Adjustable supporting frames

VARIANT

USER MANUAL

www.variant-factory.eu

ISO 9001
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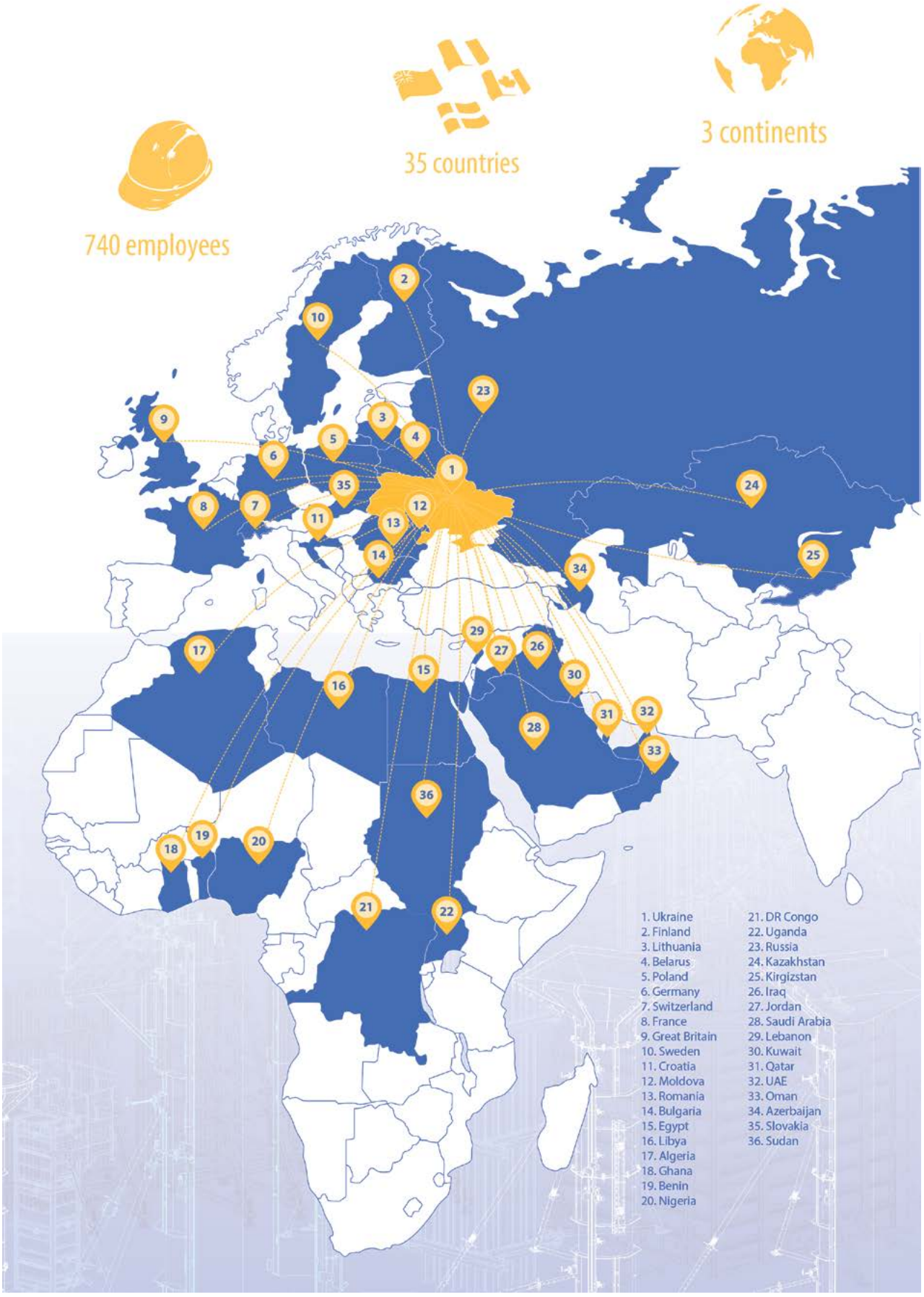
N° 00000


740 employees
35 countries
3 continents
1. Ukraine
2. Finland
3. Lithuania
4. Belarus
5. Poland
6. Germany
7. Switzerland
8. France
9. Great Britain
10. Sweden
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36. Sudan

Contents

GENERAL INSTRUCTIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

WARNING NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SYSTEM OVERVIEW

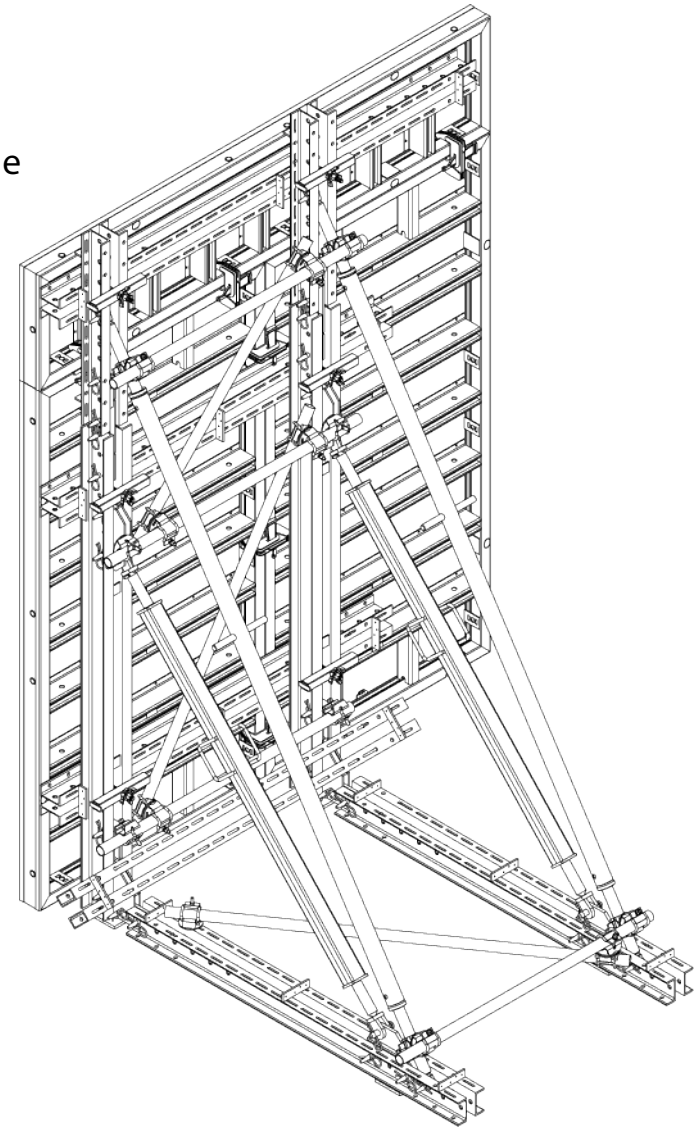
The adjustable supporting made by «VARIANT» factory have optimum dimensions and are easily compatible with any formwork system offered.
They are characterized by good sustaining of heavy load and easy installation. The adjustable supporting may be assembled separately, and then they are to be connected by framed tubes to achieve the required stiffness.

The supporting frames may be installed manually.

PRODUCT FEATURES:

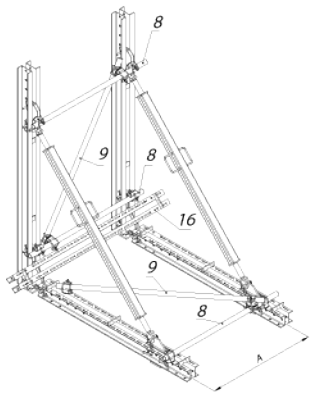
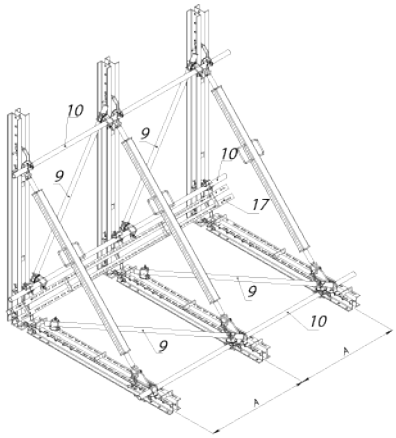
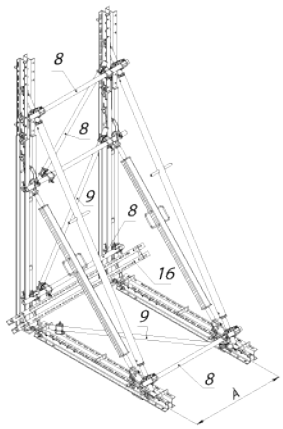
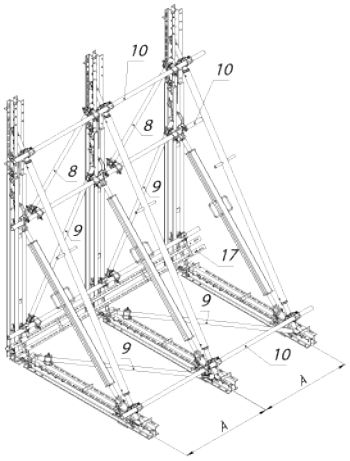
- The supporting frames are compatible with large-area Vertex 60 and framed formwork Varimax.
- Load of fresh concrete is borne by the thrust anchor at the base of the structure.
- Depending on the shape and load characteristics of the structure, it's only necessary to change the distance between the frames of the adjustable buttress as required.

Permitted load pressure – up to 50 kPa



STANDARD UNITS

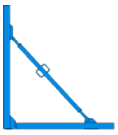
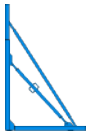
The adjustable supporting frame units can be assembled in identical fashion for use with either large-area or framed formwork.
The adjustable supporting frames must be correctly braced with scaffold tubes to attain the stated capacity.
The examples illustrated below show the correct ways of bracing of the adjustable supporting frame units.

	2 parallel Adjustable supporting frames		3 parallel Adjustable supporting frames	
	Large-area formwork	Framed formwork	Large-area formwork	Framed formwork
Centre-to-centre* A [m]	1,00 or 1,25	1,35 or 1,55**	1,00	0,90
Adjustable supporting frames Frame type I				
Vertically extended Adjustable supporting frames Frame type II				

* is normally the same as the influence width
** only when the following framed panels are used: 2,40 x 2,70 m, 1,35 x 2,70 m , . . x 2,70 m – horizontally (results in an influence width of 1,35 m in each case)

STANDARD UNITS

- Items needed for a centre-to-centre distance of 0,90 m to 1,35 m

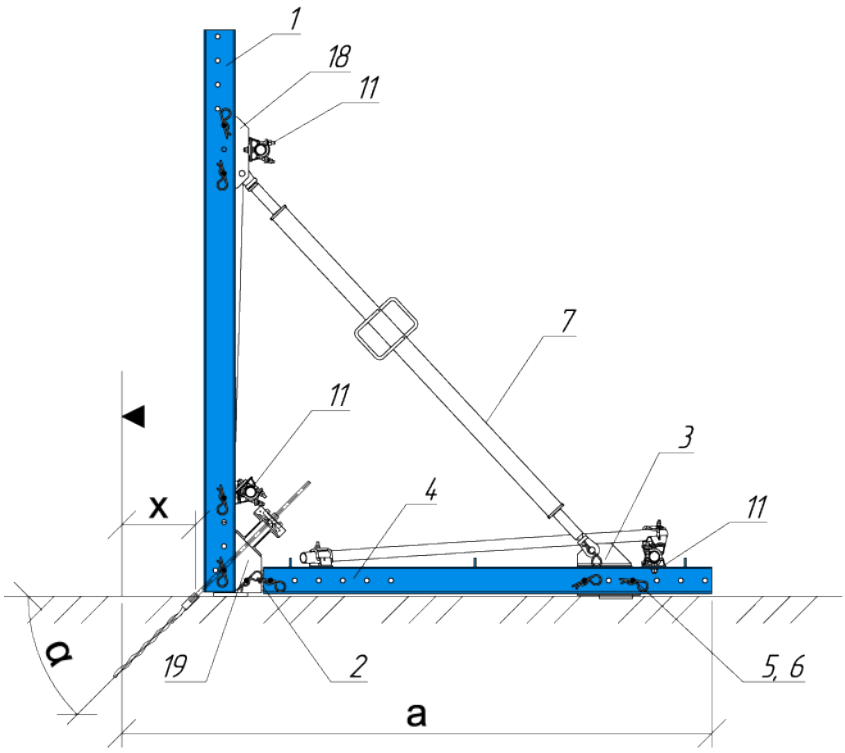
Adjustable supporting frames type	Article, №				
Number of parallel adjustable supporting frames		**2**	**3**	**2**	**3**
(1) Steel section	4019	2	3	2	3
(2) Tension plate	4020	2	3	2	3
(3) Supporting shoe	4017	2	3	2	3
(4) Waling 12 2,00 m	3007	2	3	2	3
(5) Connection pin***	3022	16	24	24	36
(6) Stripping cotter***	3023	16	24	24	36
(7) Spindle strut 12 3,00 m	4022	2	3	2	3
(8) Framed tube 1,50 m*	9413	3	–	5	2
(9) Framed tube 2,00 m*	9414	2	4	2	4
(10) Framed tube 2,50 m*	9415	–	3	–	4
(11) Screw-on coupler	9423	7	11	5	8
(12) Swivel coupler	9417	3	6	9	16
(13) Waling 12 1,00 m	3003	–	–	2	3
(14) Element connector	3034	–	–	2	3
(15) Spindle strut T7 305/355	4021	–	–	2	3
(16) Waling 12 2,00 m used as anchor walings**	3007	1	–	1	–
(17) Waling 12 3,00 m used as anchor walings**	3010	–	1	–	1
(18) Pressure shoe	4018	2	3	2	3
(19) Anchoring shoe	4016	2	3	2	3
Weight of the unit [kg] – approximately		**436**	**669**	**583**	**896**

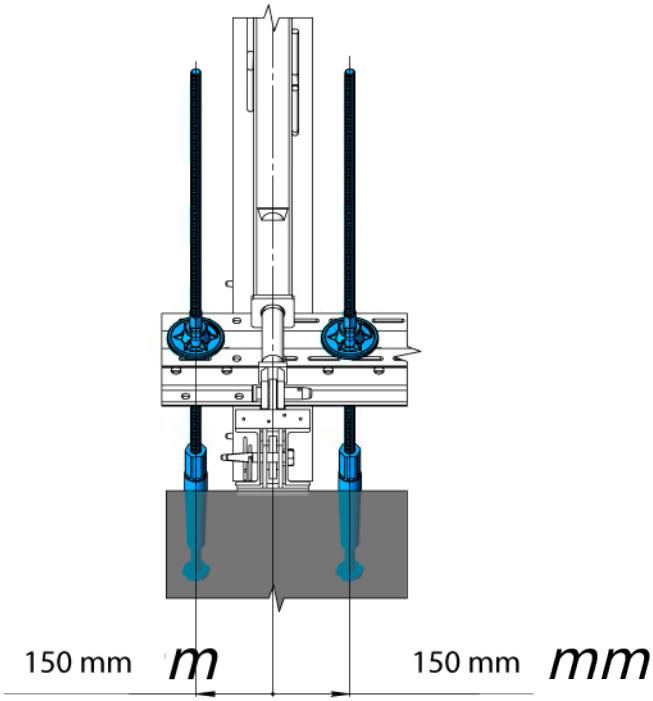
* required length of the framed tubes for a centre-to-centre distance of 1,55 m: stated length + 0,50 m
** for dimensioning details, see the following sections:
– «Combining with large-area formwork»
– «Combining with framed formwork»
– «Anchoring solutions for the Adjustable supporting frames»
*** the table also shows how many connecting pins and spring cotters are needed for lifting the unit (see the section headed «Lifting and resetting by crane»).

STANDARD UNITS

CONNECTION DETAILS AND ANCHOR POSITIONING

The loads from the diagonal anchors are transferred via anchor walings (Walings 12). For each adjustable supporting frame, an anchor is placed 15 cm either side of the vertical axis of the Adjustable supporting frame (i.e. 2 in all).
Exception: If the load-bearing capacity is sufficient for 1 anchor per adjustable supporting frame, the anchors on each unit must be placed symmetrically.





a = 249 mm
α = 45°
◀ – line of concrete wall

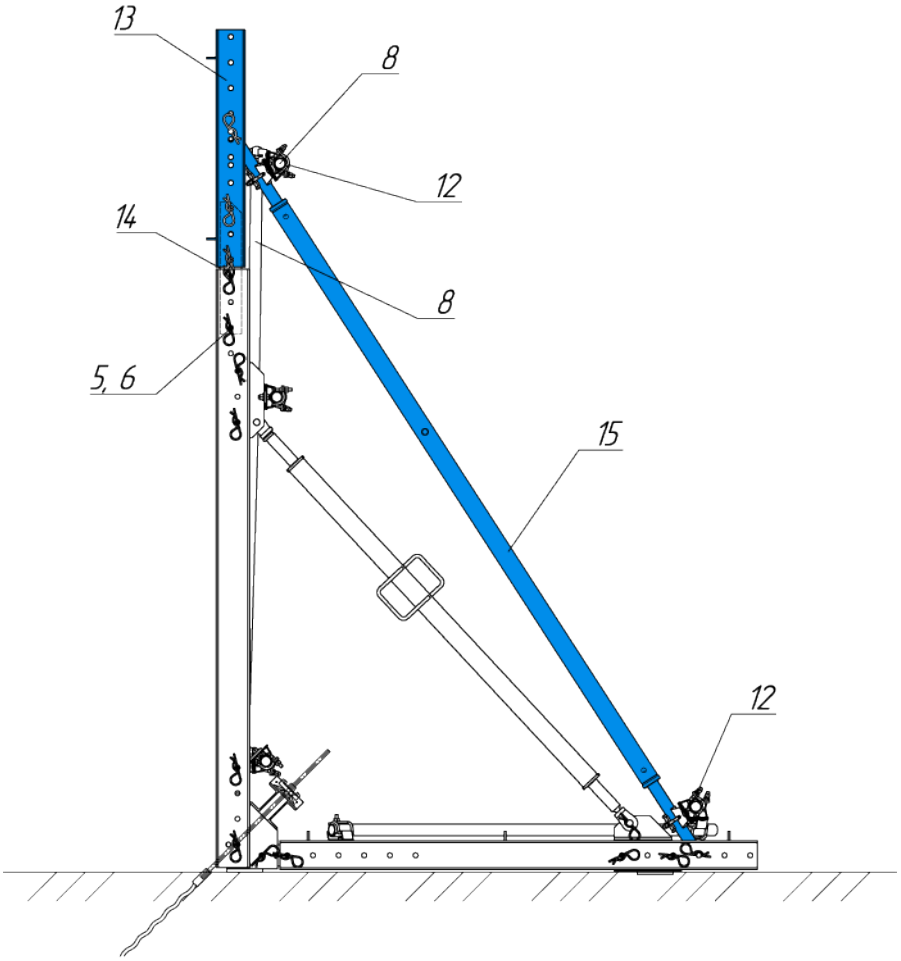
Formwork system	X
Large-area formwork Vertex60 (plywood 21 mm)	32.0 cm (where anchor is angled at 45°)
Framed formwork Varimax in conjunction with walings 12	22.0 cm (where anchor is angled at 45°)

STANDARD UNITS

VERTICALLY EXTENDING

The following components are used for vertically extending an adjustable supporting frame:

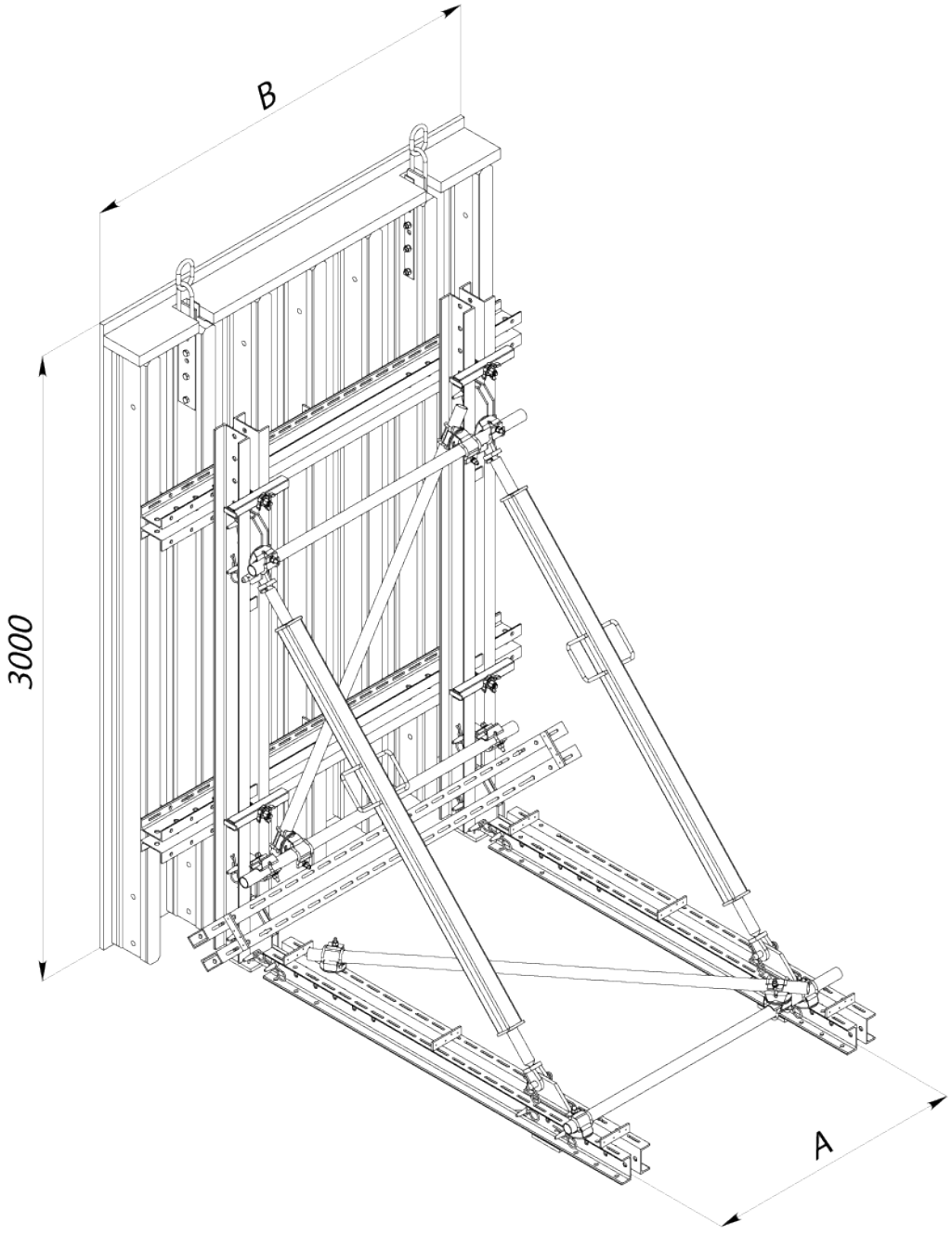
- waling 12 1,00 m
- element connector + connecting pin
- spindle strut T7 for additional shoring
- supplementary bracing



COMBINING WITH LARGE-AREA FORMWORK VERTEX 60

EXAMPLE: FORMWORK HEIGHT 3,00 m

Centre-to-centre distance «A» = 1,00 m
Influence width = 1,00 m
Frame type – I



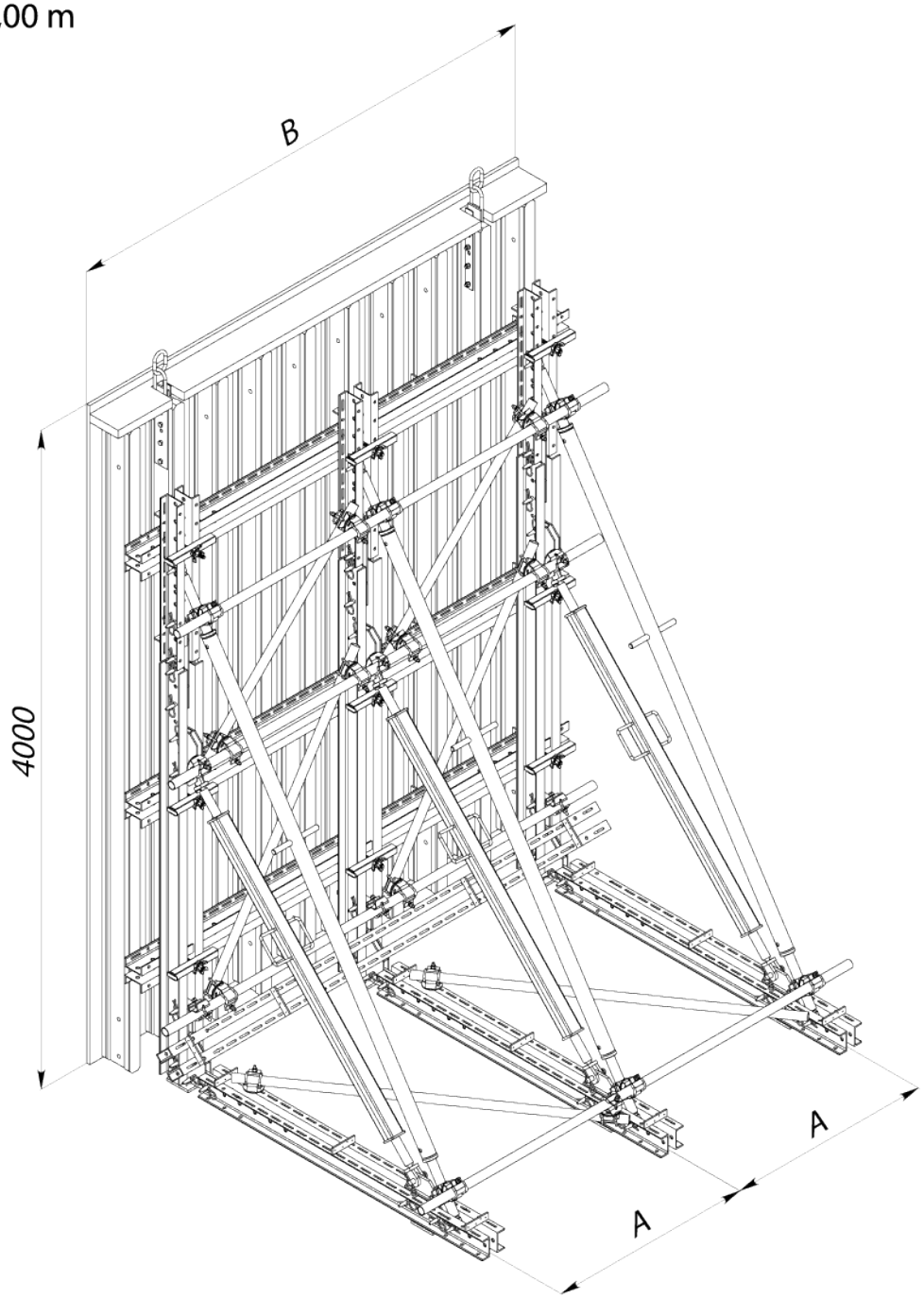
A = 1,00 m
B = 2,00 m

EXAMPLE: FORMWORK HEIGHT 4,00 m

Centre-to-centre distance «A» = 1,00 m

Influence width = 1,00 m

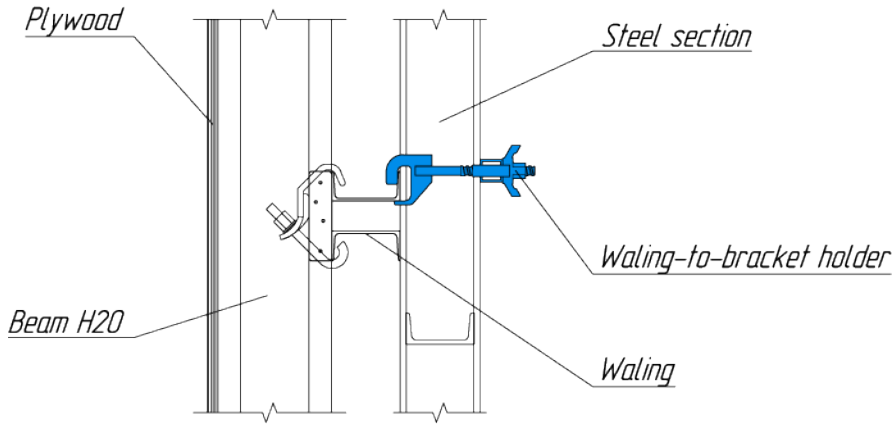
Frame type – II



A = 1,00 m
B = 3,00 m

FIXING THE FORMWORK

Large-area formwork elements are clamped directly onto the adjustable supporting frame using the waling-to-bracket holder. The walings of the elements can be fixed anywhere onto the steel section.



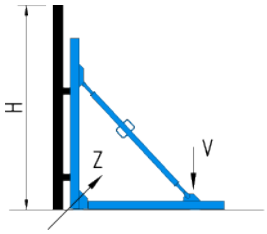
Frame type	2 parallel adjustable supporting frames	3 parallel adjustable supporting frames
Formwork height up to 3.0 m		
Number of waling-to-bracket holders	4	6
Formwork height up to 4.0 m		
Number of waling-to-bracket holders	6	9

STRUCTURAL DESIGN

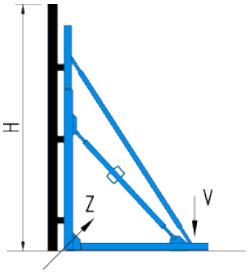
The values given in the table are only applicable for forming situations where there is no kicker. In cases with large kickers, the overall stability of the Adjustable supporting frame must be reviewed.
The loading data is per parallel frame with an anchor inclination of 45°.
Fields containing no data (-----) are not permissible – Adjustable supporting frame would be overloaded!

H – pour height, [m]
Zk – anchor force, [kN]
Vk – shoring force, [kN]
f – deformation at top, [mm]

Pour heights of up to 3,25 m

Adjustable supporting frame (type I)			H	Influence width 1,00 m			Influence width 1,25 m		
				Zk	Vk	f	Zk	Vk	f
	Permitted pressure of fresh concrete	40 kN/m²	2,50	96	34	2	120	43	2
			2,75	110	45	3	138	56	3
			3,00	124	56	3	156	70	4
			3,25	139	69	4	173	86	5
		50 kN/m²	2,50	106	36	2	133	45	2
			2,75	124	47	3	155	59	3
			3,00	141	60	4	177	75	5
			3,25	159	75	5	199	94	6

Pour heights from 3,25 m to 4,00 m

Adjustable supporting frame (type II)			H	Influence width 1,00 m			Influence width 1,25 m		
				Zk	Vk	f	Zk	Vk	f
	Permitted pressure of fresh concrete	40 kN/m²	3,25	139	69	2	173	86	2
			3,50	153	83	2	191	104	3
			3,75	167	99	3	–	–	–
			4,00	181	116	5	–	–	–
		50 kN/m²	3,25	159	75	2	199	94	2
			3,50	177	91	3	–	–	–
			3,75	194	110	4	–	–	–
			4,00	212	130	5	–	–	–

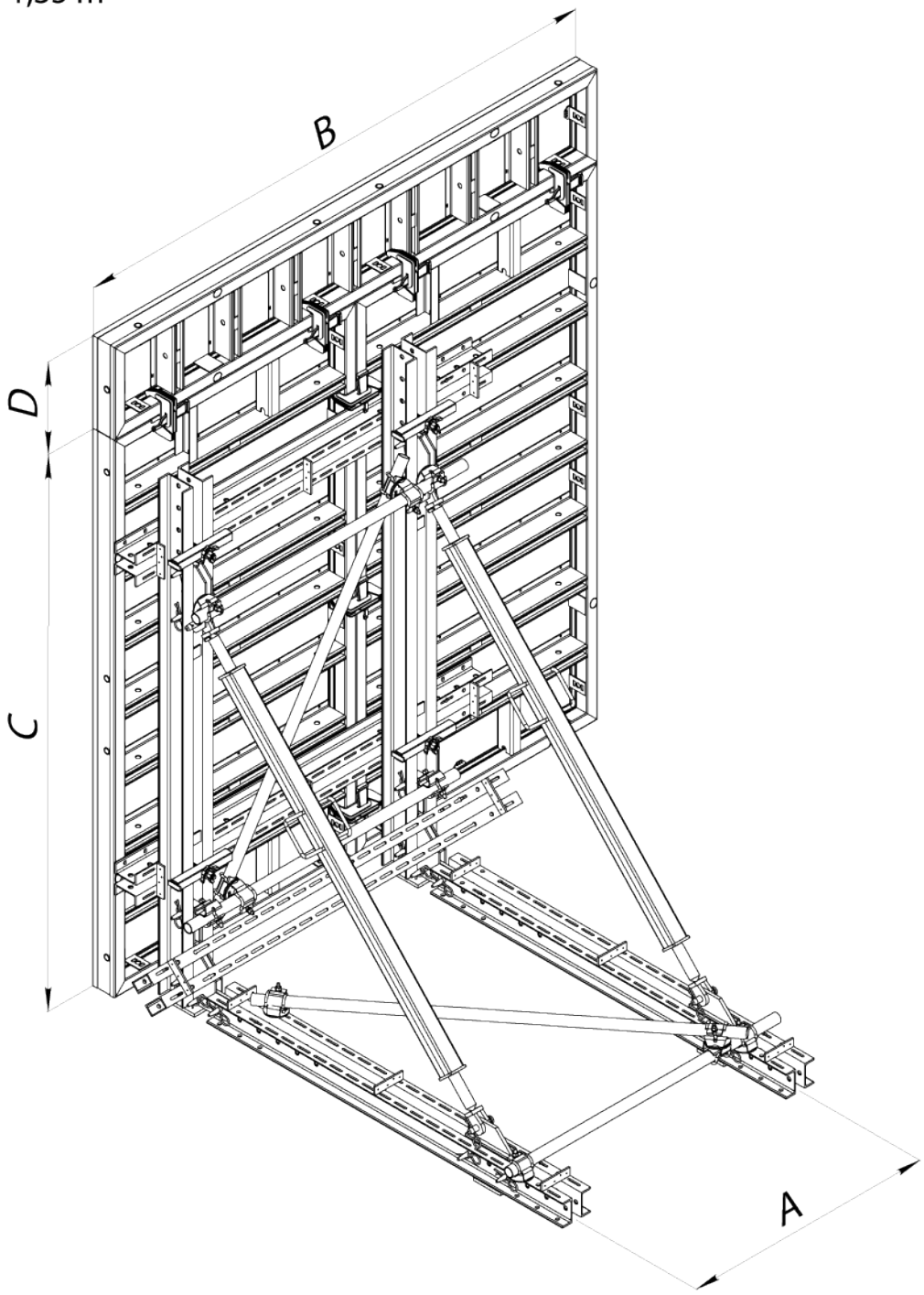
COMBINING WITH FRAMED FORMWORK VARIMAX

EXAMPLE: FORMWORK HEIGHT 3,00 m

Centre-to-centre distance «A» = 1,35 m

Influence width = 1,35 m

Frame type – I



A = 1,35 m
B = 2,70 m
C = 2,70 m
D = 0,30 m

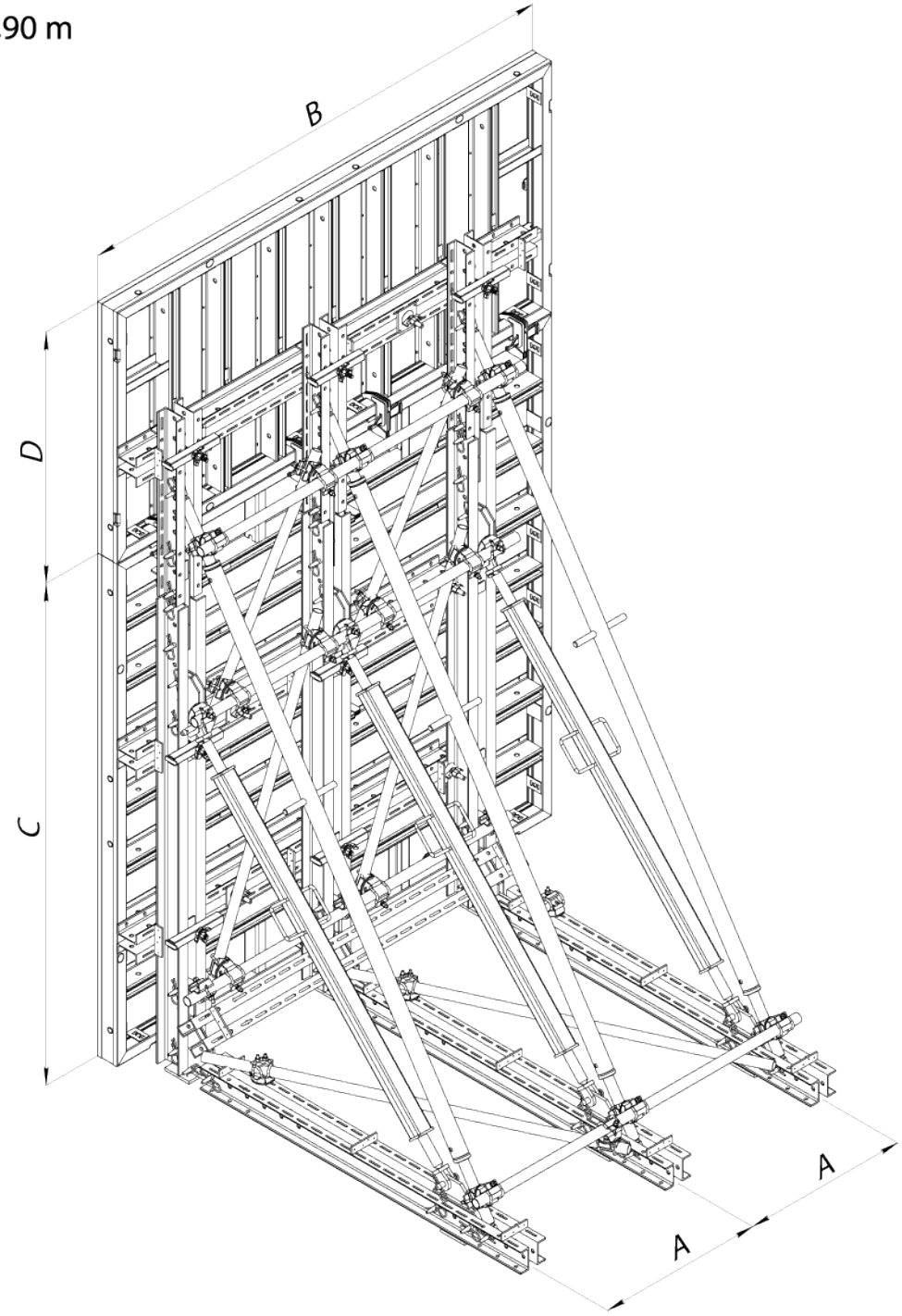
COMBINING WITH FRAMED FORMWORK

EXAMPLE: FORMWORK HEIGHT 4,05 m

Centre-to-centre distance «A» = 0,90 m

Influence width = 0,90 m

Frame type – II



A = 0,90 m
B = 2,70 m
C = 2,70 m
D = 1,35 m

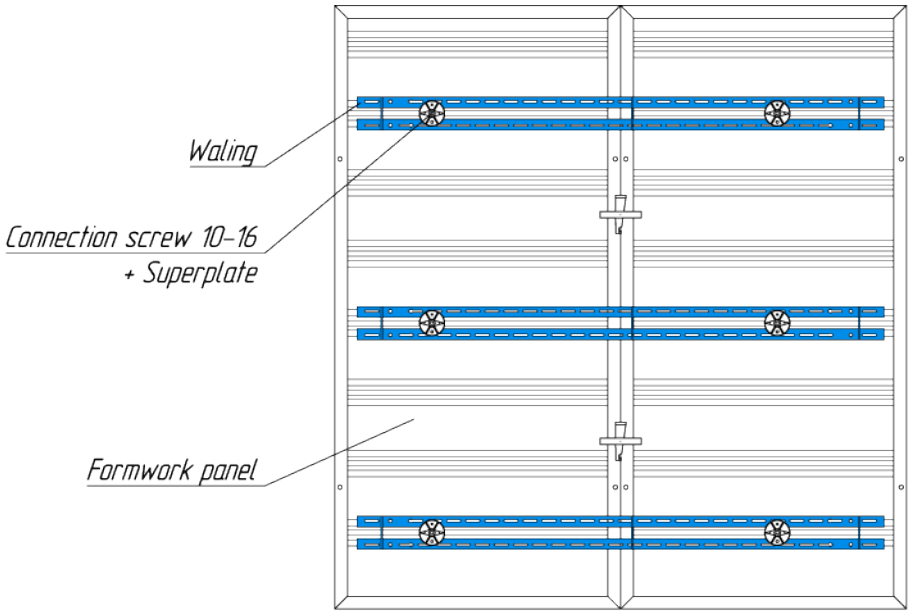
FIXING FORMWORK

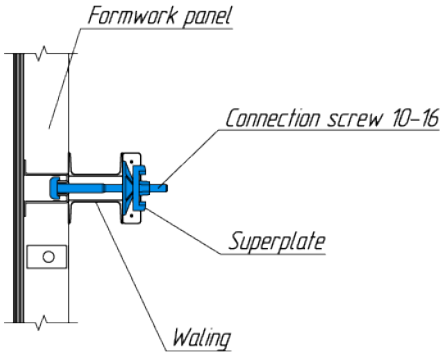
To fix Adjustable supporting frames to framed formwork Varimax use Walings 12. Waling 12 is fastened in the profile of the formwork using the Connection screw 10-16 and Superplate.

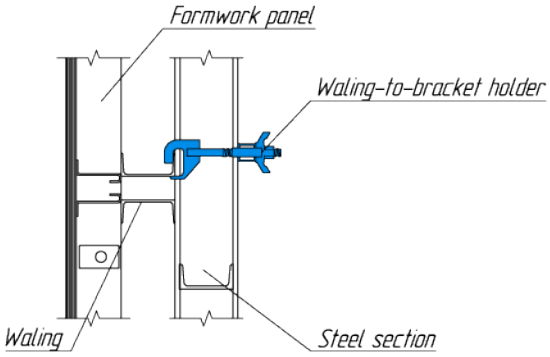
Length of the walings:

- on upright panels: 2.50 m (for block width 2.70 m); 1.5 m (for block width 1.80 m)
- on horizontal panels: 2.50 m

If the max.formwork height is required (4.05 m), the top panels can only be upright 1.35 m panels.







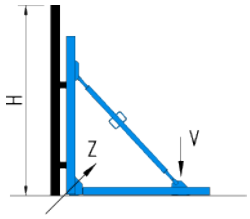
Panel	Number of walings
On upright 2,70 m, 2,85 m panels	2
On upright 3,00 m, 3,30 m panels	3
On horizontal panels up to 0,90 m	1

STRUCTURAL DESIGN

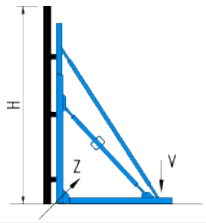
The values given in the table are only applicable for forming situations where there is no kicker. In cases with large kickers, the overall stability of the Adjustable supporting frame must be reviewed.
The loading data is per parallel frame with an anchor inclination of 45°. Fields containing no data (-----) are not permissible – Adjustable supporting frame would be overloaded!

H – pour height, [m]
Zk – anchor force, [kN]
Vk – shoring force, [kN]
f – deformation at top, [mm]

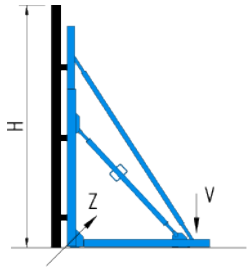
Pour heights of up to 3,00 m

Adjustable supporting frame (type I)			H	Influence width 1.35 m		
				Zk	Vk	f
	Permitted pressure of fresh concrete	40 kN/m²	2,70	145	57	3
			3,00	168	76	4
		50 kN/m²	2,70	162	60	3
			3,00	191	81	5

Pour heights from 3,30 m

Adjustable supporting frame (type II)			H	Influence width 1.35 m		
				Zk	Vk	f
	Permitted pressure of fresh concrete	40 kN/m²	3,15	179	86	2
			3,30	191	97	2
		50 kN/m²	3,15	205	93	2
			3,30	220	105	3

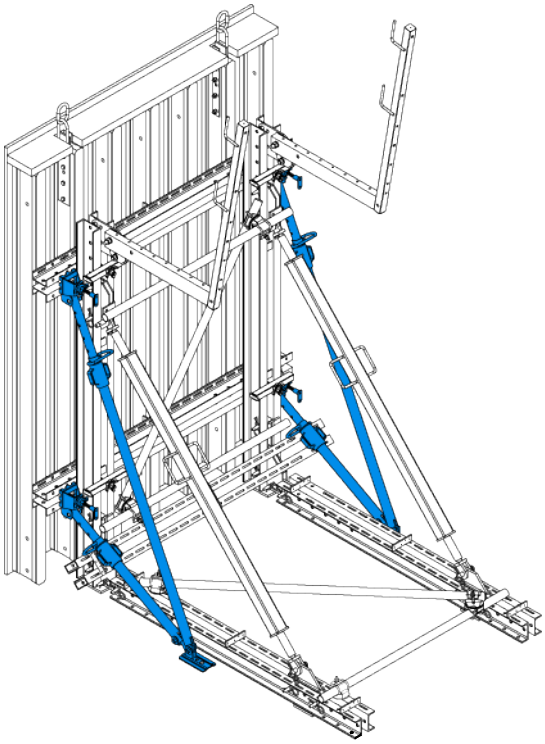
Pour heights up to 4,05 m

Adjustable supporting frame (type II)			H	Influence width 0.90 m		
				Zk	Vk	f
	Permitted pressure of fresh concrete	40 kN/m²	3,60	143	81	2
			3,75	150	89	3
			3,90	158	98	4
			4,05	165	108	4
		50 kN/m²	3,60	165	89	3
			3,75	175	99	3
			3,90	185	109	4
			4,05	194	120	5

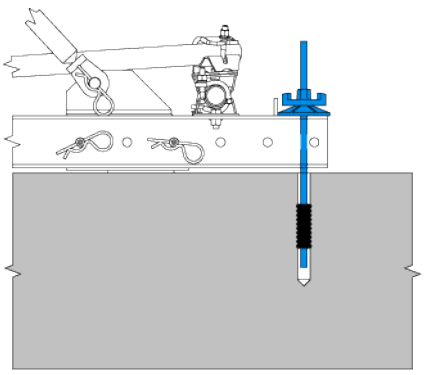
MOUNTING INSTRUCTIONS

MOUNTING THE ADJUSTABLE Supporting FRAME

1) Lift the pre-assembled formwork element into the upright, and use Support braces to safely stabilize it in the upright position.
2) Mount the components of the Adjustable supporting frame onto the upright formwork, spaced at the appropriate centre-to-centre distance.
3) Brace the Adjustable supporting frame with framed tubes.
4) Remove the Support braces.
5) Crane-lift the entire unit to the usage location (see "Lifting and resetting by crane»).

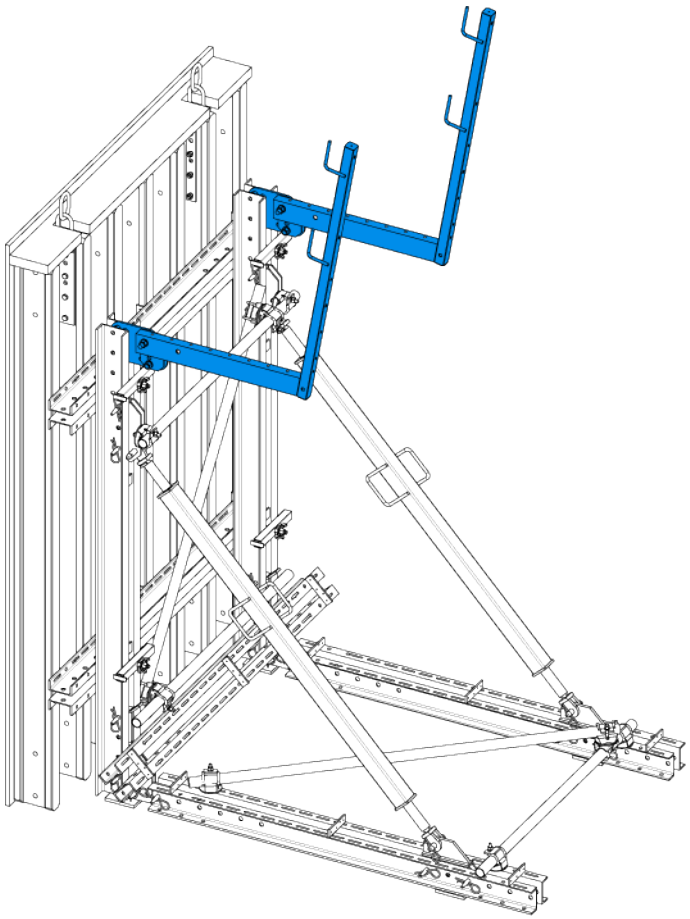


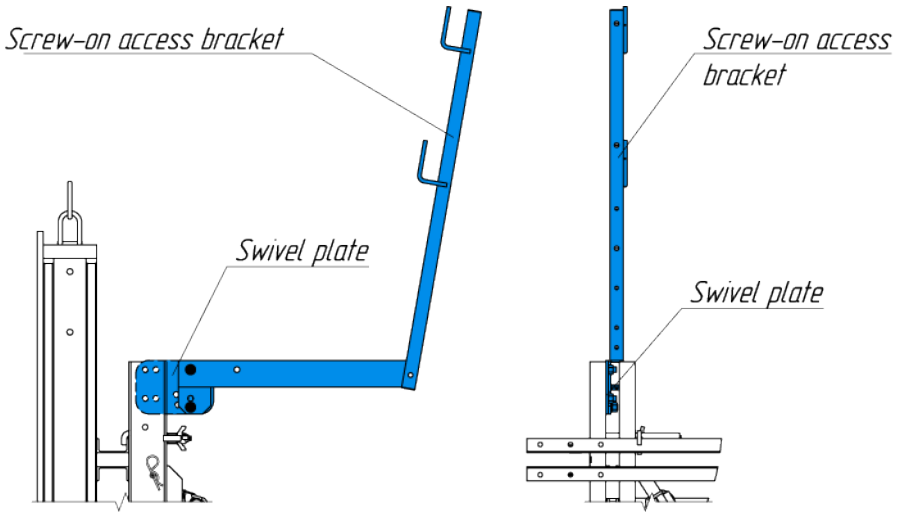
For more exact plumbing and aligning of the formwork, secure the horizontal Walings against accidental lift-out with rock anchor spreader unit, tie-rod and superplate.



POURING PLATFORMS

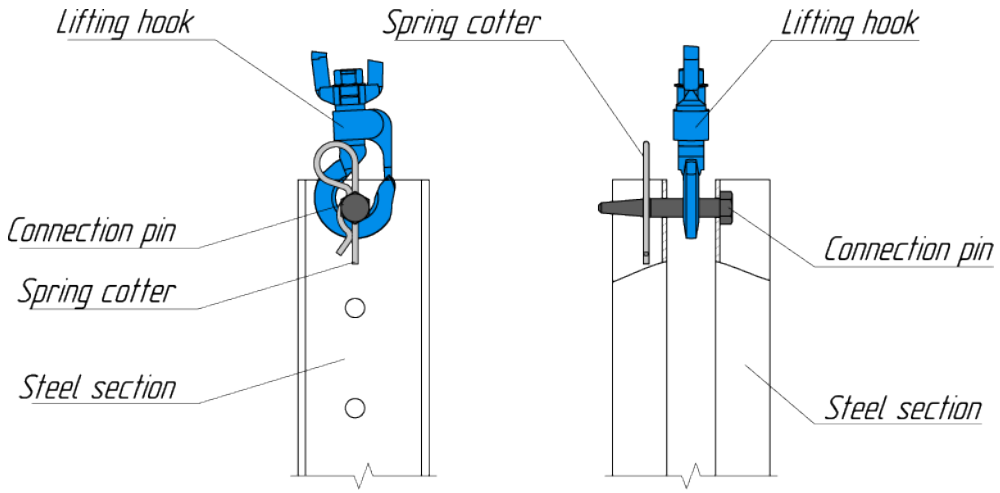
With Adjustable supporting frame use non-formwork dependent platforms – Screw-on access bracket which fastened to the Steel section via Swivel plate.





LIFTING AND RESETTING BY CRANE

Attach the lifting hook directly to the Steel section
1) Bolt in place with a Connecting pin
2) Secure the pin with a Spring cotter



IMPORTANT NOTE:

When lifting and resetting Adjustable supporting frames, do not attach the crane to the formwork element or to other components such as Walings.
Lifting the Adjustable supporting frames with the formwork attached is only permitted at near-ground level.
Make sure that the crane suspension tackle is sufficiently long (oblique pull).
Never use the crane to break concrete cohesion!
Max. load: 1000 kg per crane-hoisting point.

ANCHORING SOLUTIONS

The decisive criterion for the choice of anchoring system is the tensile forces that will occur.

Permitted anchor force

Anchoring system	Permitted load to DIN 18216	Max. load, allowing a 1.6:1 factor of safety against failure
15.0	90 kN	120 kN
20.0	150 kN	220 kN

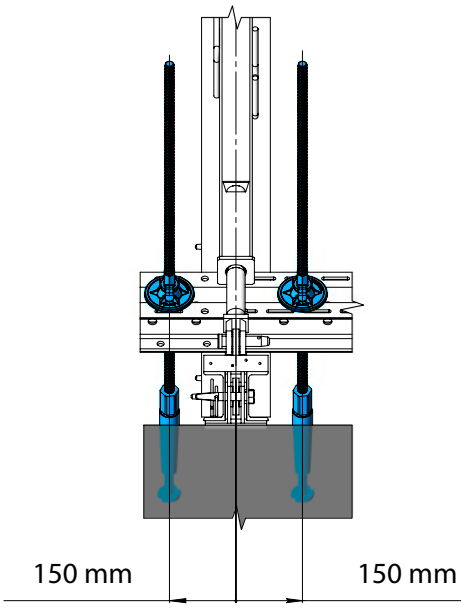
Standard situation: 2 anchors per one Adjustable support frame.

Example:

Tensile force Zk shown in Table = 220 kN

Anchoring system to choose:

220÷2 = 110 kN, i.e. choose Anchoring system 20.0



Only use approved anchoring components.

Never weld or heat tie-rods - risk of fracture.

It is forbidden to mix suspension components that have different depths of concrete cover.

Always screw in components until they fully engage. When correctly fitted, there will still be 1cm of thread visible between the part and the depth mark on the stop anchor or pigtail anchor.

Permitted loads for anchor walings

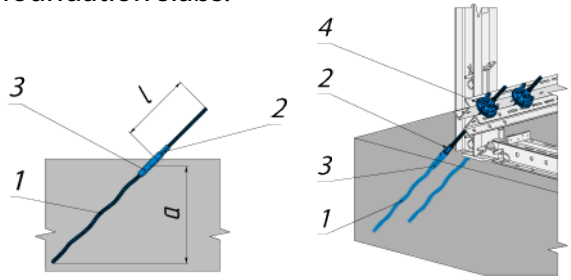
Anchor waling	Permitted anchor force: Z
Waling 12	175 kN
Anchor Waling 14	250 kN

The tensile forces that can be sustained only apply where the anchor is positioned exactly as required, i.e. 15 cm either side of the vertical axis of the Adjustable support frame.

VARIANTS OF ANCHORING SYSTEM 15.0

With pigtail anchor

This is the anchorage method that can best transfer the high tensile forces from Adjustable support frames into the foundation slabs.



a_{min}=39.5cm, a_{max}=52.0 cm

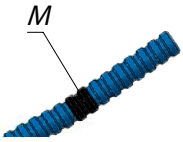
(1) Pigtail anchor 15.0*

(2) She-bolt 15.0 5 cm (length 65cm) incl. (3) or She-bolt 15.0 5 cm (length 120 cm) incl. (3)

(3) Sealing sleeve 15.0 5 cm*

(4) Superplate

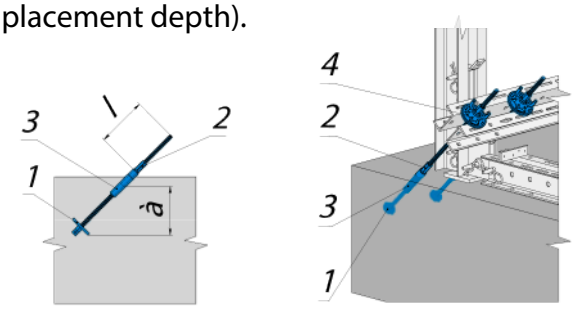
* expenda nt



(M) The depth mark must always be at the end fitted into the she-bolt

With stop-anchor

Only use these with appropriate extra reinforcement steel (as dictated by the placement depth).



	a
Stop-anchor 15.0 40 cm	33.5 cm
Stop-anchor 15.0 16 cm	16.5 cm

(1) Stop-anchor 15.0 16 cm* or Stop-anchor 15.0 40 cm*

(2) She-bolt 15.0 5 cm (length 65 cm) incl. (3) or She-bolt 15.0 5 cm (length 120 cm) incl. (3)

(3) Sealing sleeve 15.0 5 cm*

(4) Superplate

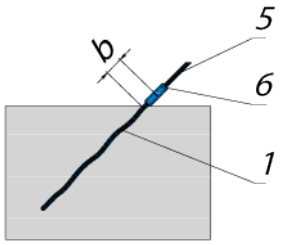
* expendable anchoring component

Tools for removing she-bolts:

- Spanner for tie-rod 15.0/20.0 or
- Fork spanner 24

Alternative solution:

Pigtail anchor protrudes from concrete: Instead of the she-bolt, fasten a Tie-rod 15.0 mm to the pigtail anchor using a Rod connector 15.0.



b_{min}=8.0 cm

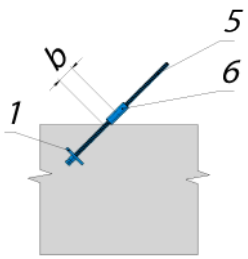
(1) Pigtail anchor 15.0

(5) Tie-rod 15.0 m

(6) Rod connector 15.0

Alternative solution:

Stop-anchor protrudes from concrete: Instead of the she-bolt, fasten a Tie-rod 15.0 mm to the stop-anchor using a Rod connector 15.0.



b_{min}=8.0 cm

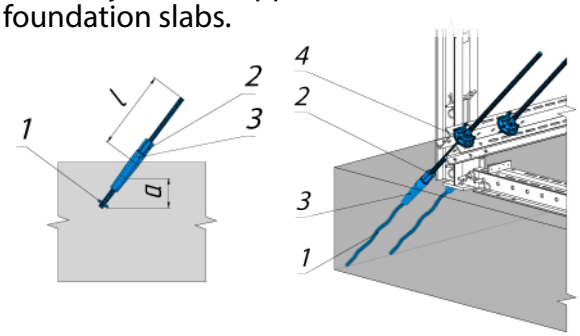
(1) Stop-anchor 15.0

(5) Tie-rod 15.0 m

(6) Rod connector 15.0

VARIANTS OF ANCHORING SYSTEM 20.0

This is the anchorage method that can best transfer the high tensile forces from Adjustable support frames into the foundation slabs.



a_{min}=48.0 cm, a_{max}=65.0 cm

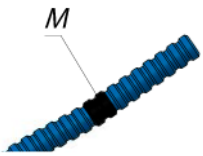
(1) Pigtail anchor 20.0*

(2) She-bolt 20.0 (length 125cm) incl. (3)

(3) Sealing sleeve 20.0 cm*

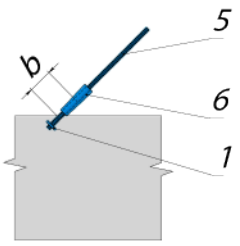
(4) Superplate 20.0

* expendable anchoring component



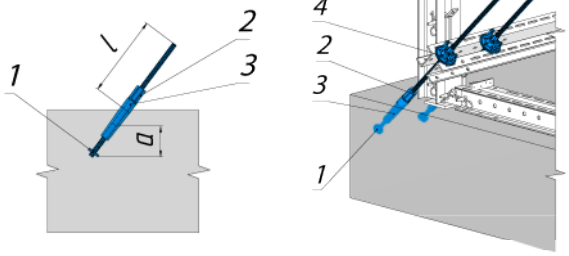
(M) The depth mark must always be at the end fitted into the she-bolt

Pigtail anchor protrudes from concrete: Instead of the she-bolt, fasten a Tie-rod 20.0 mm to the pigtail anchor using a Anchoring cone 20.0



b_{min}=10.0 cm
(1) Pigtail anchor 20.0
(5) Tie-rod 20.0 m
(6) Anchoring cone 20.0

Only use these with appropriate extra reinforcement steel (as dictated by the placement depth).



	a
Stop-anchor 20.0 45 cm	34 cm
Stop-anchor 20.0 22 cm	18 cm

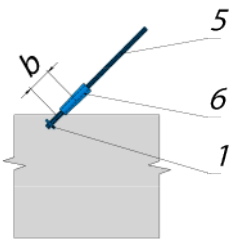
(2) She-bolt 20.0 (length 125cm) incl. (3)

(4) Superplate 20.0

* expendable anchoring component

Tools for removing she-bolts:
- Spanner for tie-rod 15.0/20.0 or 20.0/26.5 or
- Fork spanner 36/41

Stop-anchor protrudes from concrete: Instead of the she-bolt, fasten a Tie-rod 15.0 mm to the stop-anchor using a Rod connector 15.0



b_{min}=10.0 cm
(1) Stop-anchor 20.0
(5) Tie-rod 20.0 m
(6) Anchoring cone 20.0

FITTING DIAGONAL ANCHORS

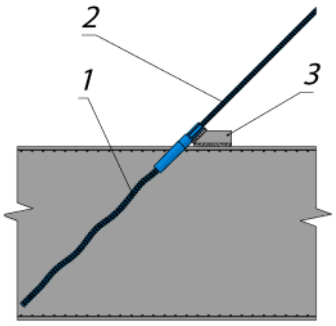
In everyday site practice, there are various different ways of preparing positioning points for diagonal anchors at a precise angle (usually 45°), depending on the site situation.
The following examples show several possible and effective variants. These apply equally to the use of either pigtail anchors or stop-anchors.

Fit the anchors at a 45° angle.

- Fitting a diagonal anchor at a steeper angle than this increases the load.
- If the angle is increased by 10° (i.e. to 55°), this increases the load on the tie-rod by over 20% and may thus lead to serious overloading.

WOODEN TEMPLATE

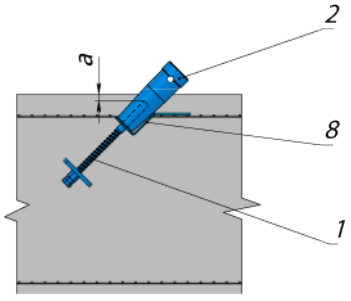
- This method permits variable distribution of the positioning points, and can therefore be reused in any situation.
- Alternatively, a clear, fixed arrangement of the positioning points can be made with nailed-on wedges of square-sawn timber.
- Many variations are possible on this theme, meaning that this example can be optimized for the case in hand.



(1) Pigtail anchor or stop-anchor
(2) She-bolt with sealing sleeve
(3) Wooden template

ANCHOR HOLDERS AND CLEARANCE CONES

- For precise location and directionally stable fitting of anchoring components at a 45° angle.
- Mount an anchor holder on the tie-rod, and fasten it to the top reinforcement.
- Screw in the clearance cone.
- After pouring, replace the clearance cone with a she-bolt.



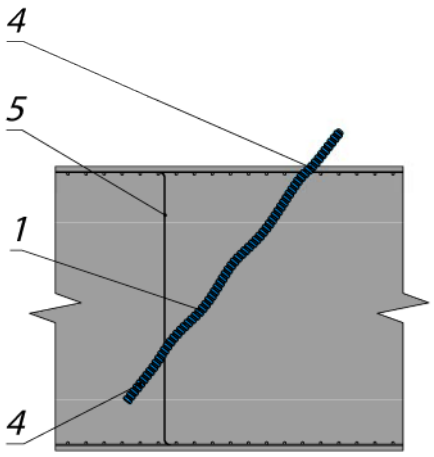
a=30 mm
(1) Pigtail anchor or stop-anchor
(2) Clearance cone
(8) Anchor holder

FIXING TO REINFORCEMENTS

- Option 1

By using two extra longitudinally-placed reinforcement rods, the anchor can be firmly fixed so that it safely withstands pouring.

(1) Pigtail anchor or stop-anchor
(4) Extra reinforcement rod
(5) Extra hoop

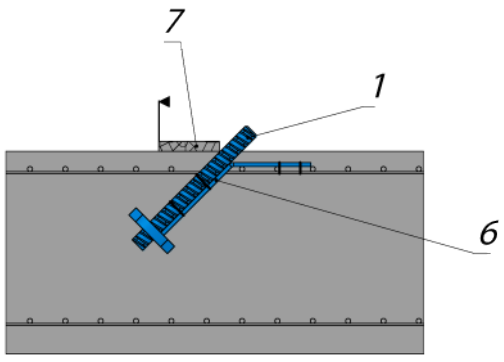


- Option 2

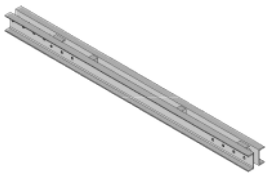
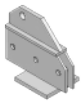
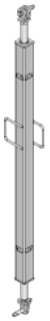
The stop-anchor or pigtail anchor can be fixed to the longitudinal reinforcements with the aid of an extra hoop.

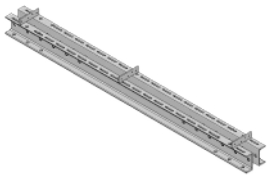
A suitably wide spacer board makes it easier to achieve exact positioning.

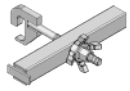
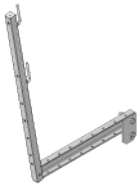
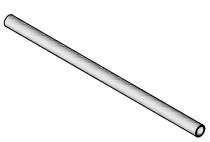
(1) Stop-anchor 15.0 40 cm or 20.0 45 cm
(6) Hoop with stop-anchor, fastened to reinforcement
(7) Spacer board

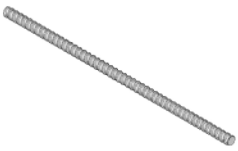


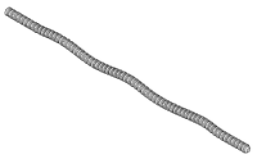
COMPONENT OVERVIEW

Steel section ASF 		65,84	35 100 000
Anchoring shoe ASF 		12,34	35 102 100
Supporting shoe ASF 		10,21	35 104 100
Pressure shoe ASF 		6,29	35 106 100
Tension plate ASF 		2,61	35 108 100
Spindle strut ASF 	3.00 m	34,79	35 200 100

Spindle strut T7 	3.05-3.55m	36,05	35 202 100
Waling 12 	1.00m 2.00m 3.00m	21,00 42,32 63,53	21 100 000 21 200 000 21 300 000
Anchor waling 14 	1.60m 2.00m 2.60m	45,34 56,06 73,60	36 160 200 36 200 200 36 260 200
Connecting plate Vertex 		6,47	23 404 000
Connecting pin 		0,39	23 400 100
Spring cotter 		0,05	23 402 100

Item		[kg]	Article nº
Connecting screw 	10-16cm	0,63	11 908 100
Waling-to-bracket holder 		2,61	75 200 10
Screw-on access bracket 		17,32	75 116 100
Swivel plate 		4,10	75 118 100
Supporting strut 340 		37,38	11 928 100
Framed tube 48 mm 	1.00m 1.50m 2.00m 2.50m 3.00m	4,60 6,91 9,21 11,51 13,81	94 100 200 94 150 200 94 200 200 94 250 200 94 300 200

Item		[kg]	Article nº
Swivel coupler 	48x48mm	1,22	95 106 100
Screw-on coupler 48 mm 	30 70 100	1,21 1,26 1,33	95 100 100 95 102 100 95 104 100
Superplate 	15 20	1,22 2,10	95 200 100 95 202 100
She-bolt 	15.0mm 0.65m 15.0mm 1.20m 20.0mm 1.25m	1,83 2,72 5,94	95 304 100 95 306 100 95 308 100
Tie rod 	15.0mm 1.50m 20.0mm 1.50m	2,40 3,60	92 150 300 93 150 300
Rod connector 	15,0	0,50	95 214 100
Clearance cone 	15,0 20,0	0,38 0,38	95 300 100 95 302 100

Item		[kg]	Article nº
Anchoring cone 	20,0	1,05	95 312 100
Pigtail anchor 	15 20	0,92 1,90	99 208 300 99 210 300
Stop anchor 	15.0mm 0.16m 15.0mm 0.40m 20.0mm 0.22m 20.0mm 0.45m	0,43 1,07 0,64 1,30	99 200 100 99 202 100 99 204 100 99 206 100
Sealing sleeve 	15 20	0,008 0,03	99 104 400 99 106 400
Anchor holder 	15 20	0,34 0,42	99 214 300 99 216 300

VARIANT

Ukraine, 61070, Kharkiv,
st. Shevchenko, 325

Tel. +38 (057) 756-37-77
E-mail: international@variant-factory.eu

www.variant-factory.eu