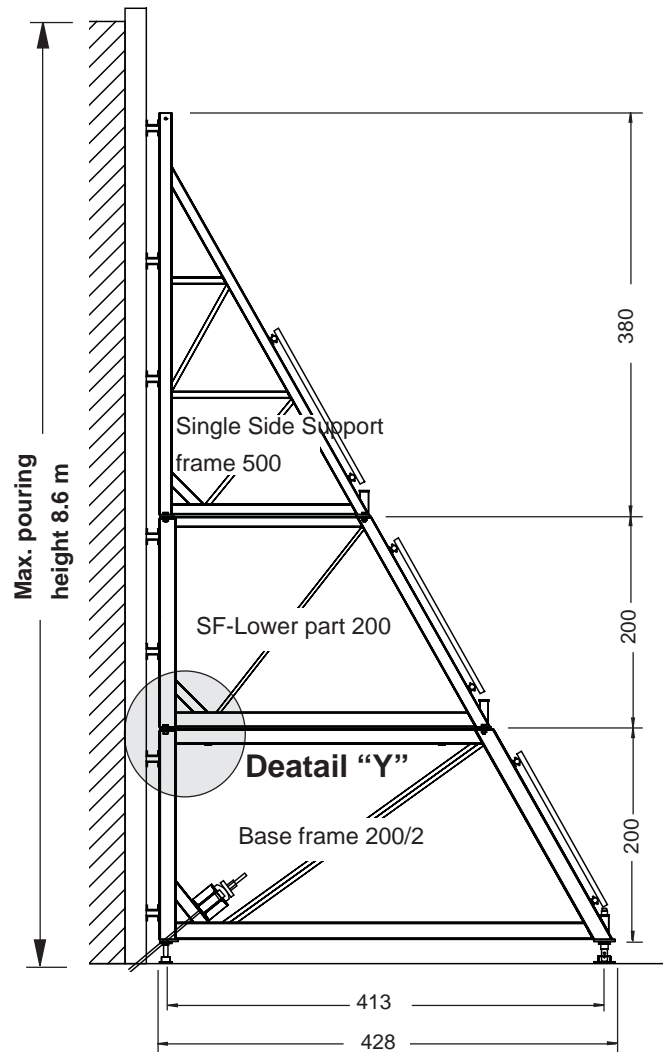
Detail X



Single Sided Support Frame 500 with Lower Part 200 and Base Frame 200/2

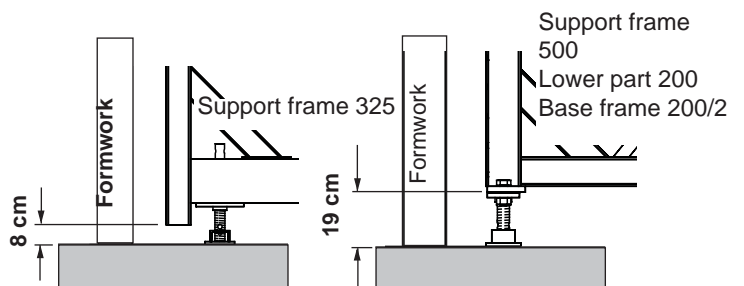
Using the Single Sided Support Frame 500 with the Lower Part 200 and the Base Frame 200/2, the assembly of a supporting structure for single sided walls of up to 8.40 m high can be achieved.

During the assembly, the jacks of the Single Sided Support Frame 500 have to be fixed to the lower Base Frame 200/2. The Single Sided Support Frame 500, Lower Part 200 and the Lower Part 200 are connected to the Base Frame 200/2 by four M27 Bolts with Nuts and A29 Washers. Note that the whole supporting structure must be sufficiently braced with tubes and couplers. A proof of structural strength and stability must always be provided for the application of this type of supporting structure



Measurement

The below illustrated ideal dimensions between the support frames and the wall formwork should also be considered.



Crane Lifting

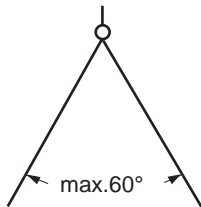
Single Sided Support Frame 500 with Lower Part 200

Carrying and lowering formwork by crane is made possible using two SF Shifting Hooks on site. Fastened to the crane ropes, simply attach the hook on top of the Single Sided Support Frame with the included pin.

The maximum load capacity of the SF Shifting Hook is 15 kN which is sufficient to carry a formwork unit of maximum 16 m² with attached Single Sided Support Frames.

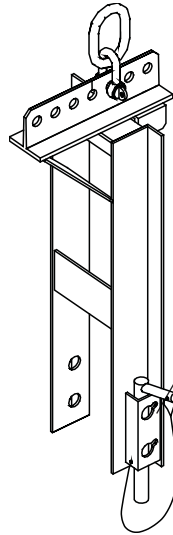
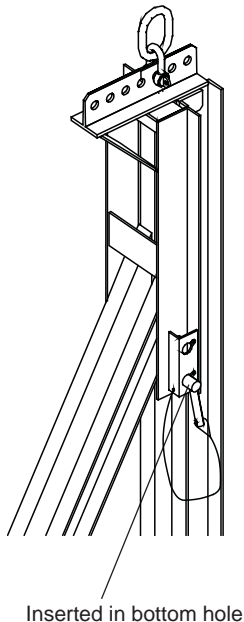
The SF Shifting Hook can also be connected to the Single Sided Support Frame 500 as well as the Single Sided Support Frame 325.

The crane ropes should not be suspended at an extreme angle.

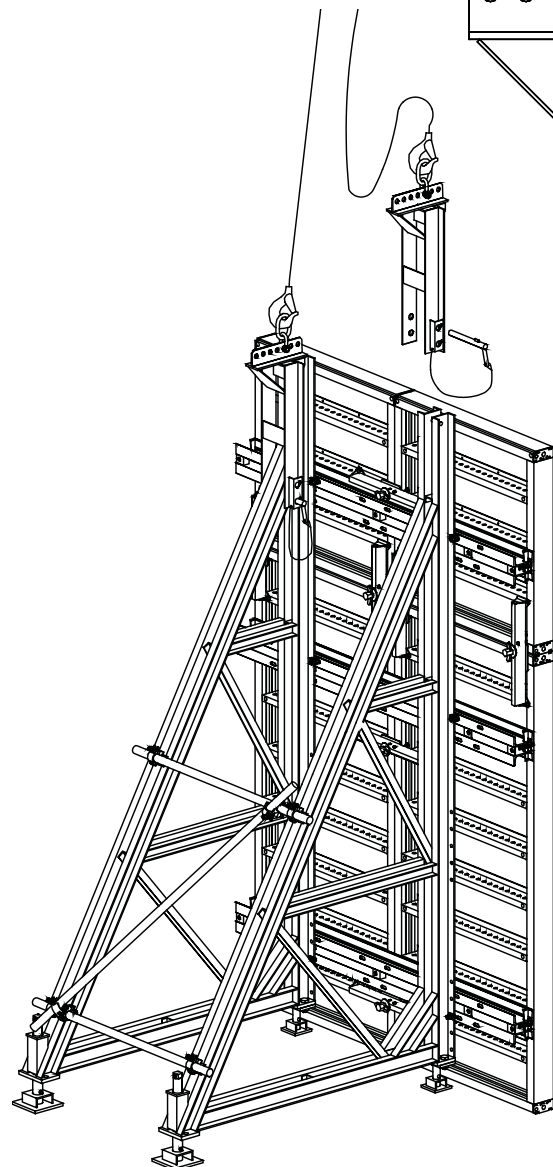
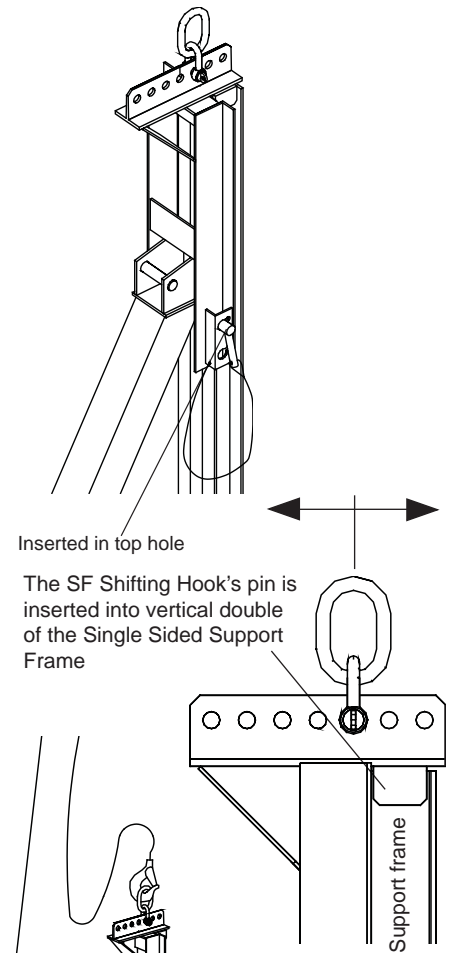


The SF Shifting Hook can be attached to:

- A. the Single Sided Support Frame 500
- B. the Single Sided Support Frame 325



Position of pin when hook is unused.



A suspension ring with shackle is attached to the horizontal profile of the SF Shifting Hook. By adjusting the position of the ring and shackle, the best possible center of gravity can be selected for the suspended formwork unit.

Loading Details

Single Sided Support Frame 325 Less than 45° anchor angle

Concrete Pressure kN/m ²	Concrete Pressure HT (m)	Reaction force			Max. distances between frames (m)
		W_a (kN/m)	W_{j1} (kN/m)	W_{j2} (kN/m)	
40	2.50	96	31	37	1.87
	2.75	110	28	51	1.63
	3.00	124	22	66	1.45
	3.25	138	14	84	1.24
50	2.50	106	38	38	1.70
	2.75	123	35	52	1.45
	3.00	142	31	70	1.27
60	3.25	159	23	90	1.13
	2.50	110	41	37	1.63
	2.75	132	41	52	1.37
	3.00	152	38	71	1.18
	3.25	174	32	92	1.03

Single Sided Support Frame 500 Less than 45° anchor angle

Concrete Pressure kN/m ²	Concrete Pressure HT (m)	Reaction force			Max. distances between frames (m)
		W_a (kN/m)	W_{j1} (kN/m)	W_{j2} (kN/m)	
40	3.50	153	34	74	2.16
	4.00	181	24	104	1.80
	4.50	209	8	140	1.55
	5.00	238	-8	181	0.97
50	3.50	177	45	80	1.88
	4.00	212	34	115	1.55
	4.50	247	17	158	1.31
	5.00	282	-2	207	0.97
60	3.50	195	54	85	1.72
	4.00	238	45	123	1.39
	4.50	280	27	170	1.16
	5.00	322	2	226	0.97

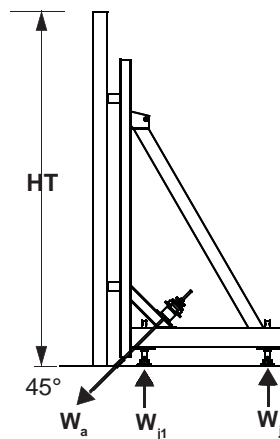
Single Sided Support Frame 500 with Lower part 200 Less than 45° anchor angle

Concrete Pressure kN/m ²	Concrete Pressure HT (m)	Reaction force			Max. distances between frames (m)
		W_a (kN/m)	W_{j1} (kN/m)	W_{j2} (kN/m)	
40	5.50	266	60	128	1.74
	6.00	294	49	159	1.56
	6.50	328	31	200	0.97
50	5.50	318	78	147	1.45
	6.00	354	66	183	1.30
	6.50	396	47	233	0.97
60	5.50	365	97	161	1.27
	6.00	407	85	203	1.13
	6.50	458	63	260	0.97

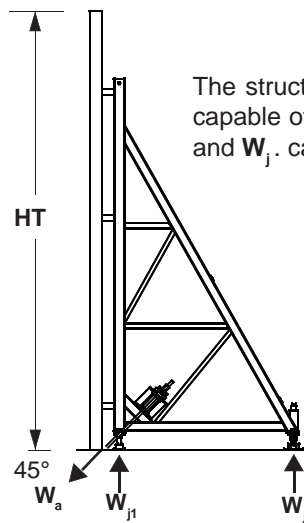
Single Sided Support Frame 500 with Lower part 200 and Base Frame 200/2 Less than 45° anchor angle

Concrete Pressure kN/m ²	Concrete Pressure HT (m)	Reaction force			Max. distances between frames (m)
		W_a (kN/m)	W_{j1} (kN/m)	W_{j2} (kN/m)	
40	7.00	319	25	176	1.56
	7.50	345	12	206	1.44
	8.00	371	7	239	1.34
	8.60	402	-16	281	0.97
50	7.00	386	37	206	1.29
	7.50	418	21	243	1.19
	8.00	451	2	282	1.10
	8.60	489	-14	334	0.97
60	7.00	448	51	232	1.11
	7.50	487	32	274	1.02
	8.00	525	10	301	0.95
	8.60	571	-7	327	0.87

A separate proof of structural strength should be provided in case of deviations from the figures mentioned in the tables. This applies in particular to the anchor angle and concrete pressure.

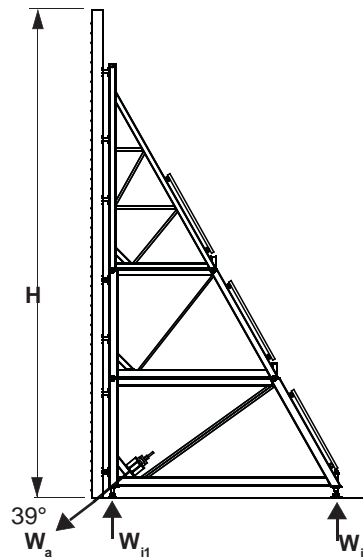
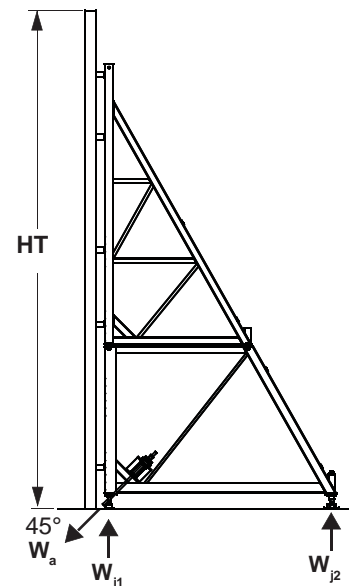


Please note that the Single Sided Support Frame only attain its full load-bearing capacity when the support structure is adequately stiffened by Scaffold Tube and Coupler bracing.



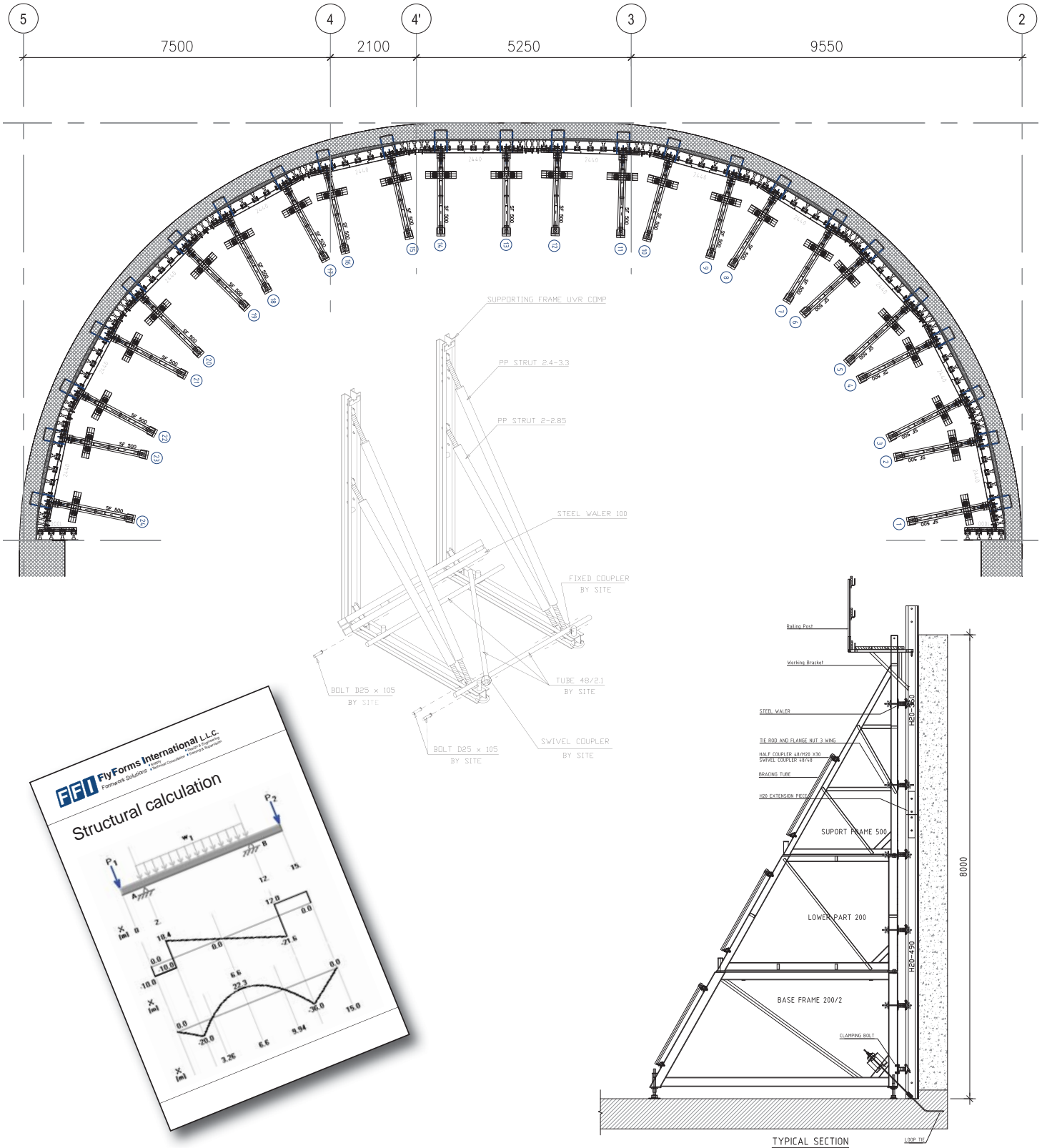
The structural parts must be capable of carrying loads W_a and W_{j1} calculated here.

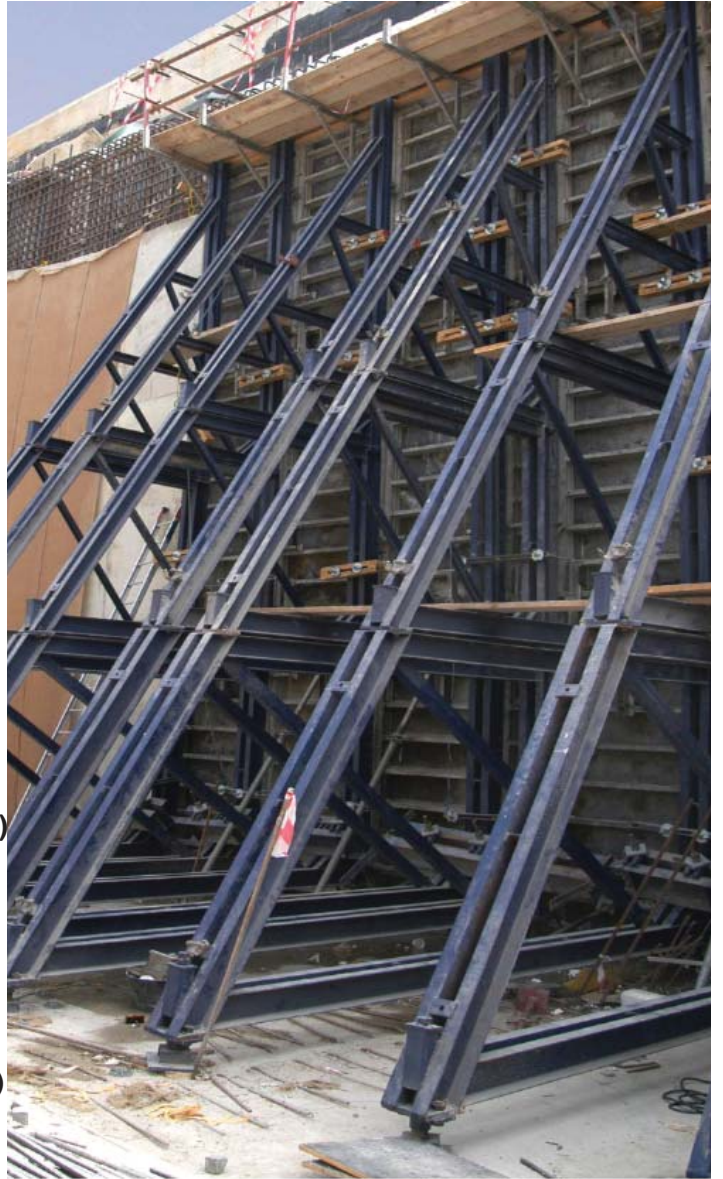
Sufficient temporary weight must be provided to prevent the support structure from moving up in case the Base Jack forces W_{j1} is in the minus range.



Engineering, Design & Drawing

- A. All the Shop drawing, Technical data & the Statical calculation will be Submitted by FFI in accordance with the structural drawing project requirement
- B. The site erection should be done as per FFI's shop drawing and shall be supervised and inspected by FFI's formwork specialist
- C. The spacing and positioning of the Formwork material are arranged based on the statical requirements and as shown in the FFI's execution drawing & Calculation





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