

META STEEL

RIGHT PANEL

Technical & Safety manual
2025

Summary

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Description of area of use

The purpose of this manual is to define, implement, and use a straight formwork panel of the META STEEL® type.

It is an assembly of sub-components from different categories (formwork surfaces, connections, safety, shoring, etc...).

For what use:

This formwork system is intended to build straight concrete walls.

For whom:

The assembly and use of this equipment must involve **qualified, competent personnel** who are experienced in this type of work and equipped with the proper tools and personal protective equipment, such as: **chin-strap helmets, safety shoes, gloves**, etc.

Where and how:

The location for this assembly is defined by the **type of ground** and **weather conditions**. If the ground is too soft and cannot support vertical loads meaning the weight of the panel, shoring, etc. — or if the environment is not suitable (strong wind, heavy snow, very low temperatures...), the assembly of the META STEEL® straight panel **cannot be carried out**.

The work area reserved for assembly must be marked out to prevent access by persons not assigned to the work. Access must be restricted to fitters only.

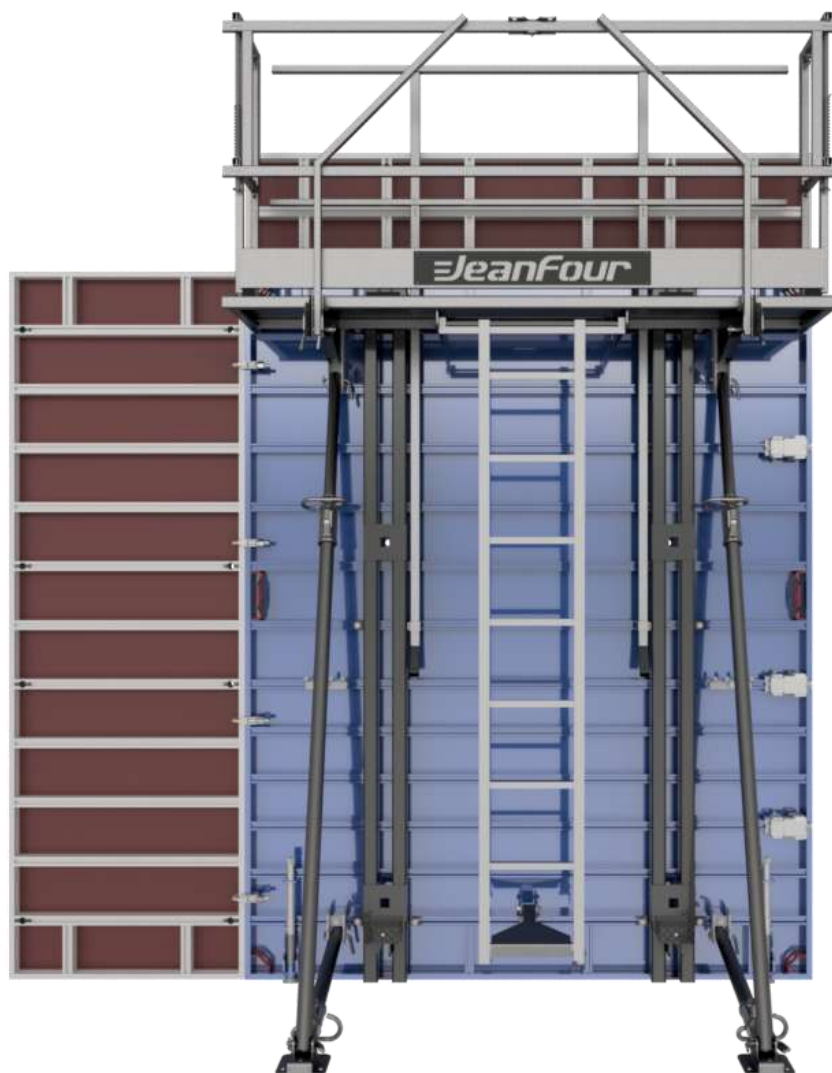
WARNING – SAFETY FIRST

This equipment must be used **exclusively** by trained, authorized, and equipped personnel. Failure to follow assembly, handling, or usage instructions may cause **serious risks to the safety** of both workers and the site.

*For further information, please contact the **JEAN FOUR -EUROBRESS SAS technical department - contact@jfed.fr***

Description of area of use

META STEEL is a metal formwork capable of withstanding pressures of 100 Kn/m². This metal formwork is adaptable to modular formwork. It can be used on large-scale construction sites. Meta Steel is designed in compliance with standard NFP 93-350.

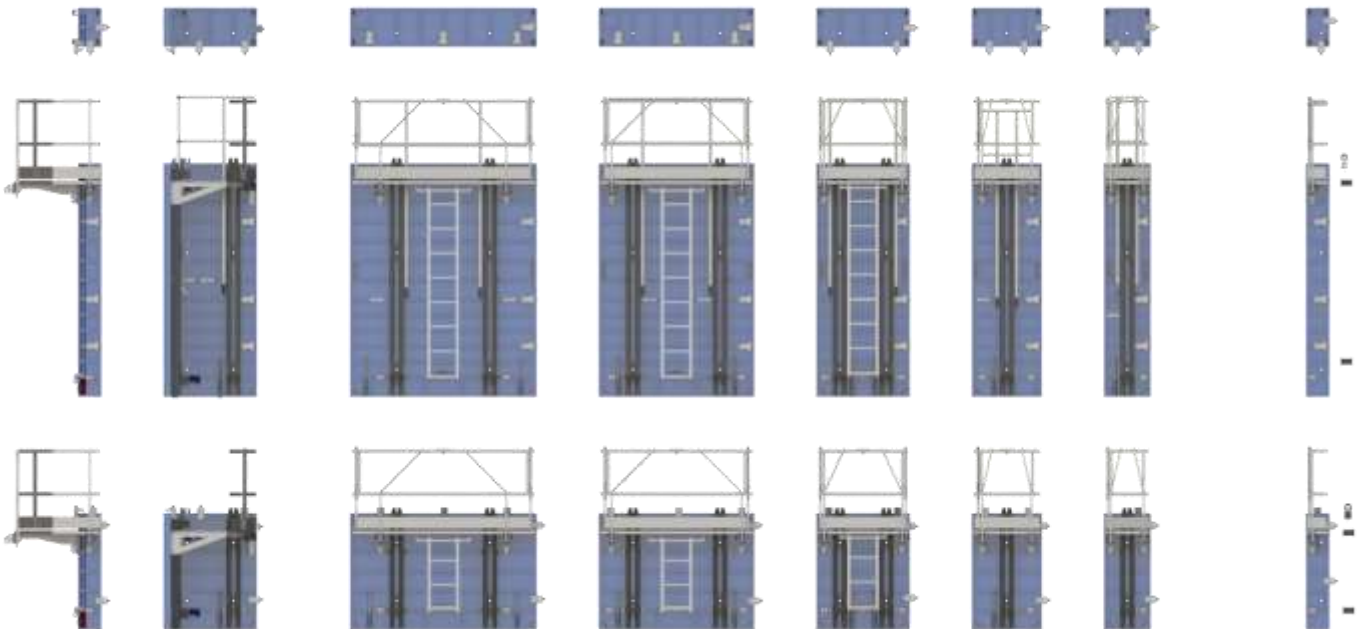


Meta Steel range

The entire Meta Steel range complies with the specifications of NFP93-350, and the admissible pressure is 10T/m^2 in accordance with the conditions defined by DIN 18218 and CIRIA 108.

Meta Steel is compatible with all Modalu and Modacier panels. The Meta Steel standard range is available in heights of 3m , 1.5m , 0.5m and widths of 2.4m , 2m , 1.2m , 0.9m , 0.6m , 0.3m.

All these sub-assemblies can be dismantled and are compatible with large-format formwork panels from the Modalu and Modacier ranges.



The different weights

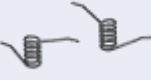


Pressure of 10T/M²

Dimensions (mm)					
DIMENSIONS	WEIGHT (with safety)	DIMENSIONS	WEIGHT (with safety)	DIMENSIONS	WEIGHT (without safety)
2400x3000	890 Kg	2400x1500	442,8 Kg	2400x500	147,6 Kg
2000x3000	800 Kg	2000x1500	399 Kg	2000x500	133 Kg
1200x3000	606 Kg	1200x1500	302,4 Kg	1200x500	100,8 Kg
900x3000	405 Kg	900x1500	202,5 Kg	900x500	67,5 Kg
600x3000	348,5 Kg	600x1500	173,7 Kg	600x500	57,9 Kg
300x3000	132 Kg	300x1500	66 Kg	300x500	22 Kg

Components

Standard equipment

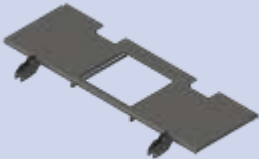
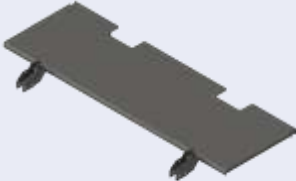
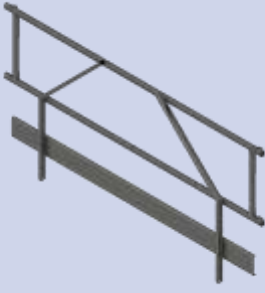
Image	Name	Reference	Weight
	Storage bin	700385	1,4 Kg
	Meta Steel Assembly Clamp	700617	4,0 Kg
	Packing cleat	700576	0,3 Kg
	Decking socket	700305	2,6 Kg
	Upgraded foot jack	700582 209216 104530	0,75 Kg
	Rear guardrail accessory Stand	700585	0,4 Kg
	Prop clevis	700188	1,5 Kg
	MS Lifting Eye	700570	2,350 Kg
	Footboard	700297	5,5 Kg
	Straight gate spring Left gate spring	700719 700718	0,100 Kg
	Bustard Alu(240-200)	700789	4,4 Kg
	Overlay Connecting Tab	700344	0,130 Kg
	Tube end cap 40x27	700792	0,050 Kg
	Front Guardrail Guide	700365	0,37 Kg
	Raised packing cleat	700939	0,075 Kg

Composants

Standard equipment

Image	Name	Reference	Weight
	H300 Beam	700236	92,1 Kg
	H150 beam	700818	51,5 Kg

Safety platform equipment:

Image	Name	Reference	Weight
	Tray with hatch 240	700282	79,5 Kg
	Tray with hatch 200	700331	70 Kg
	Tray with hatch 120	700390	46,5 Kg
	Tray without hatch 240	700824	105,0 Kg
	Tray without hatch 200	700829	72,2 Kg
	Tray without hatch 120	700831	46,6 Kg
	Tray without hatch 090	700501	39,7 Kg
	Tray without hatch 060	700404	32,5 kg
	Tray without hatch 030	700514	16,2 Kg
	AI Hatchless Tray (020x020)	700491	50,0 Kg
	AE hatchless tray (120x120)	700448	52,1 Kg
	Rear Guardrail 240	700248	23,0 Kg
	Rear Guardrail 200	700333	20,1 Kg
	Rear Guardrail 120	700393	14,3 Kg
	Rear Guardrail 090	700508	12,3 Kg
	Rear Guardrail 060	700407	10,5 Kg
	Rear Guardrail 030	700519	4,1 Kg
	AI Rear Guardrail (020x020)	700489	18,8 Kg
	AE Rear Railing (120x120)	700458	5,2 Kg

Composants

Safety platform equipment:

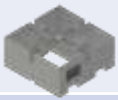
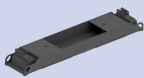
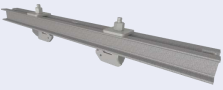
Image	Name	Reference	Weight
	Front Guardrail 240	700387	19,5 Kg
	Front Railing 200	700337	18,0 Kg
	Front Guardrail 120	700431	14,9 Kg
	Front railing 090	700507	13,7 Kg
	Front Railing 060	700412	13,0 Kg
	Front Railing 030	700522	2,5 Kg
	Front Railing Outside corner (120x120)	700466	18,7 Kg
	Ladder 3m (240-200)	700542	10,53 Kg
	Ladder 3m (120)	700560	10,47 Kg
	Ladder 1,5m (240-200)	700822	4,31 Kg
	Ladder 1,5m (120)	700880	4,25 Kg
	Gate	700379	8,0 Kg
	Gate axis	700542	10,5 Kg
	Ladder axis(240-200)	700279	0,9 Kg
	Ladder axis(120)	700399	0,8 Kg

Specific equipment width 030:

Image	Name	Reference	Weight
	Packing cleat(030)	700527	2,5 Kg
	Lifting Eye(030)	204790	3,4 Kg

Components

Optional equipment:

Image	Name	Reference	Weight
	Alignment cylinder	102246	1,5 Kg
	Fairing plate	700629	45,5 Kg
	Marking sheet gate	700861	0,7 Kg
	Footboard	211891	2,0 Kg
	Safety marking plate	700314	1,8 Kg
	Concrete ballast 1T5	212732	Empty 98,4 Kg Full 1500,0 Kg
	Concrete ballast 300 Kg		Empty 125 Kg Full 300 Kg
	Single-sided clamping	800457	1,1 Kg
	Bench pallet	301380	264 Kg
	End Strip1000	104652	13,2 Kg
	End StripSP 1000	212253	25,3 Kg
	Fur corner clip	204518	3,7 Kg
	Alignment clamp	104635	4,9 Kg
	Container Comegal700x1545x475	200680	79 Kg
	Container 800x1000x800	213234	80 Kg
	Ballast assembly flange	700733 700739	2 Kg

Components

Stabilization shoring:

Image	Name	Reference	Weight
	Screw prop 100/180	700706	13,3 Kg
	Screw prop 220/400	701016	25,8 Kg
	PROP JF L1 105-180	901030111753	5,5 Kg
	PROP JF L2 240-400	9010302240003	20,9 Kg
	Equipped foot plate	102989	3,8 Kg

Bracing struts :

Image	Name	Reference	Weight
	Prop JF L2 290/500	901030285003	25,2 Kg
	PropRAS-TP 400/705 + reduction	102080	48,0 Kg
	Push-pull prop 6-10	103034	100,0 Kg
	PUSH-PULL PROP 12-16 M.	104555	221,0 Kg

The different nuts:

Image	Name	Reference	Weight
	WING NUT 3L Ø23 ZINGUE	103813	1,05 Kg
	FLOATING WASHER NUT D23	103896	1,2 Kg
	SQUARE LOCKING NUT D23	103764	0,93 Kg

Packing

All folding systems are pin-locked and pin-locked. The safety system is fully stackable on the 3m high panel.

For the under-rises, the rear guardrail must be dismantled for storage. The clamps are integrated and can also be packed on a 3m high panel and on a riser.

The colosseum panels can be superimposed on the cleats provided for this purpose. The maximum number of overlapping panels is 5 flat elements.

Tightening

The tightening of the individual elements on the panel such as clamps and foot jacks is done with a 30 mm wrench.

On the entire panel there are screws in sizes M8 and M14.

The accessories are fixed with hammer head bolts and can be removed with a 24 mm wrench.

Modularity security platform

The gates are assisted by right and left springs allowing them to be deployed automatically and the doors to be kept in the closed position. A superposition tab is located at the bottom of the ladder allowing the assembly of two ladders together when two panels are superimposed. Guide notches are provided at the edge of the platform for the passage of the sling when lifting the panel through the lifting rings on the ground. Tube plugs are placed on those representing a risk of cutting or snagging. The hatch closes by gravity. The step can be locked in the colosseum position when the panel is upright.

Crowbar

The location for the use of the crowbar is located under the beams.

Characteristic

Storage

An accessory support is placed on the rear guardrail and two others on the frame of the panel to accommodate two rods and two nuts.

Lifting

The lifting of the panels must be carried out by the rings at the head of the beam.

The lifting rings have a WLL of 3T.

The maximum lift that can be achieved on the rings at the head of the beam is 21.6 m² (3 Panels 2400x3000) allowing better balancing and facilitating handling on site.

In the case where the panels are positioned on props and standing, lifting can be done on the lifting rings on the ground.

The floor lifting rings have a WLL of 3T.

On these rings the maximum lifting capacity is 14.4 m² (2 Panels 2400x3000).

The 4 rings in the corners are designed to move up to 3 strips flat on top of each other.

Characteristic

Maintenance

Cleaning the panels is imperative after each use to remove the remains of laitance and concrete from the entire formwork panel. The use of a pressure washer of at least 400 bar or more is recommended.

Storage oil should be applied to the formwork side after each cleaning to prevent rust.

Use formwork oil before each pour. This will facilitate the stripping of formwork and provides protection to the formwork face.

The threads should be lightly greased after each cleaning.

A visual check must be carried out before each pouring to ensure the proper functioning of all Meta Steel equipment to ensure safety on site.

Recommendation

Any use of Meta Steel equipment outside its predefined use in this manual is strictly prohibited, in case of necessity or special request please refer to the design office to avoid any danger on the site.

Characteristic

Finishing Options

Customize the Meta Steel to your taste and your company's colors, choose from:

- The colour of the beams
- The color of the chassis
- Steel or stainless steel formwork skin
- Rear railing skirting board
- Gate skirting board
- Fairing plate

For your comfort you can also choose:

- Overlapping alignment cylinders
- Footboard on crossbar
- Single-sided clamping
- Self-ballasting, concrete

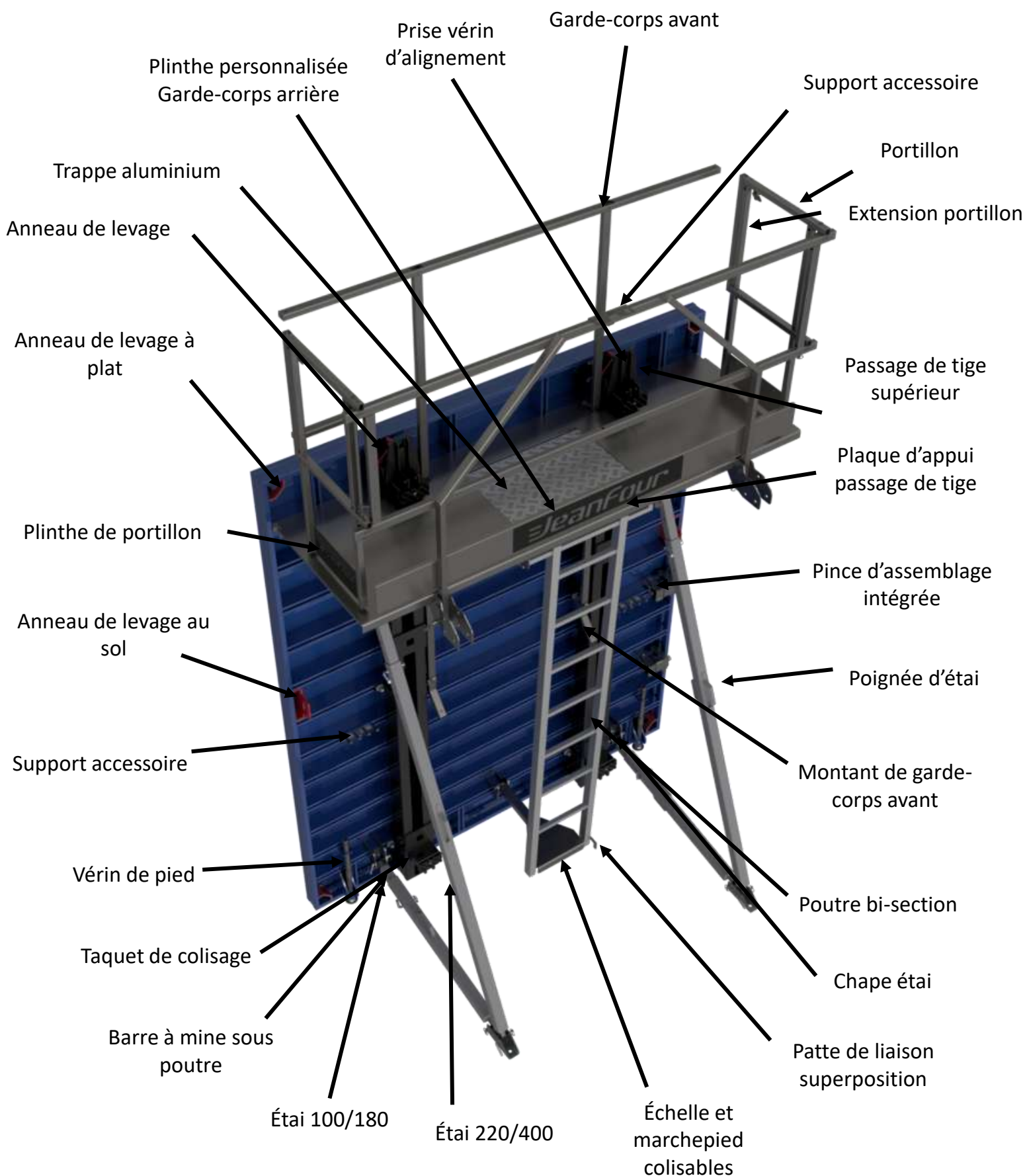
Attention

The visuals on this manual are presented for information purposes only and do not take into consideration the bracing and stabilization props. Please refer to the bracing chapter.

The different options presented in this document may differ from the visuals or a command as a result of an evolution of the different Meta Steel equipment.

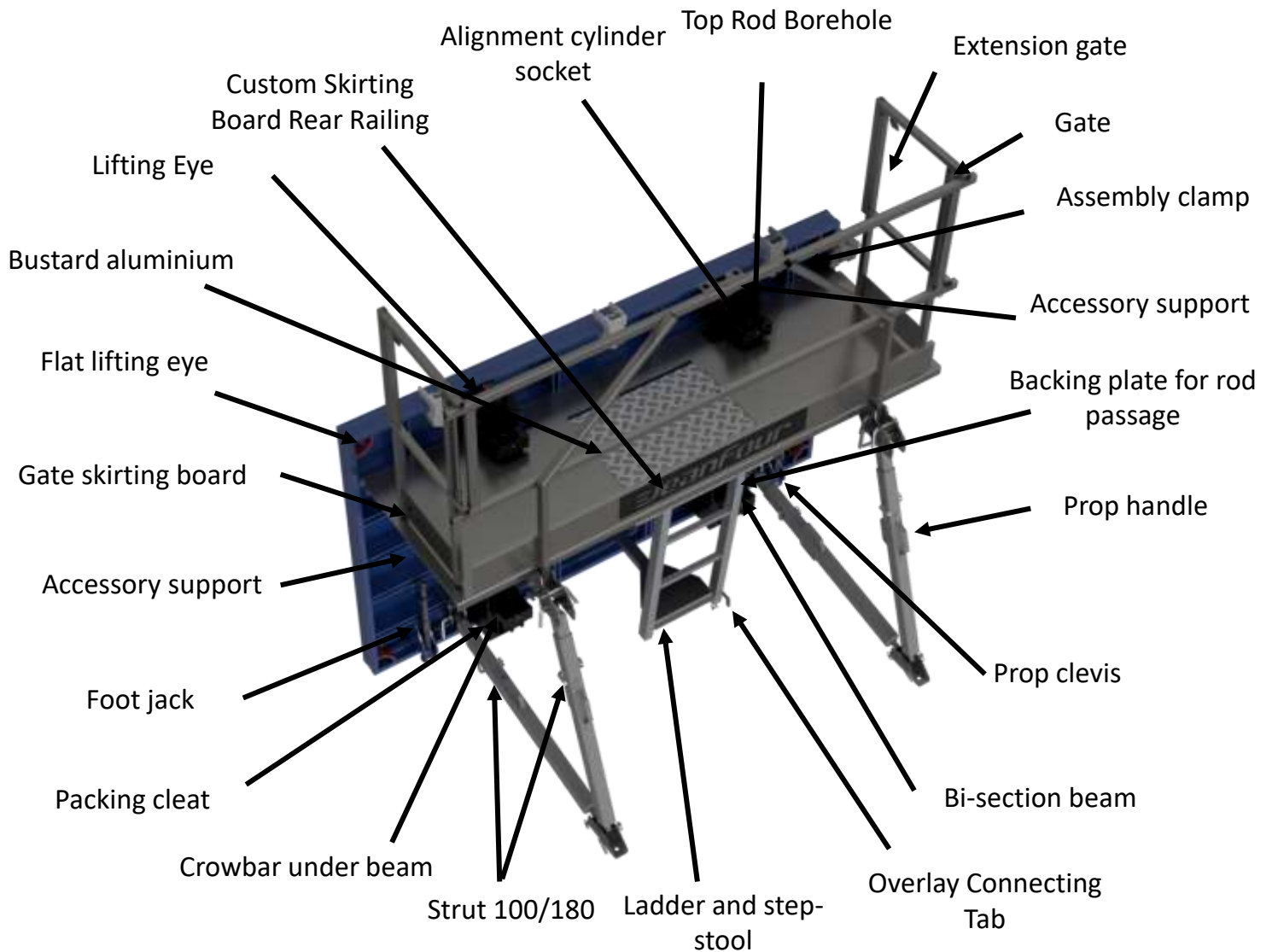
Nomenclature

Panneau 2400x3000 :



Nomenclature

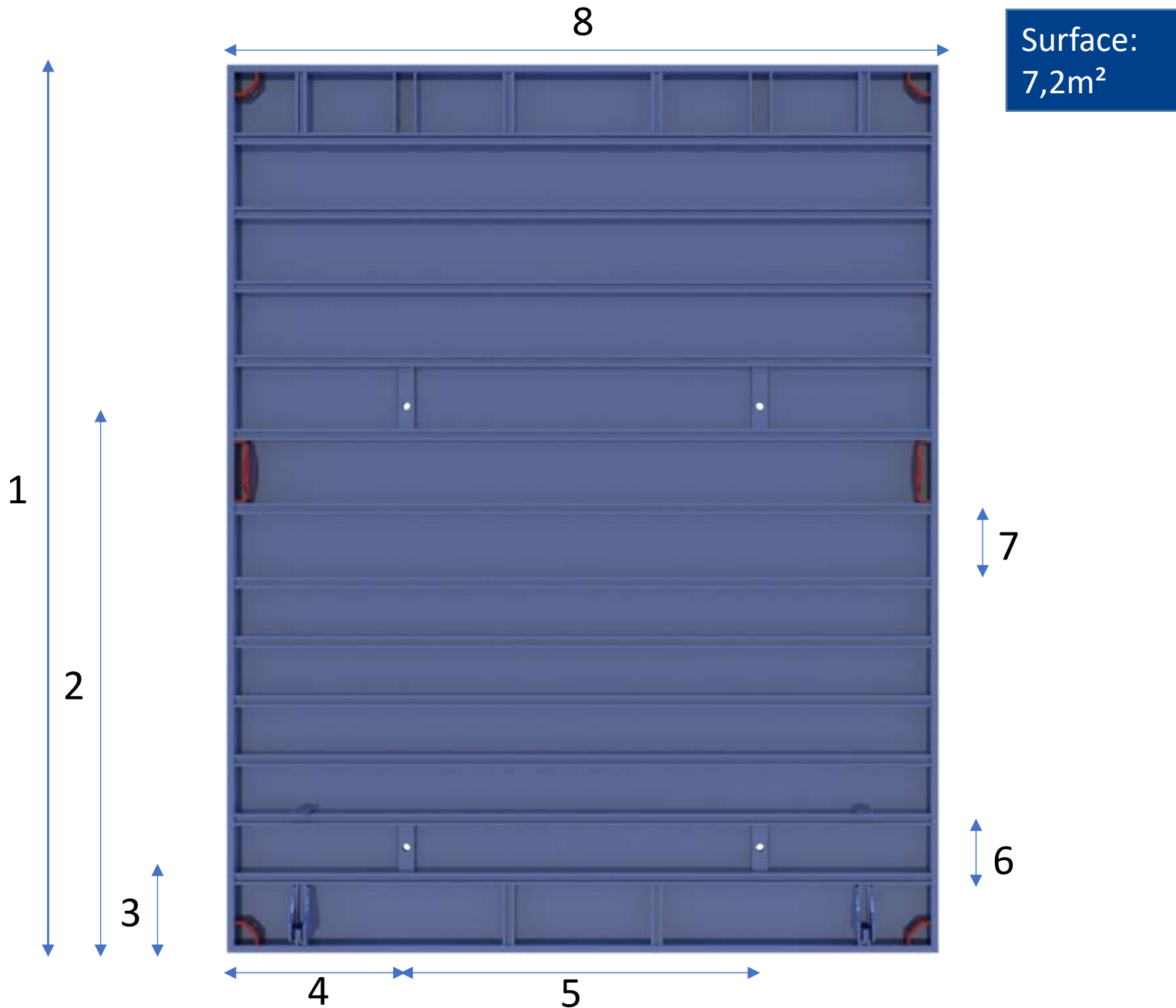
Panel 2400x1500 :



Panel 2400x500 :

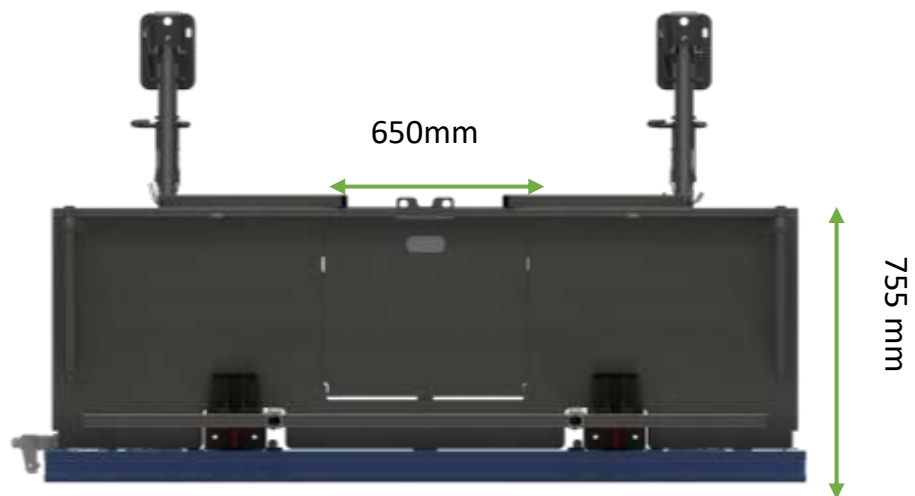


Significant Dimensions Chassis



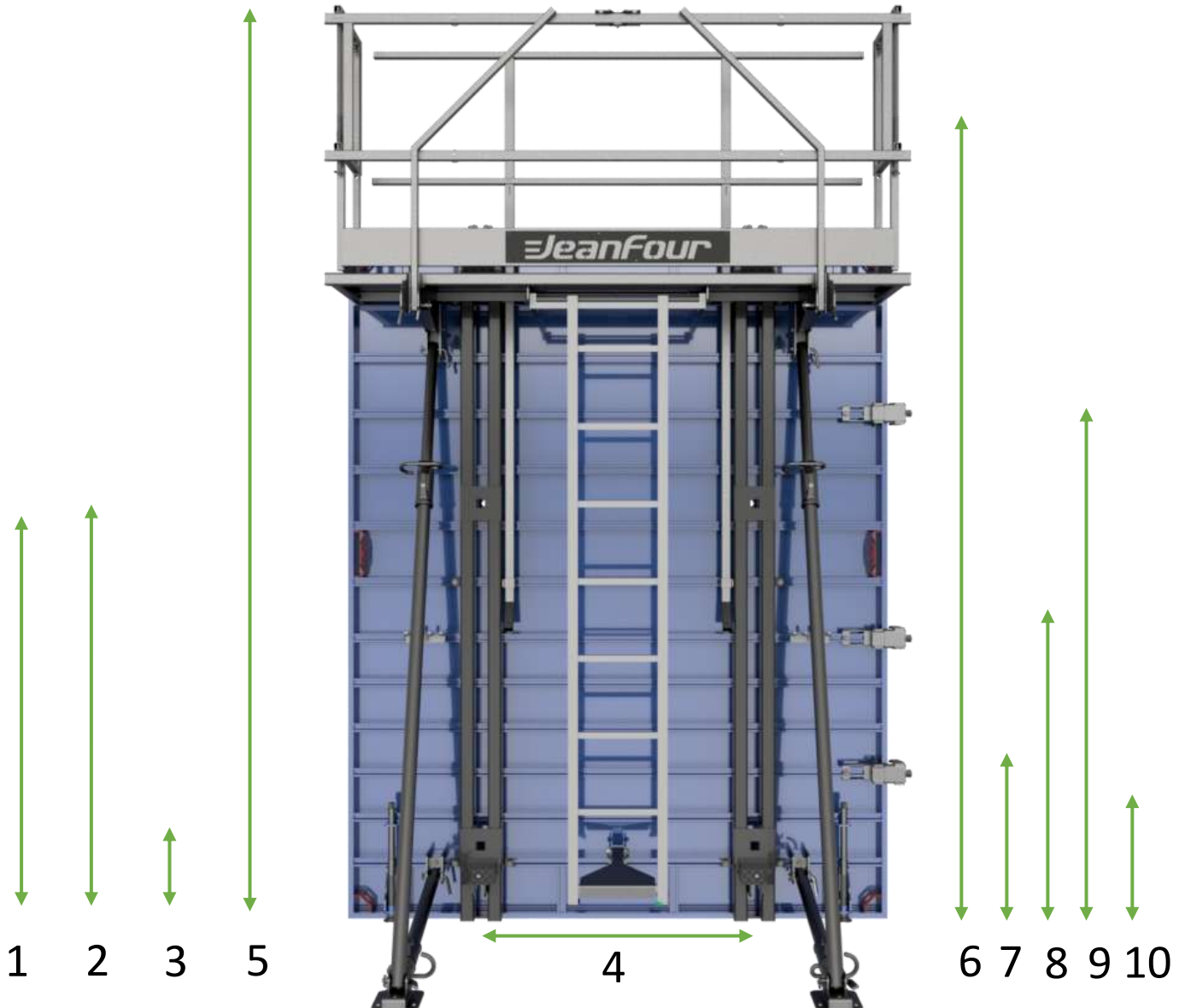
1	Height of the panel	3000 mm
2	1st rod pass	1850 mm
3	2nd rod pass	350 mm
4	Rim / rod passage	600 mm
5	Spacing between 2 rod passages	1200 mm
6	Spacing between 2 low rails	160 mm
7	Spacing between 2 high rails	210 mm
8	Width of the panel	2400 mm

Various important odds:



All options integrated with modular versatility

Various important odds:

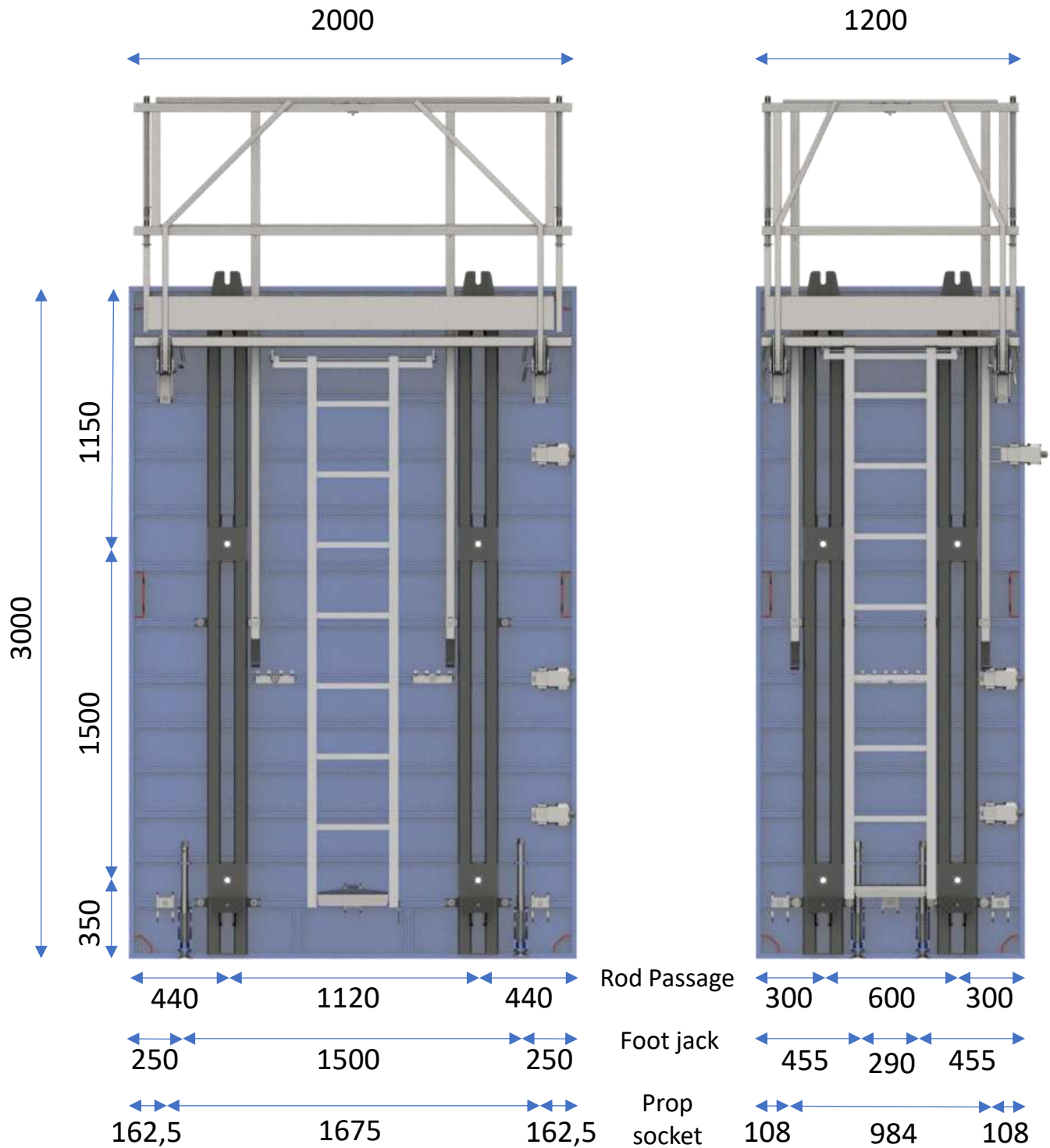


1	Height taken slinging on the ground	1615 mm
2	Height 2nd rod pass	1850 mm
3	Height 1st rod pass	350 mm
4	Length at the axis between the 2 rod passages	1200 mm
5	Overall height with railing	3860 mm
6	Total panel height including overhead rod passages	3065 mm
7	Height 1st clamp	650 mm
8	Height 2nd clamp	1250 mm
9	Height 3rd clamp	2250 mm
10	Height of foot cylinders	524 mm

Meta Steel Dimensions panel

Panel dimensions H3000 L2000 / L1200

Dimensions in mm

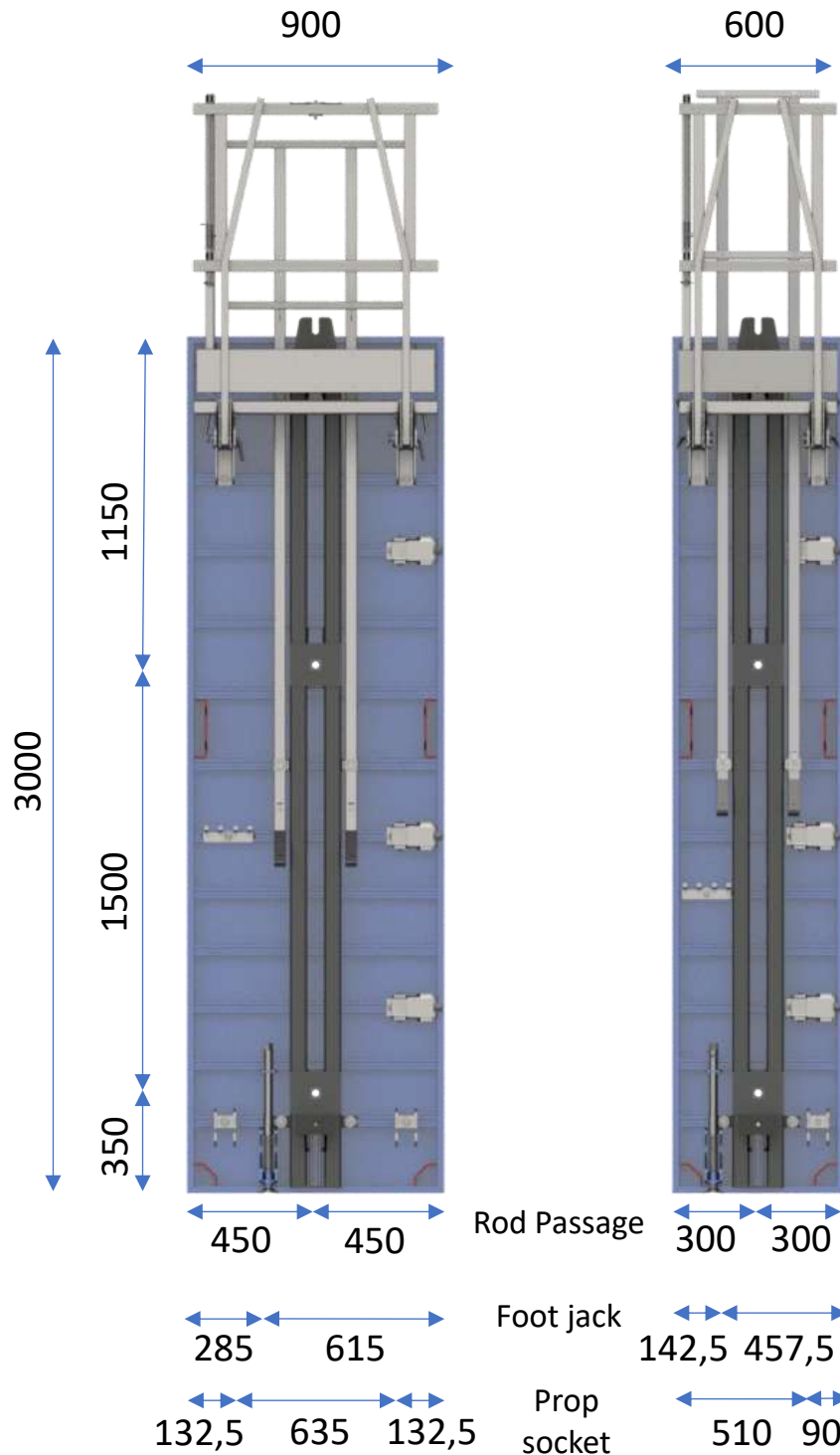


The panels of width 2400 to 1200 are composed of 2 beams

Meta Steel panel dimensions

Panel dimensions H3000 L0900 / L0600

Dimensions in mm

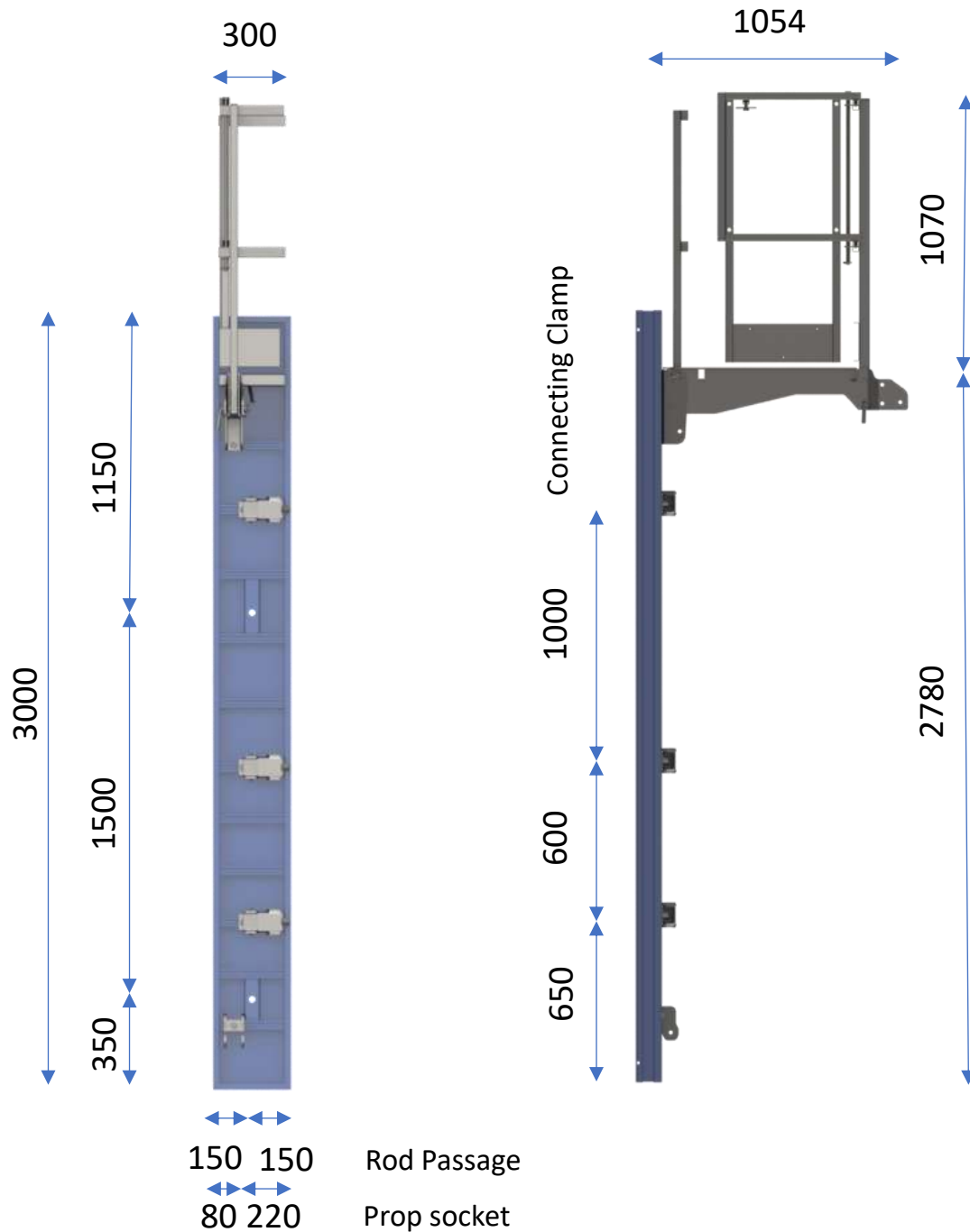


The 0900 to 0600 wide panels are composed of 1 beam

Meta Steel panel dimensions

Panel dimensions H3000 L0300

Dimensions in mm

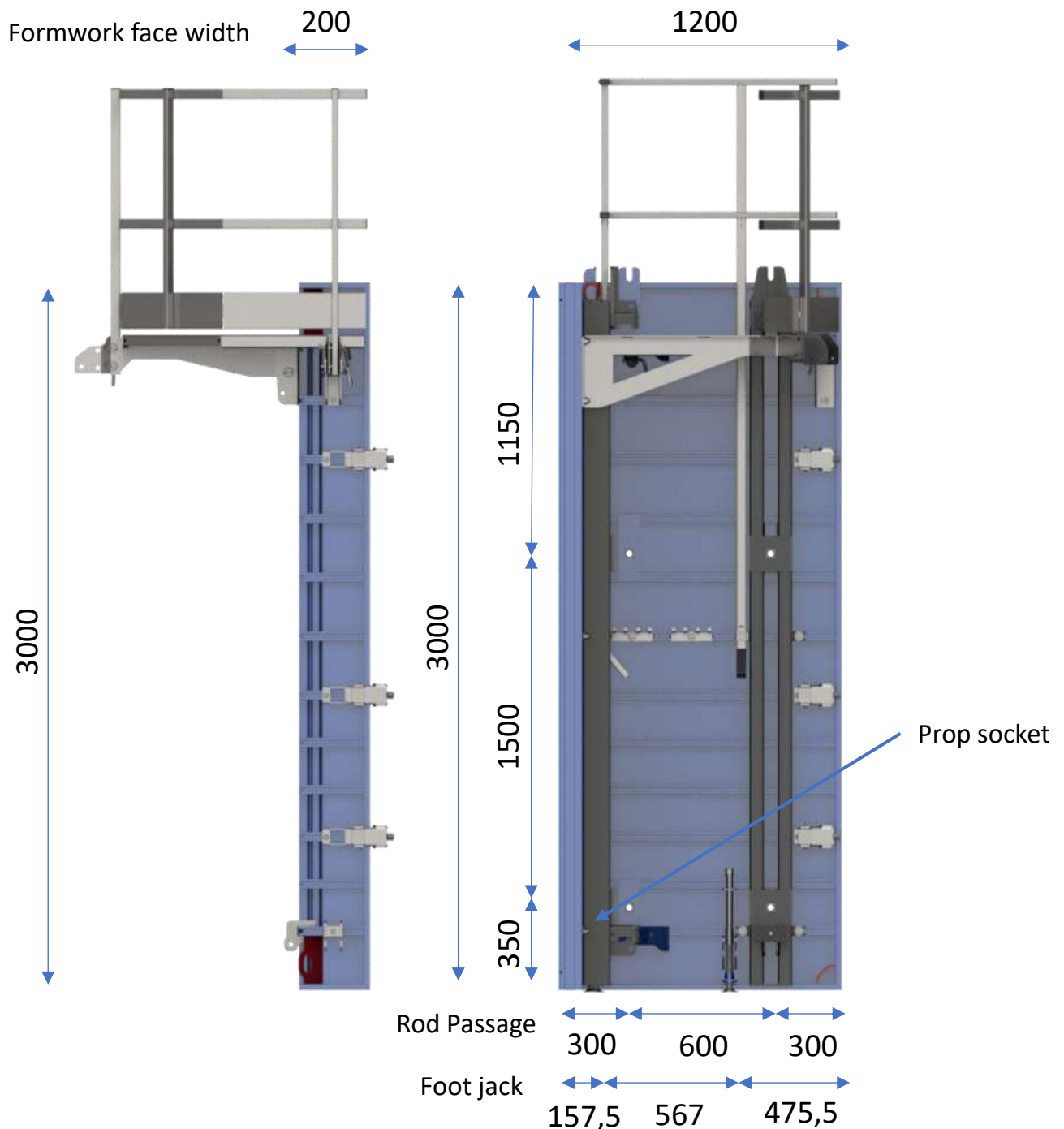


The 0300 wide panels do not have a beam

Meta Steel panel dimensions

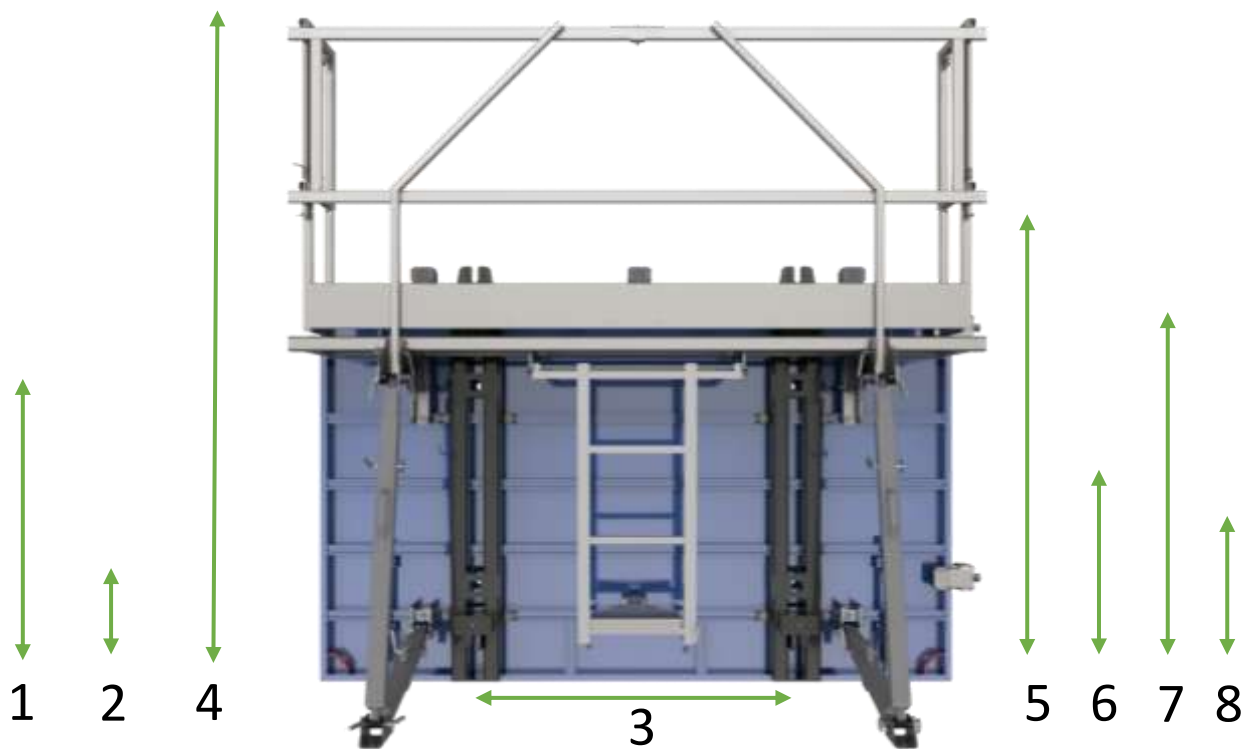
Panel dimensions corner H3000
L0200x0200 / L1200x1200

Dimensions in mm

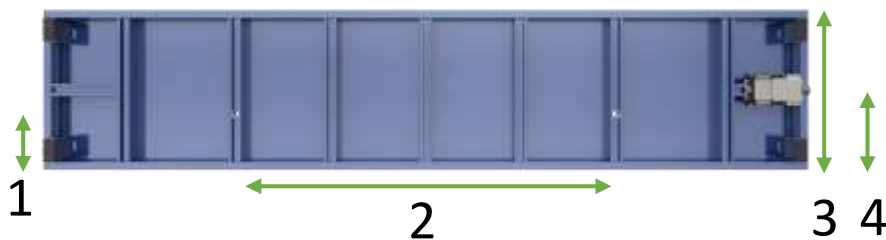


The 0200x0200 corner does not feature a rod passage and front railing. The rear guardrails on both corners can be removed.

Different important dimensions:



1	Height 2nd rod pass	1125 mm
2	Height 1st rod pass	375 mm
3	Length at the axis between the 2 rod passages	1200 mm
4	Overall height with railing	2348 mm
5	Total height of the panel including the air rod passages	1567 mm
6	Height 1st clamp	375 mm
7	Height 2nd clamp	1345 mm
8	Foot cylinder height	524 mm

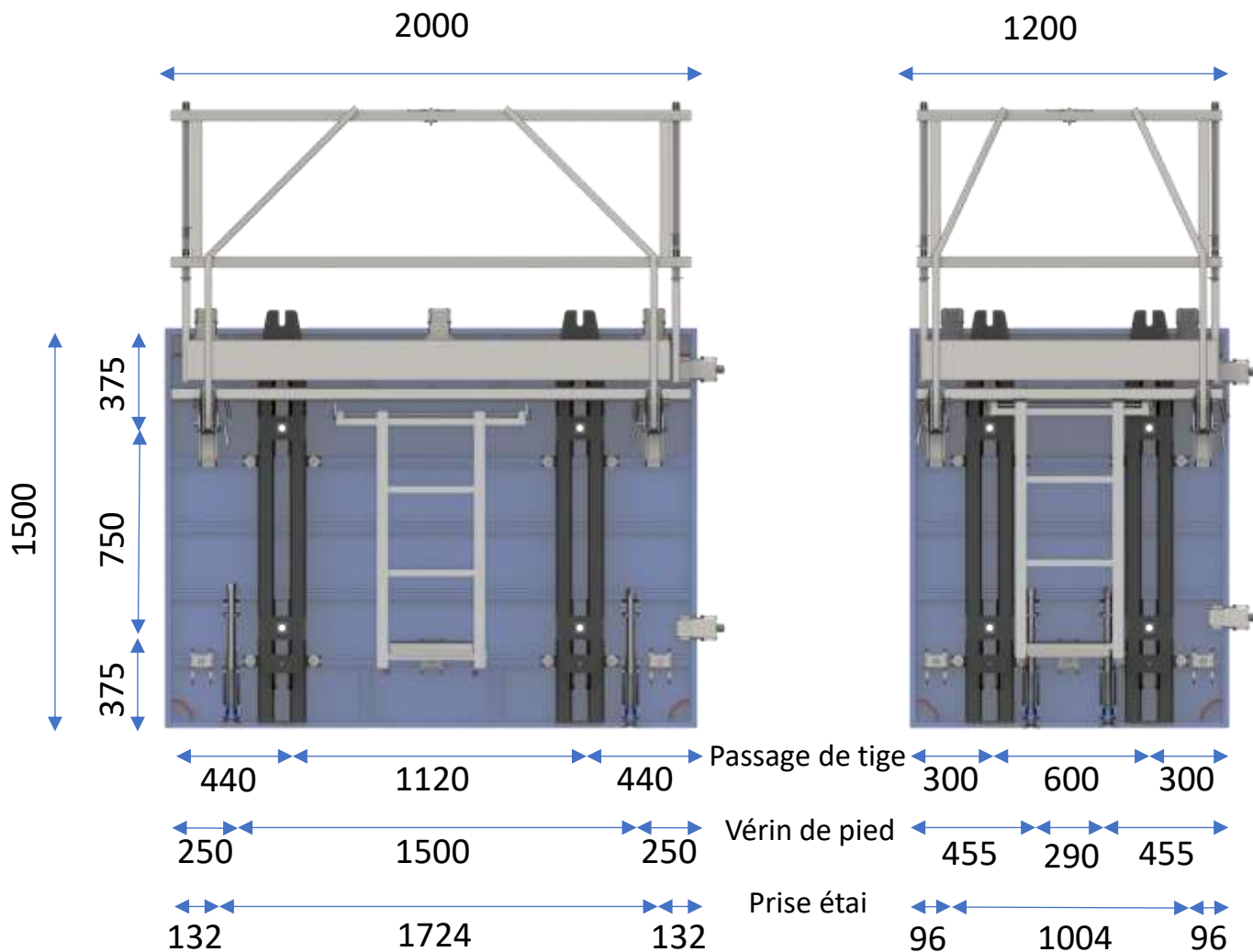


1	Height 1st rod pass	175 mm
2	Length at the axis between the 2 rod passages	1200 mm
3	Total panel height including overhead rod passages	500 mm
4	Height 1st clamp	250 mm

Meta Steel base extensions dimensions

Base extensions dimensions
H1500 L2000 / L1200

Dimensions in mm

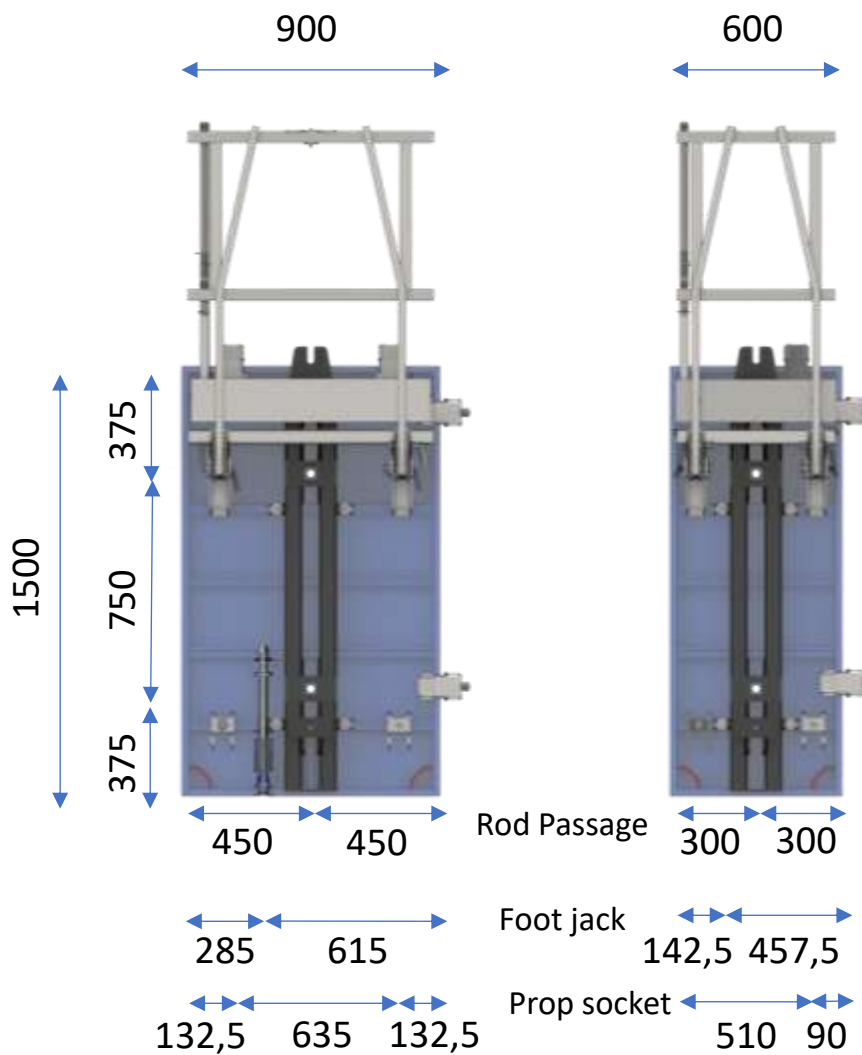


The panels of width 2400 to 1200 are composed of 2 beams

Dimensions base extension Meta Steel

Base extensions dimensions
H1500 L0900 / L0600

Dimensions in mm

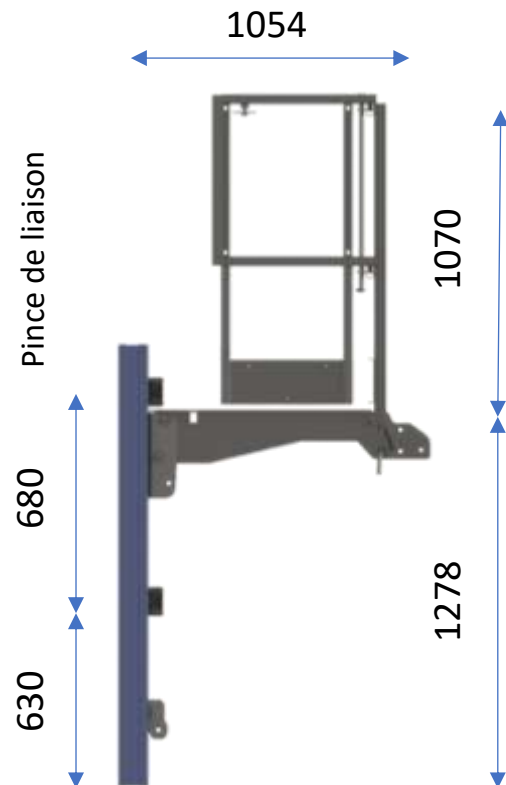
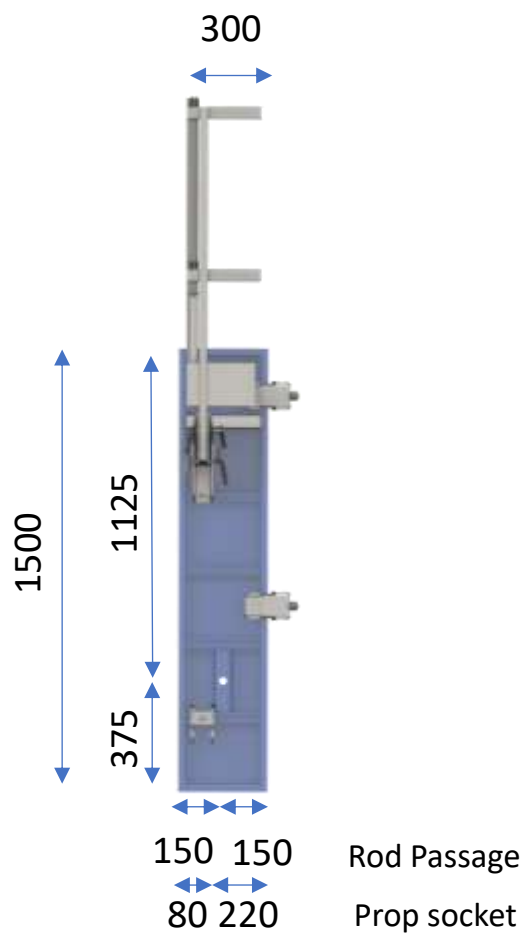


The 900 to 0600 wide panels are composed of 1 beam

Dimensions base extension Meta Steel

Base extensions dimensions
H1500 L0300

Dimensions in mm

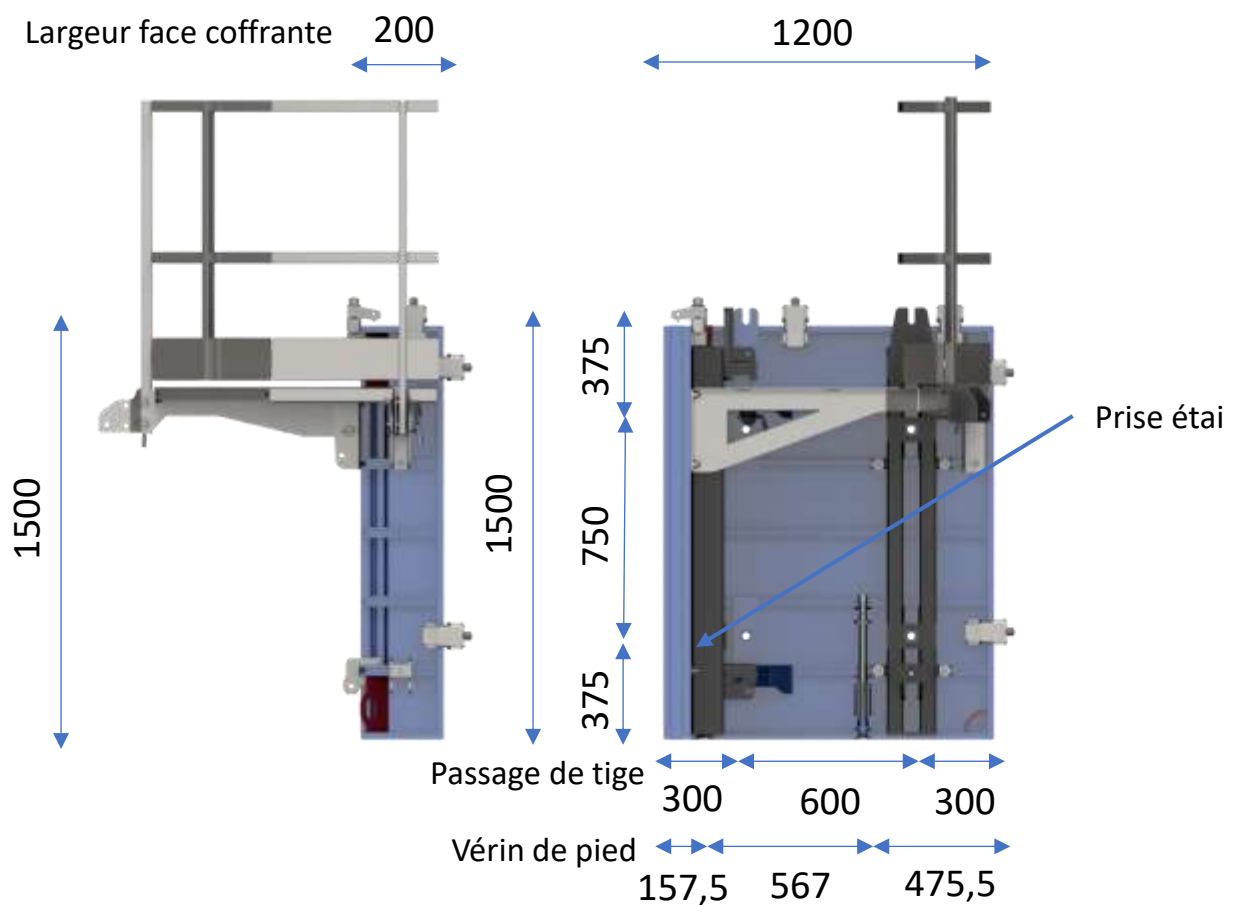


The 0300 wide panels do not have a beam

Dimensions base extension Meta Steel

Base extensions corner dimensions
H1500 L0200x0200 / L1200x1200

Dimensions in mm

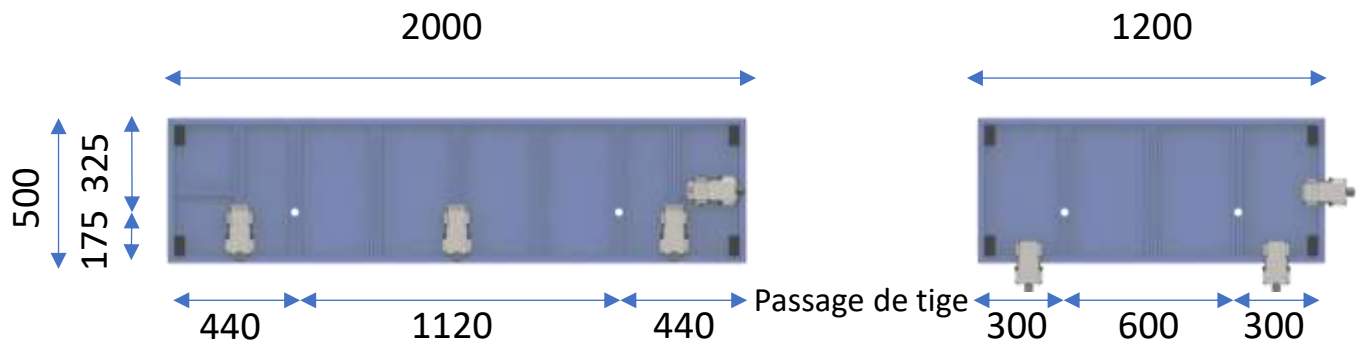


The 0200x0200 corner does not feature a rod passage and front railing. The rear guardrails of Meta Steel undercarriages must be dismantled at the end of each construction site and are not suitable for passing.

Meta Steel riser dimensions

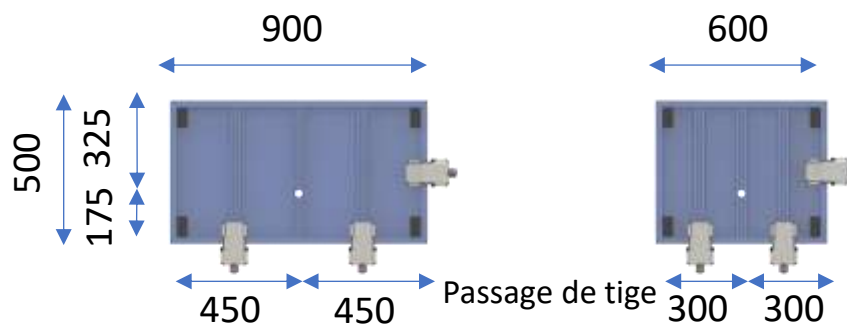
Riser dimensions
H1500 L2000 / L1200

Dimensions in mm



The panels with a width of 2400 to 2000 are composed of integrated clamps

Riser dimensions
H0500 L0900 / L0600

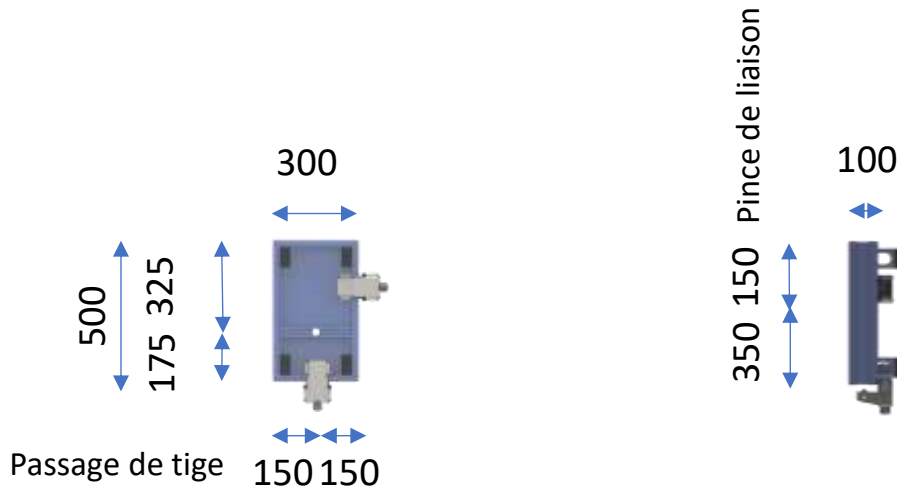


The panels with widths of 1200 to 0300 are made of modular clamps.

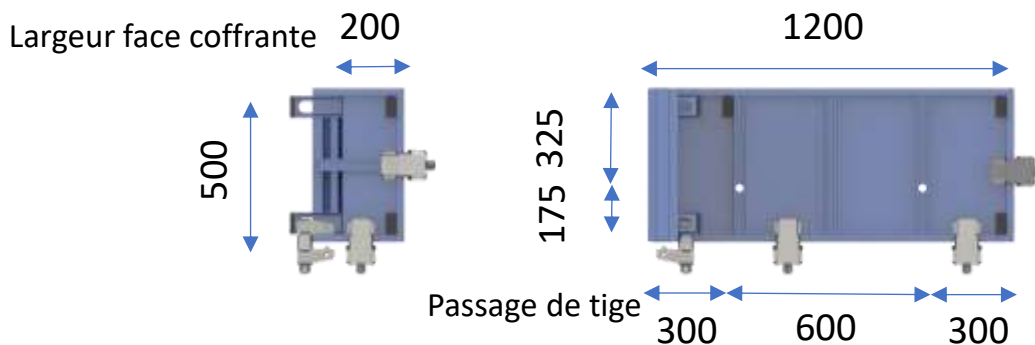
The clamps for layering are not attached.

Meta Steel riser dimensions

Riser dimensions
H0500 L0300



Riser corner dimensions
H0500 L0200x0200 / L1200x1200



The sub-extensions can only be used when assembled to another Meta Steel panel. They do not have a stabilizing or bracing socket. The extensions are not equipped with a safety platform.

The corners Meta Steel

The Meta Steel interior corner is available in 1200x1200 in heights of 3, 1.5 and 0.5 m. It is composed of two beams and a safety platform.



The corners Meta Steel

The Meta Steel outer corner is available in 0200x0200 in heights of 3, 1.5 and 0.5 m. It is composed of a security platform.



The corners Meta Steel

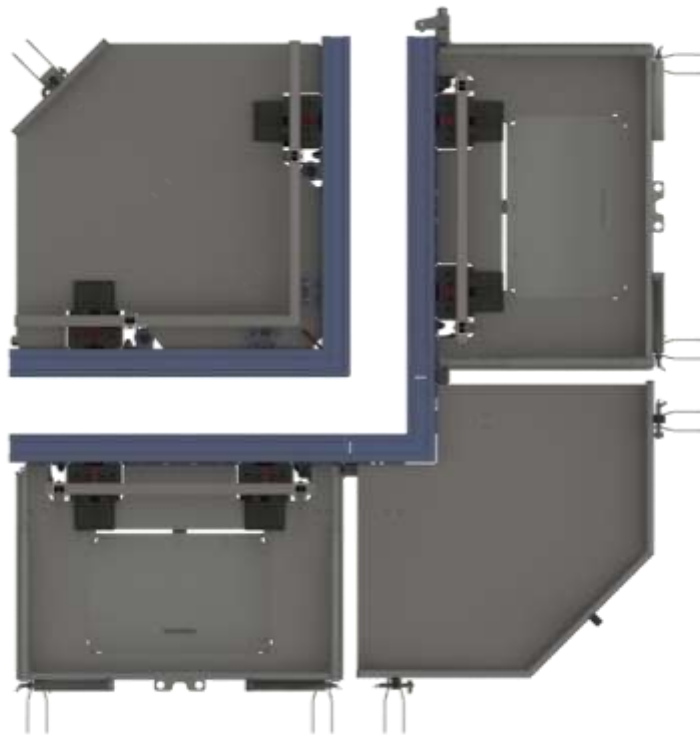
- Example of the composition of a Meta Steel corner for a 20 cm thick wall.

-Composition:

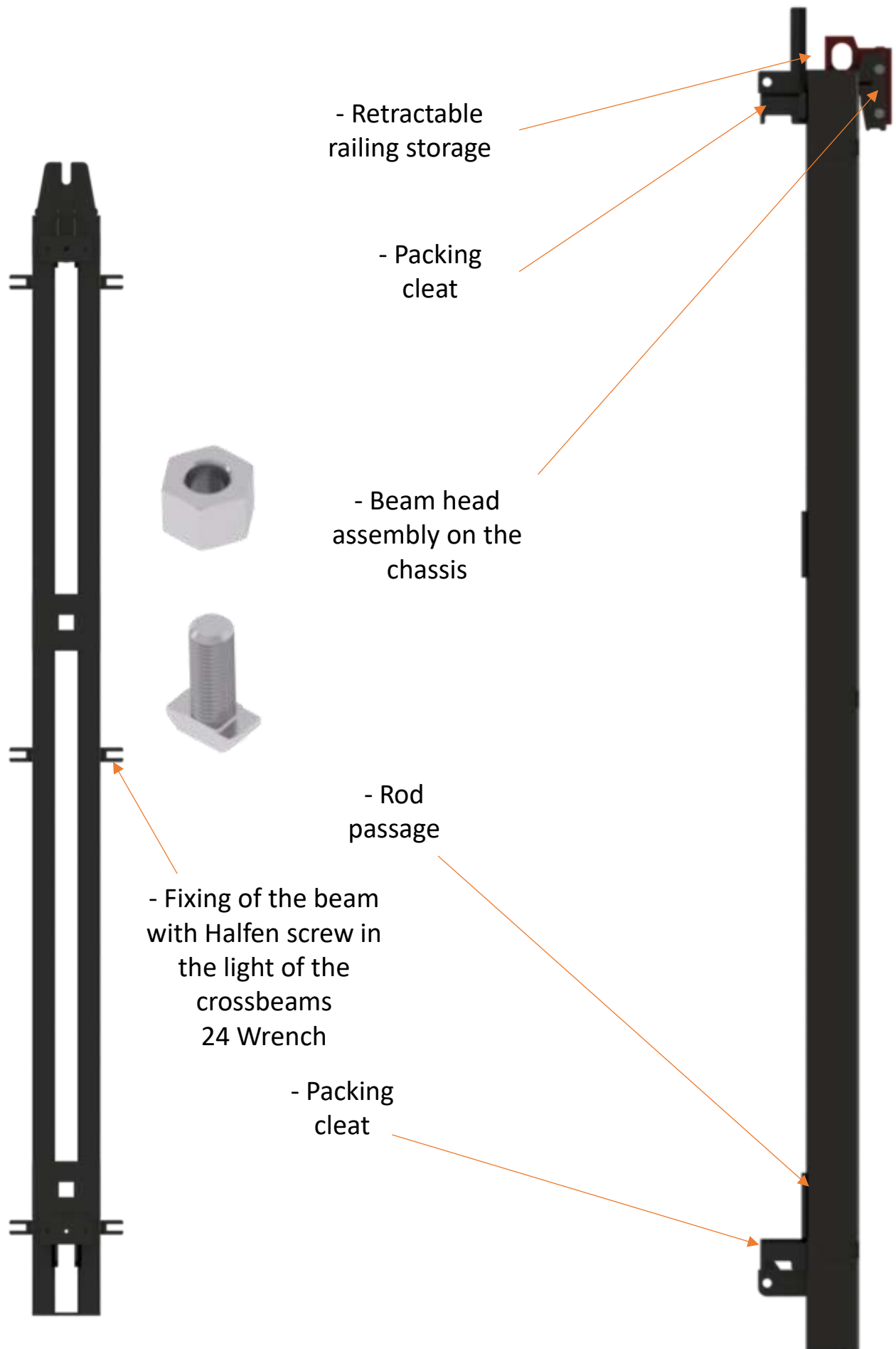
Inside Angle Meta Steel 1200x1200x3000

Exterior Corner Meta Steel 0200x0200x3000

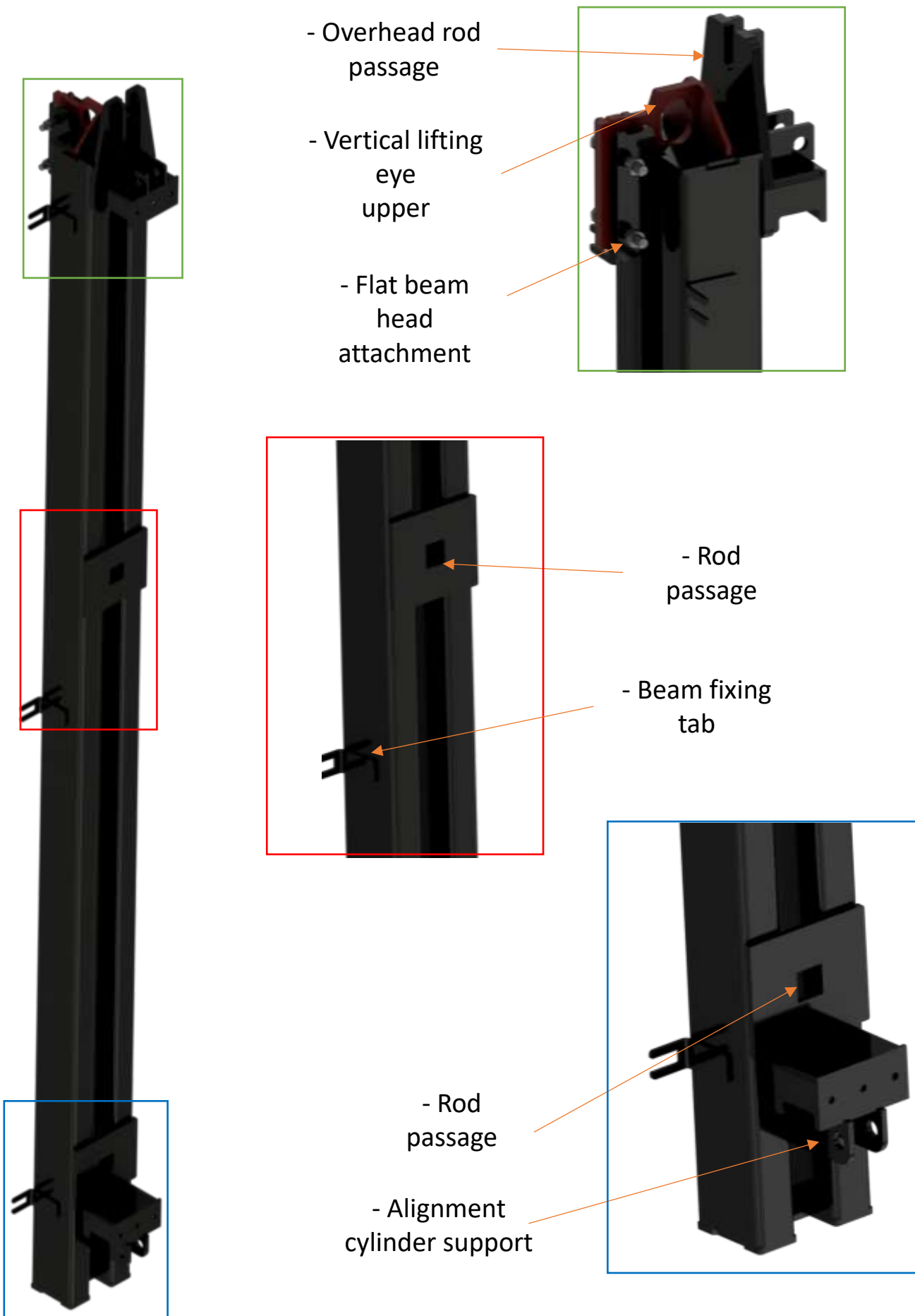
Meta Steel Element 1200x1200x3000 (x 2)



Beam details



Beam details

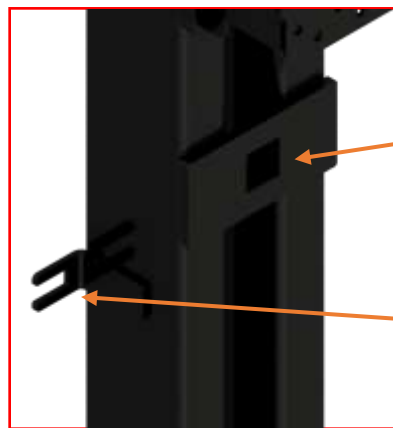
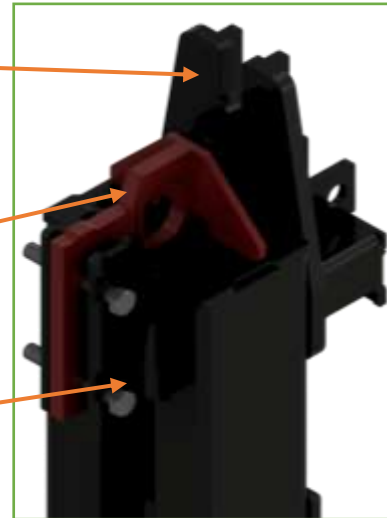


Beam details for base extensions

- Overhead rod passage

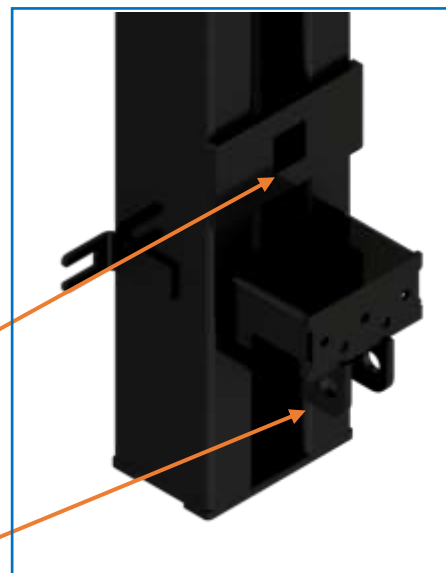
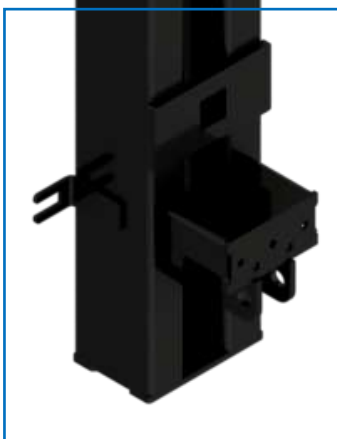
- Vertical lifting eye upper

- Flat beam head attachment



- Rod passage

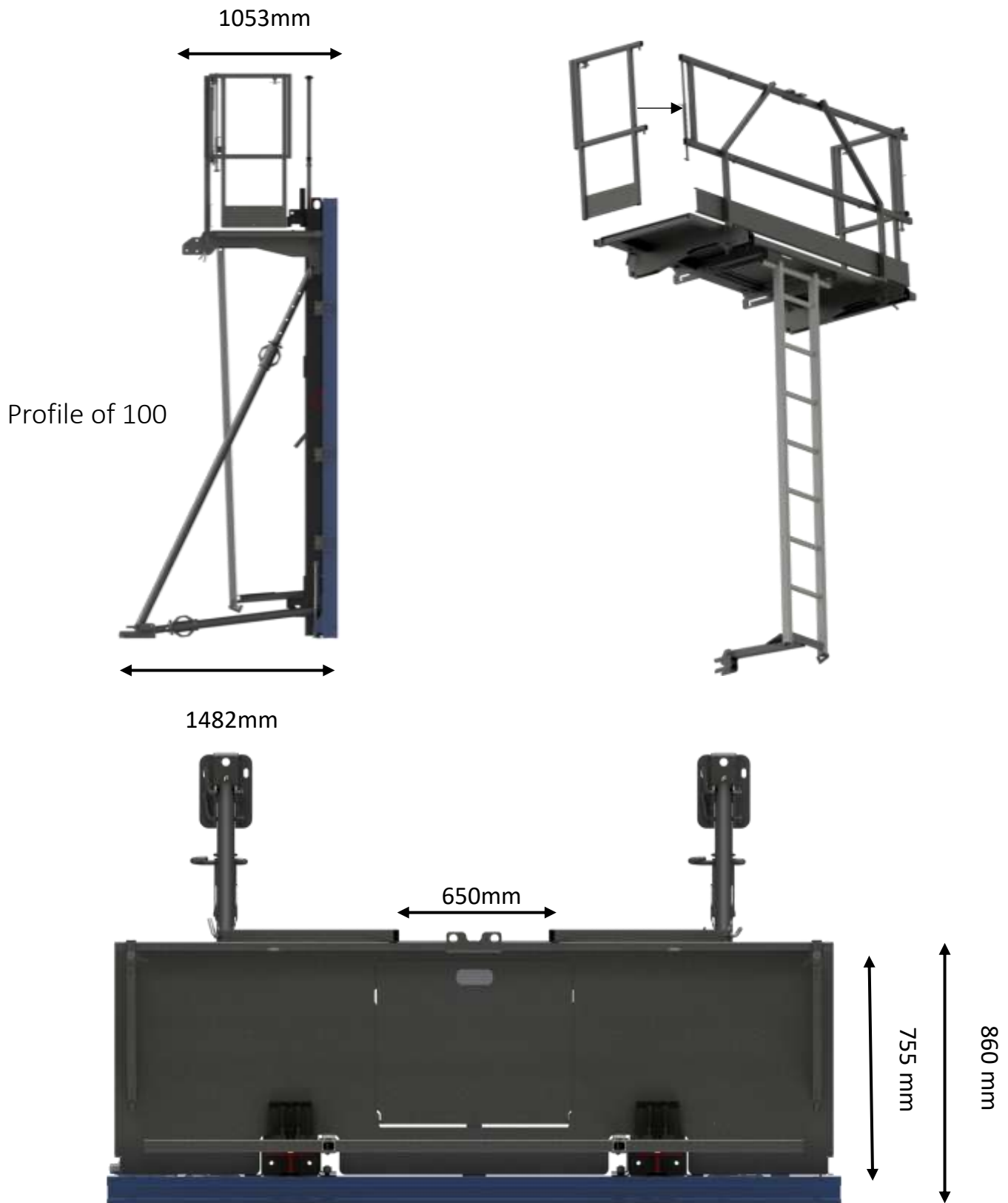
- Beam fixing tab



- Rod passage

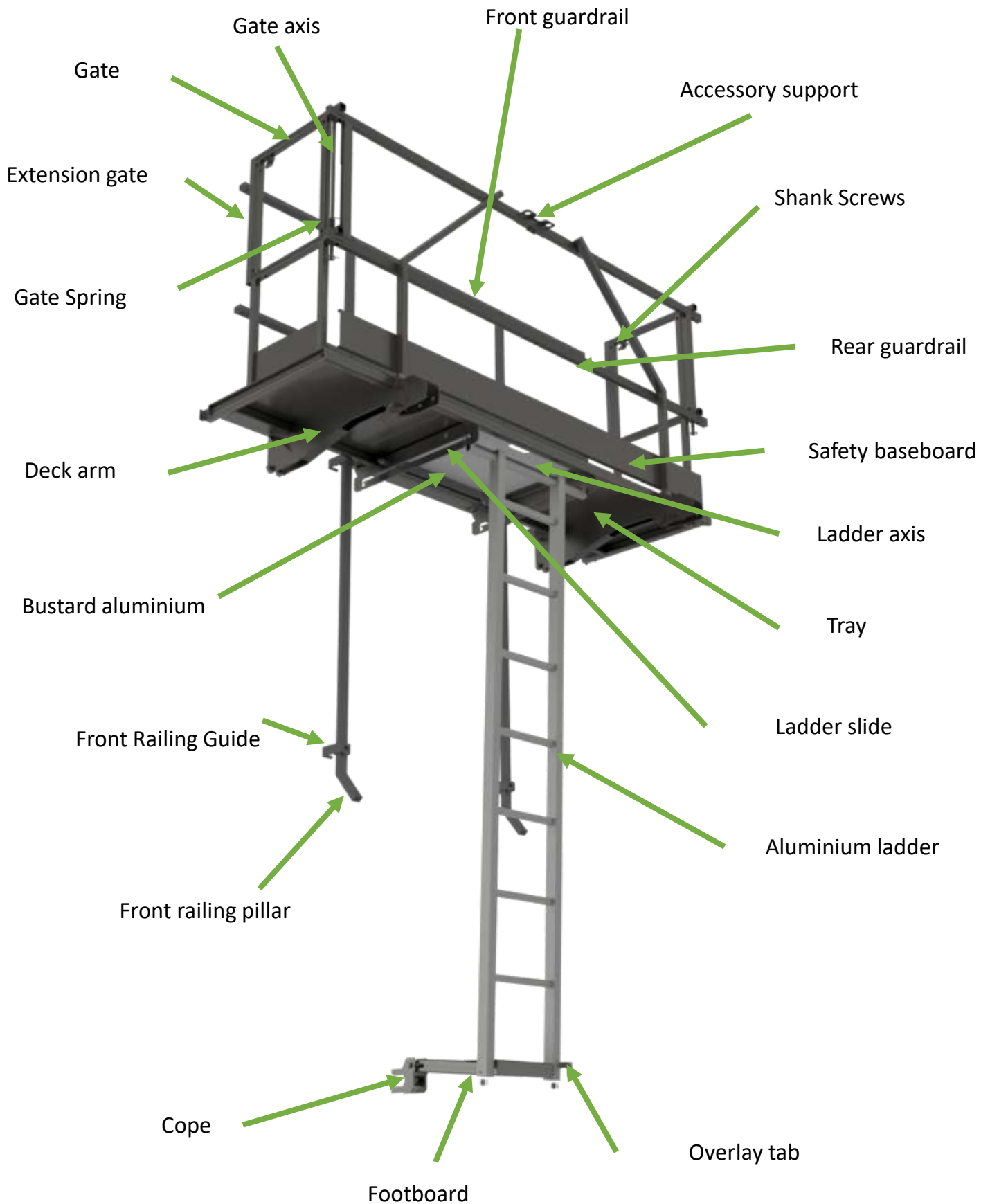
- Alignment cylinder support

Security Platform

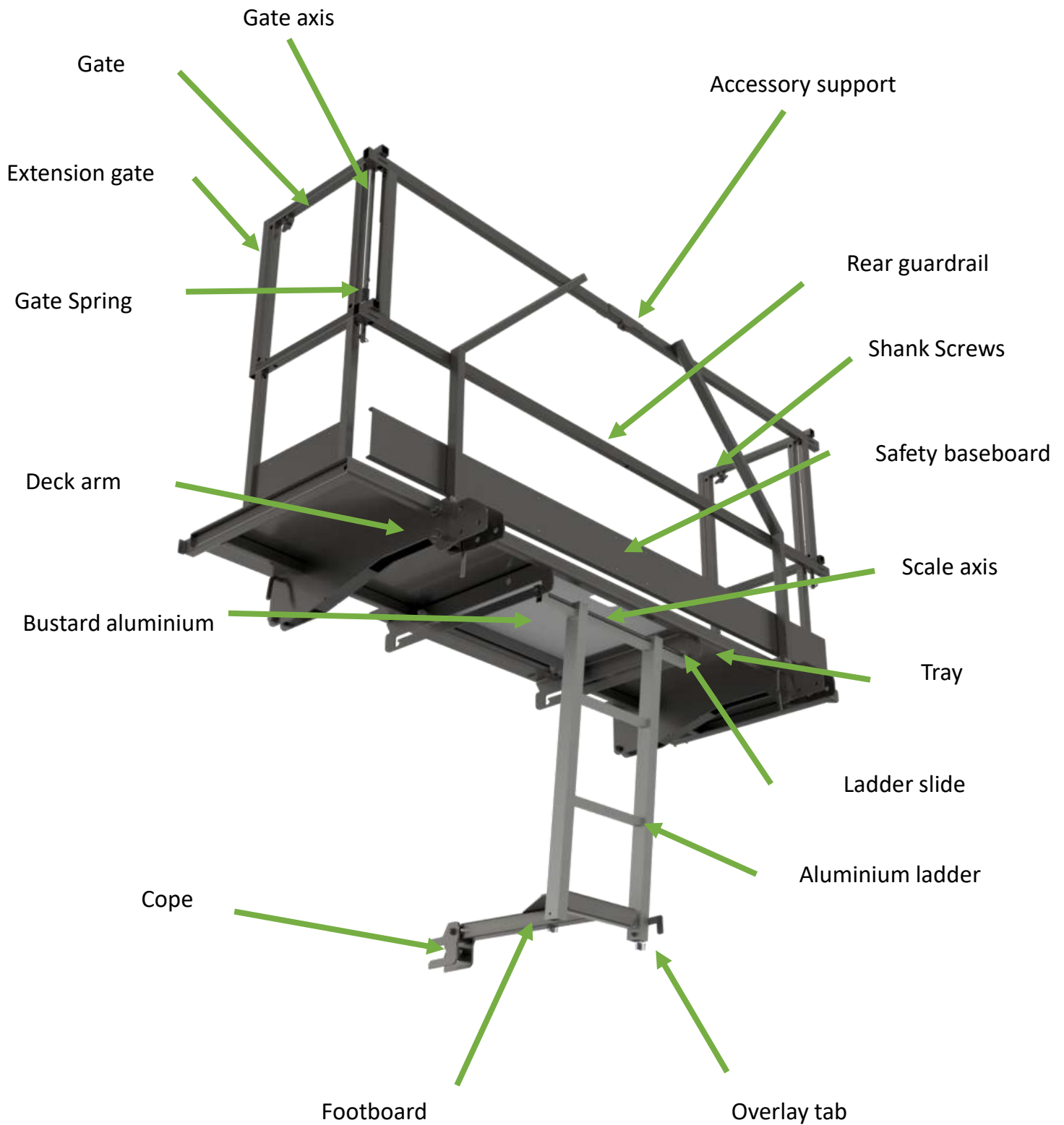


- The safety system is the same on the panel as on the base extension except for the front guardrail and the length of the ladder

Security Platform



Security Platform



Security Platform

The Meta Steel safety platform is a work-friendly area with access above the panel. It is accessed from the inside of the ladder. It is modular and its various equipment can be dismantled.

It complies with the NFP 93-350 standard and allows **a maximum weight of up to 150 Kg/m²**, it is designed to accommodate 2 people and their tools. For safe work, make sure that the rear and front guardrails are deployed as well as the gates. Also check that the pins are pinned and equipped with pins.

A periodic visual inspection is necessary to ensure that the various elements of the security system are in good condition.

All the steel elements making up the safety system are galvanized. The ladder and hatch are made of aluminum.

The safety platform is customizable with several options such as the rear guardrail marking plate and gate.

Standard equipment

Accessory support

Fixing to the profile with a hammer head screw.



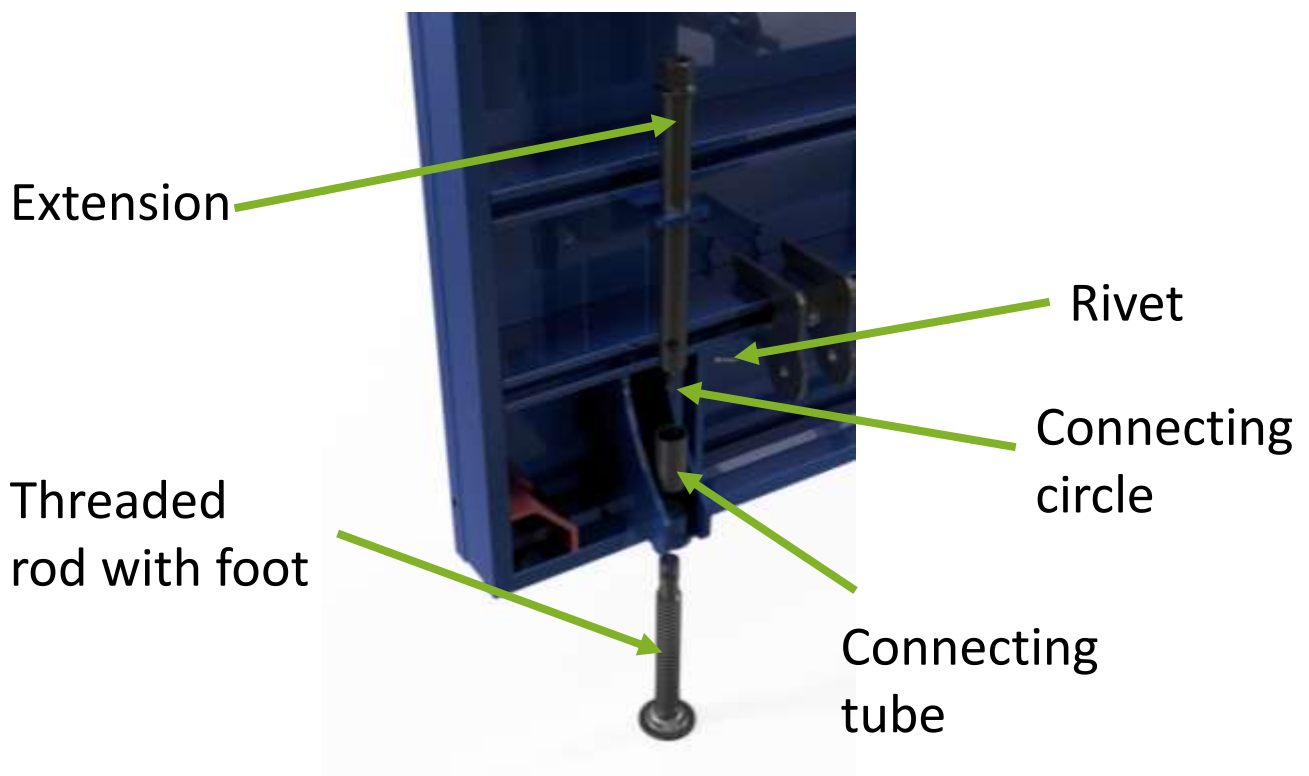
Accommodates either two rods with nut or two nuts.



Standard equipment

Foot jack

The base of the foot cylinder as well as the extension guide are welded to the chassis. The threaded rod of the foot cylinder is screwed into the nut of the base. Adjustment range 65mm.



Standard equipment

Floor slinging ring

The slinging ring on the ground is welded to the frame, it allows the sling to be attached from the ground. It allows a maximum of 14.4m² of formwork to be lifted on 2 rings. Passage of the sling through the cutout at the edge of the tray. CMU 3T.



Flat lifting eye

The Meta Steel has 4 flat lifting rings in each corner of the chassis. The rings are welded to the frame and allow 3 colosseum panels to be lifted on 4 rings. CMU 2T.



Standard equipment

Slinging Ring

The sling ring allows a panel train to be raised or moved. It is screwed into the beam head and allows a panel train to be lifted up to 21.6m² of panels on 2 rings. CMU 3T.



Standard equipment

Prop screed

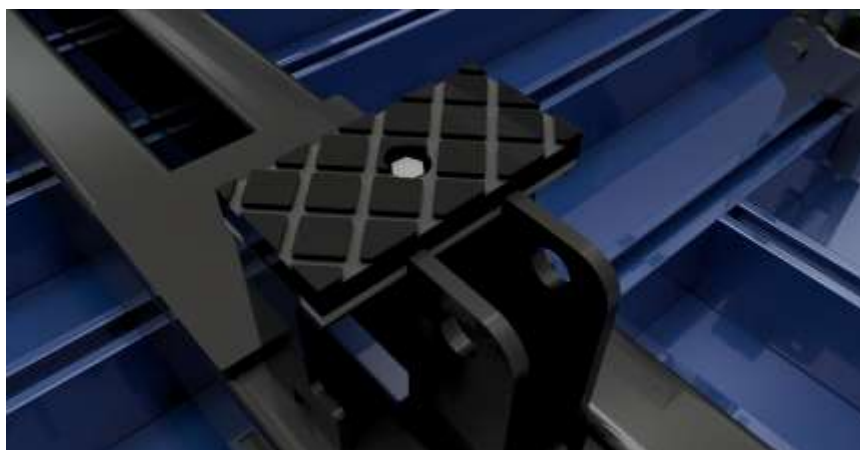
The prop clevis allows the stabilizing props to be received on Meta Steel. It is fixed with a hammer head screw to the profile of the Meta Steel. It allows the step of the safety platform to be attached as well. It is used with a D14 axis.



Packing cleat

The packing cleat allows the colosseum panels to be superimposed.

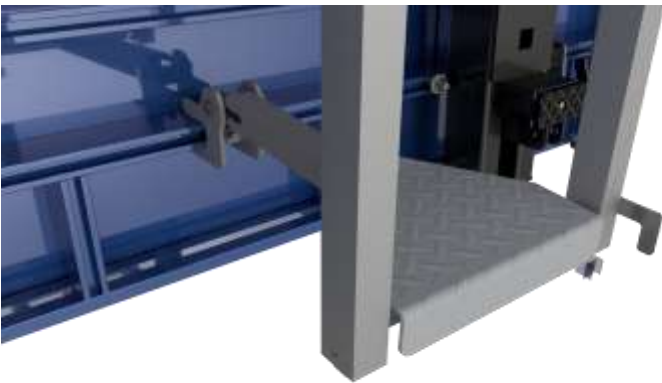
It is bolted to the beam and glued. It prevents scratches on the formwork faces when they are superimposed and colossed.



Standard equipment

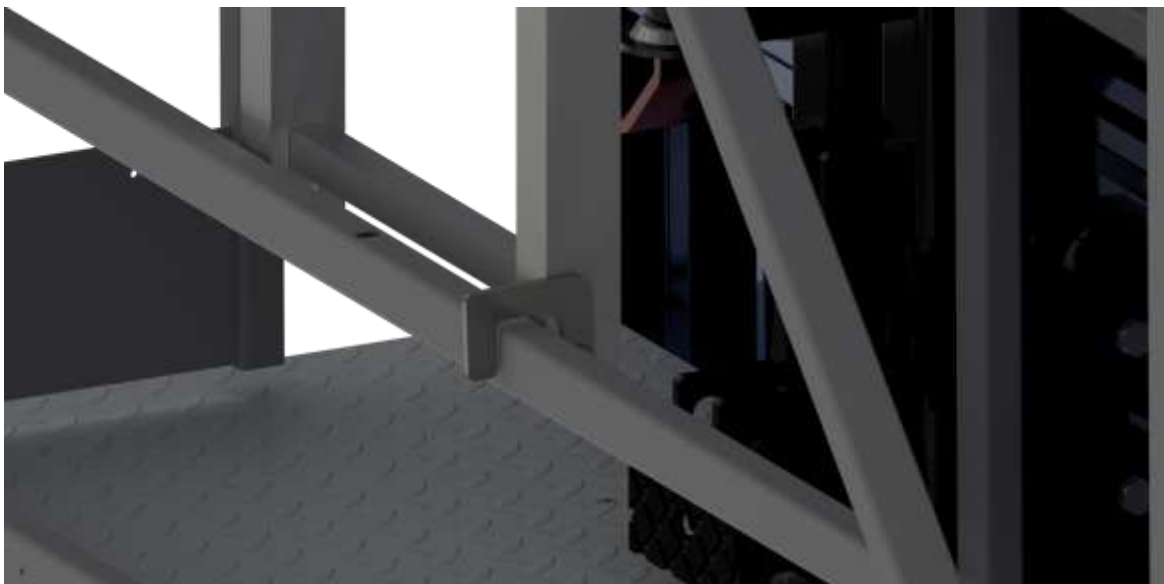
Footboard

The step is connected to the panel by a prop screed. It allows the ladder to be positioned and serves as a platform to climb the ladder. It can lock in the coliseum position. He comes to position himself on the last rung.



Overlay Tie Tab

The overlapping link tab is positioned on the underside of the rear railing and allows the scale of the lower panel to be held when layering. Screw to the bottom of the ladder.



Standard equipment

Access Ladder

The ladder is made of aluminum and weighs less than 11 Kg. It allows access to the safety platform and to pry up the tray. It is attached to the slide under the tray that allows it to be packaged.



Access hatch

The hatch is made of aluminum. It allows access to the safety platform and closes by gravity. It is assembled to the platform tray.



Standard equipment

Rear guardrail

The purpose of the rear guardrail is to prevent falls at the rear of the platform. It is fixed on the platform tray.



Front guardrail

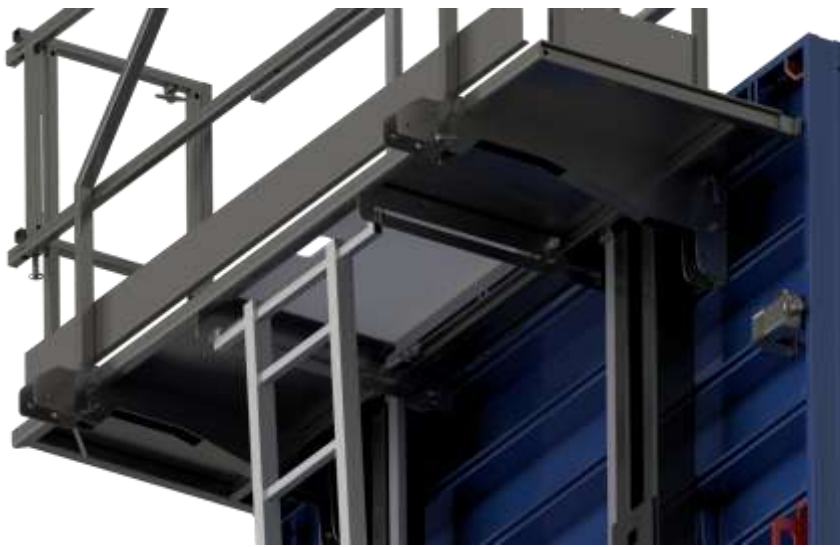
The purpose of the front guardrail is to prevent falls at the front of the platform. It is fixed on the platform frame and rests on the beam heads. The lock is done on the guides fixed to the chassis.



Standard equipment

Tray

The deck is the working platform for moving around at the top of the Meta Steel. It is locked on two screeds. It is the basis of all the elements that make up the security system.



Standard equipment

Built-in clamp

The integrated clamp is attached to the panel and allows the panels to be joined together. The clamp is attached to a plate composed of a light allowing it to be deployed. It is attached to the Meta Steel with a hammer head screw.



Rear railing accessory support

The accessory support of the rear guardrail allows you to store two rods with their nuts. It is fixed with an M8 screw on the rear guardrail.



Standard equipment



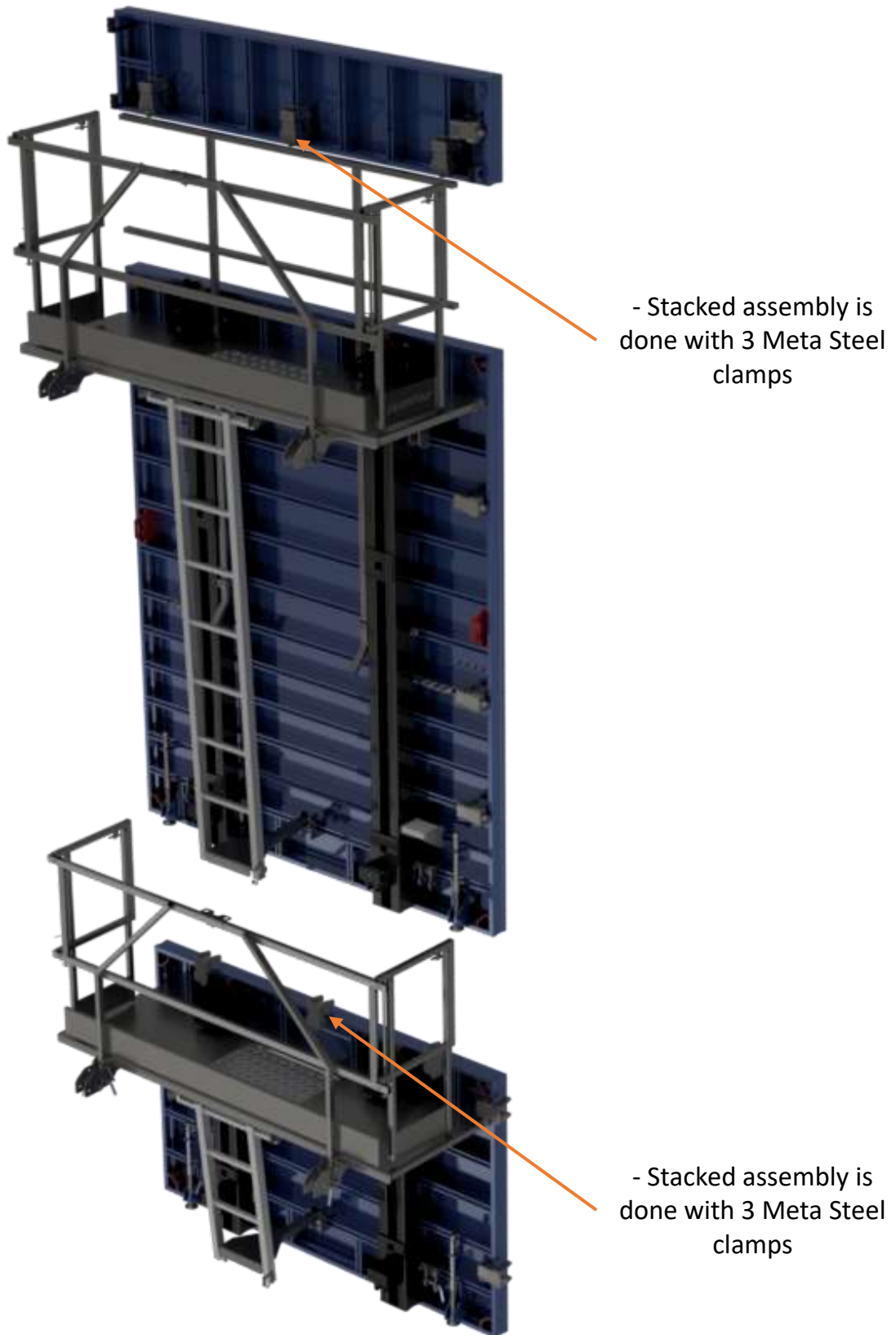
Standard equipment



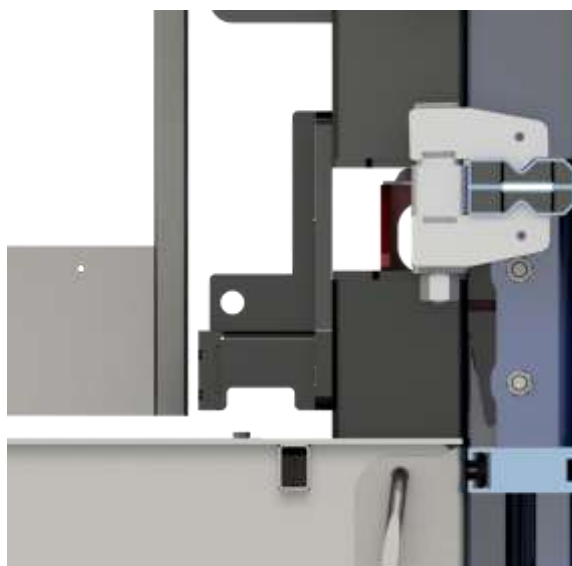
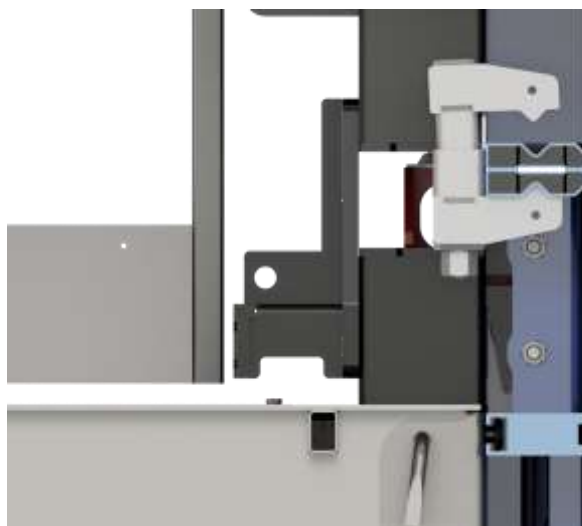
- Meta Steel equipment can be dismantled using a 24 mm wrench



Standard equipment



Standard equipment



Options

- Customize the color of the frame and your beams.



Options

- Possibility to add a custom fairing plate to your tastes.



Gate

The gate allows access to be opened or closed on the edges of the platform. It is fixed by an axle and a spring on the rear guardrail. It has an adjustable extension system with a shank screw.



Options

- Customization of the gates with the gate marking plate

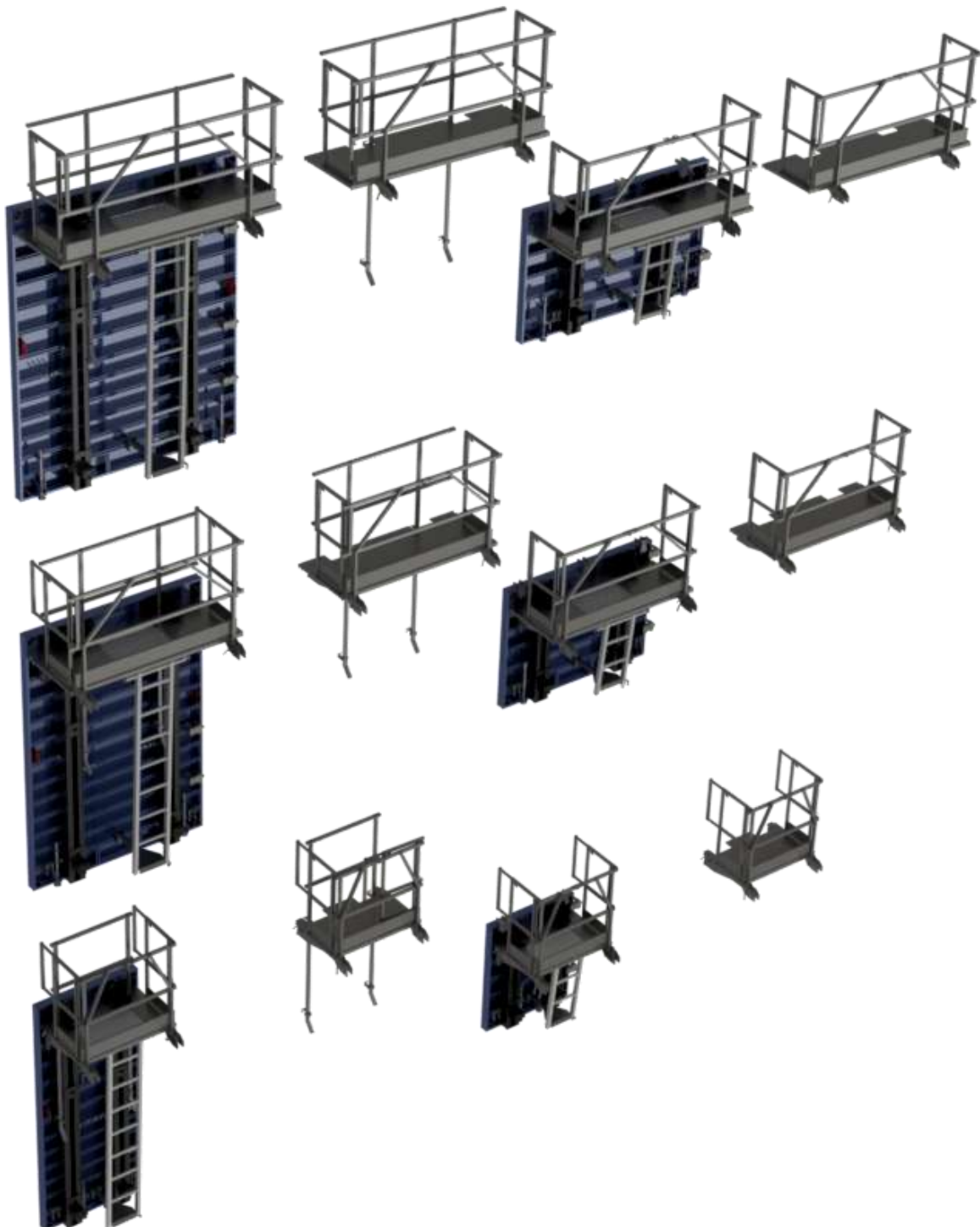


- Customization of the rear guardrail with the marking plate



Options

- Customization of the tray. For widths from 2400 to 1200 equipped with a hatch, the safety trays are available in options without flap on the panel and under elevation



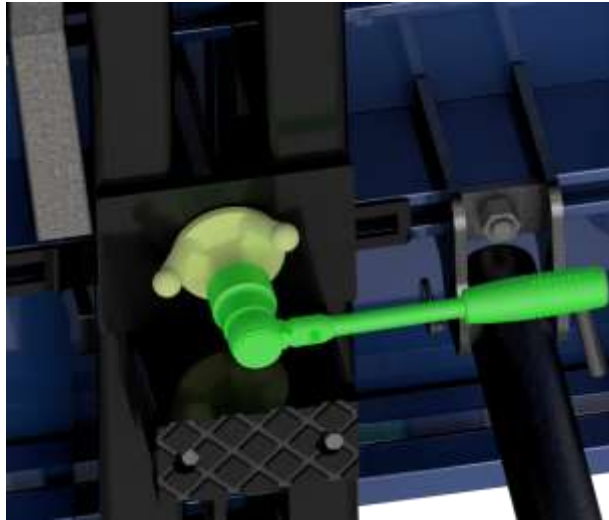
Options

- The Meta Steel formwork face is available in 2 different versions with a thickness of 5mm:



Options

Use of D23 rod several options:



- D23 rod / 3-wing nut
36 mm wrench



Washer nut
Floating



Square nut
blocking



Clamping plate
1 side

36 wrench tightening

Options

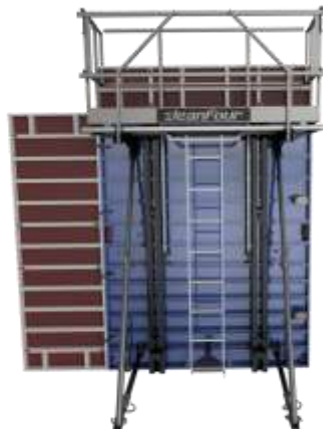
Modalu, Modacier and Meta Steel compatibility:

The Meta Steel and the Modacier and Modalu panels both have a 100mm external profile, which allows them to be **compatible with assembly in all possible configurations.**

The rod passages of the Modacier and Modalu large-format panels are located on the same sides, so they can form a pair when the concrete pressure does not exceed **60 Kn/m²** (maximum GF capacity). For the use of Modalu or Modacier with Meta Steel, it is imperative to use D23 rods.

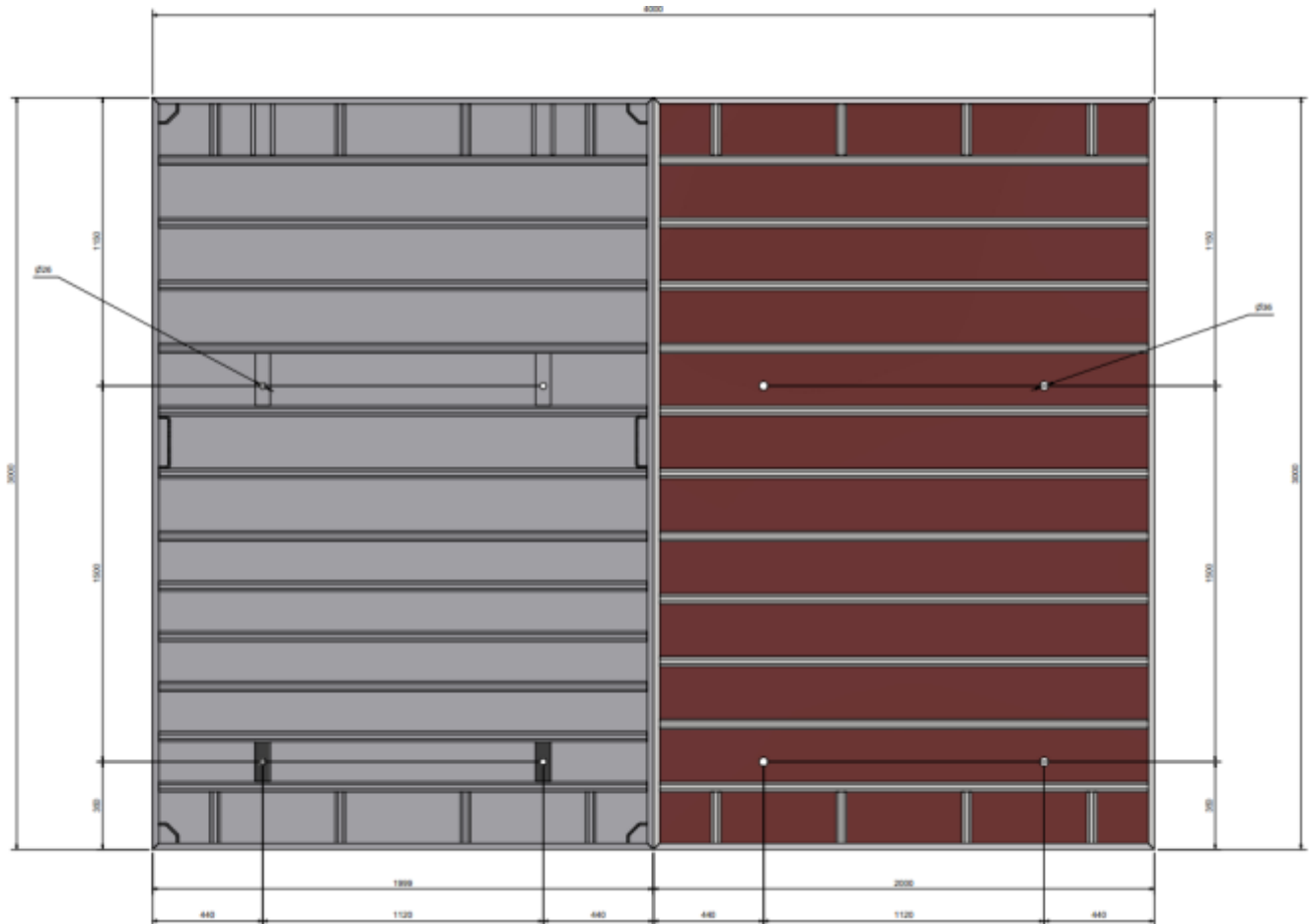
With the same interior profile shape, the Modalu and Modacier accessories are compatible with Meta Steel.

The positioning of the crossbeams maintains a certain correspondence between the two ranges and allows the GF panels to accommodate the **Meta Steel safety system as well as the beams and other equipment.**



Options

Modalu, Modacier and Meta Steel compatibility:



The props

2 ranges:



- Compound triangulation of 1050x1800 / 2400x4000

- Sleeve prop



- Compound triangulation of 1000x1800 / 2200x4000

- Screw prop

Sleeve prop size	Weight	Screw prop dimension	Weight
1050x1800	7 Kg	1000x1800	13,2Kg
1700x3000	10 Kg	-	-
2400x4000	20,5 Kg	2200x4000	25,8 Kg
2900x5000	25,2 Kg	-	-
4000x7000	48,0 Kg	-	-

The props

Sleeve prop



- Prop 170-300

- Prop 240-400

1350mm/H sleeve



1815mm/H sleeve

Screw prop

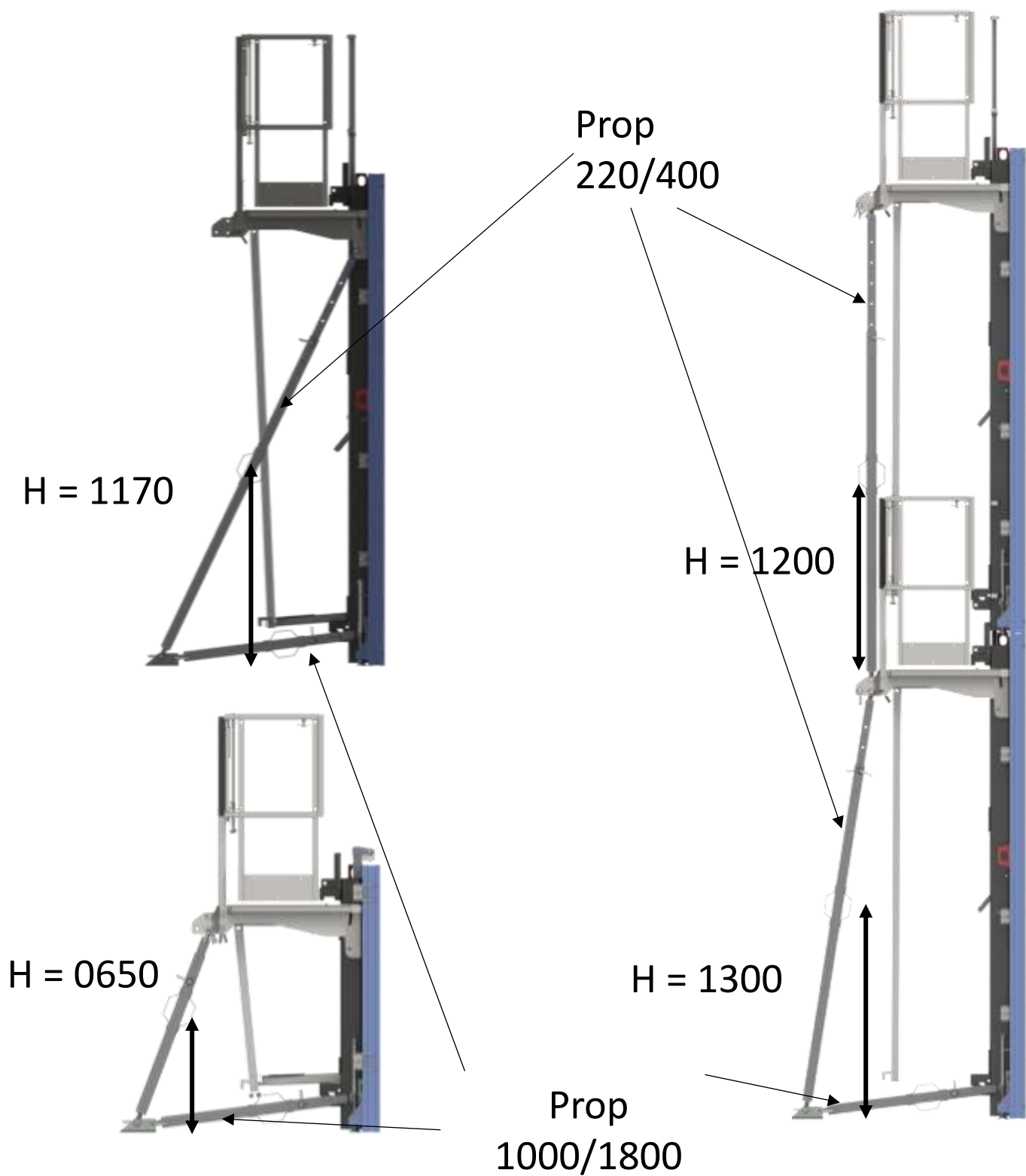
- Prop 220-400



1170mm/H handle

The props

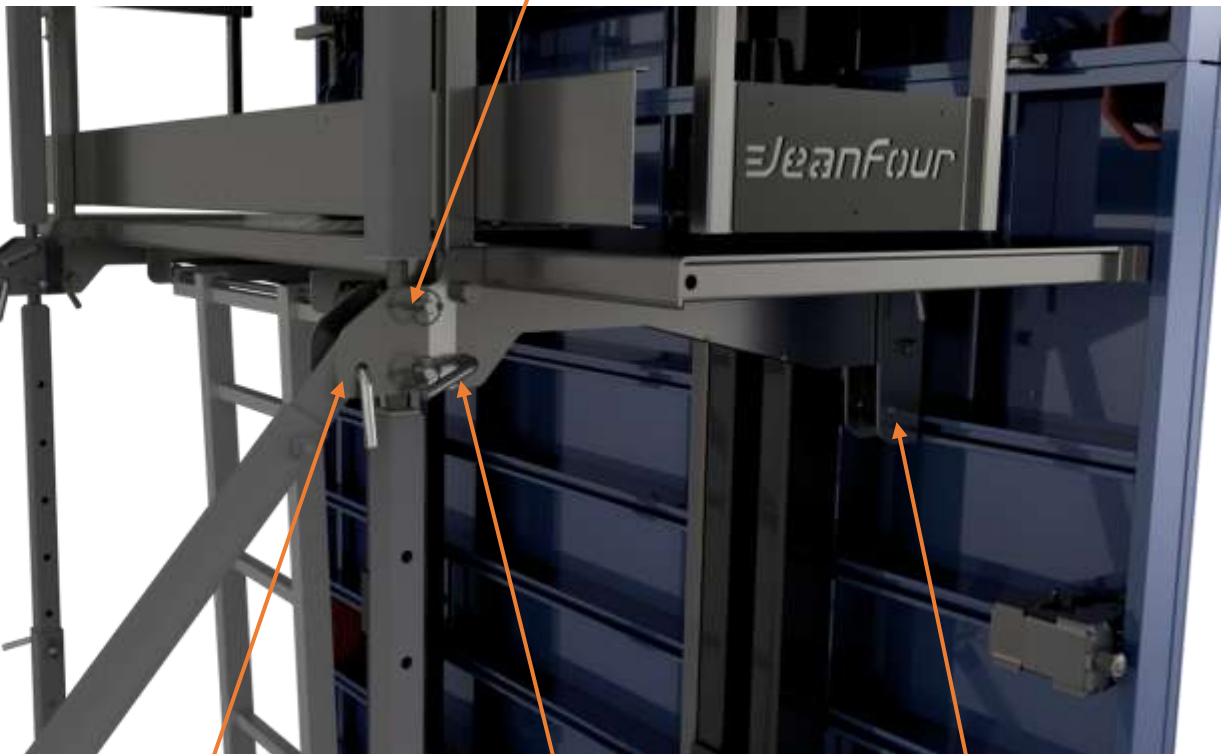
- Height handle screw prop



The props

- Using the Meta Steel arm:

- Stabilisation
superposition



-Bracing

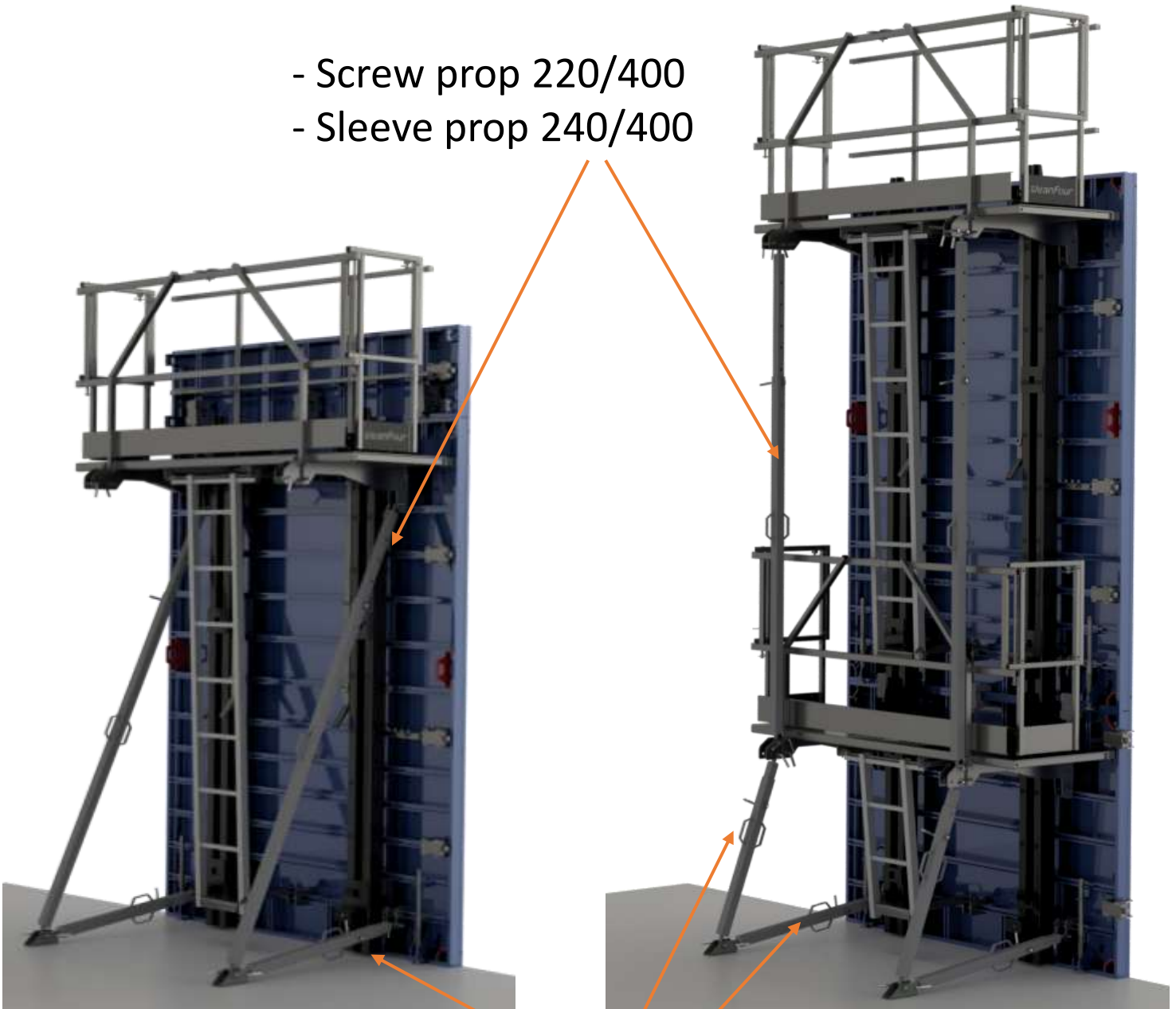
- Stabilisation

-Stabilization
Up to a
height of
3.5m

The props

- Use of stabilizing props in different configurations

- Screw prop 220/400
- Sleeve prop 240/400

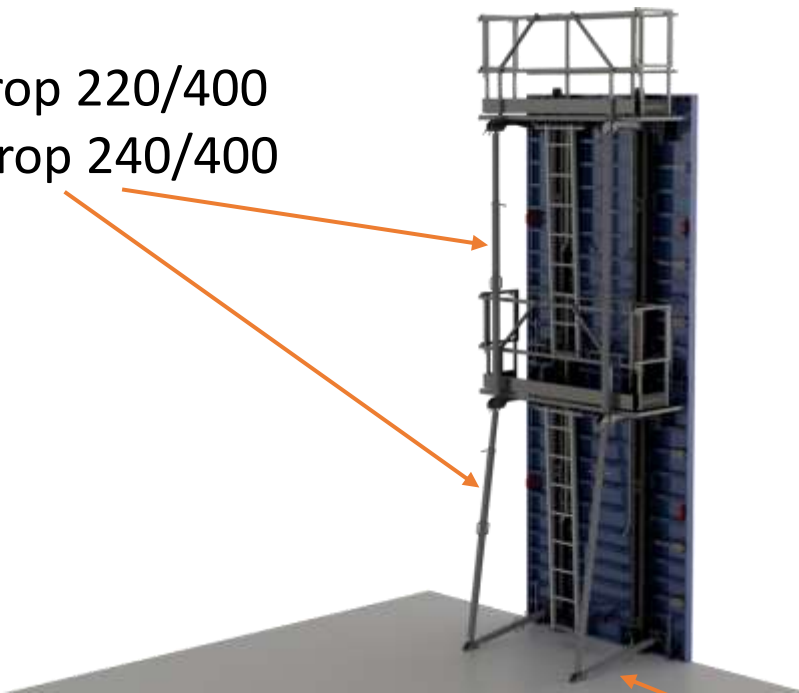


- Screw prop 100/180
- Sleeve prop 105/180

The props

- Use of stabilizing props in different configurations

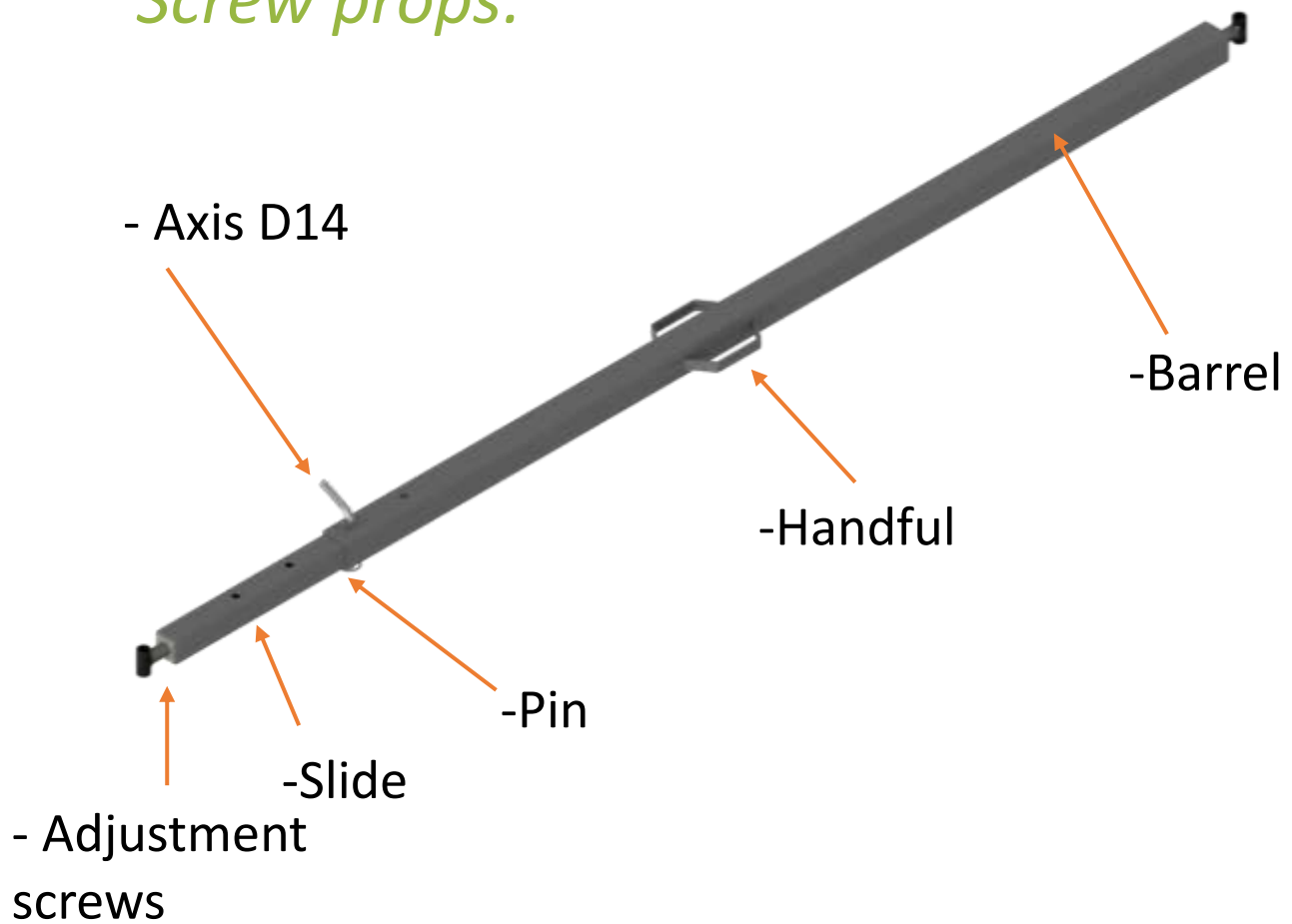
- Screw prop 220/400
- Sleeve prop 240/400



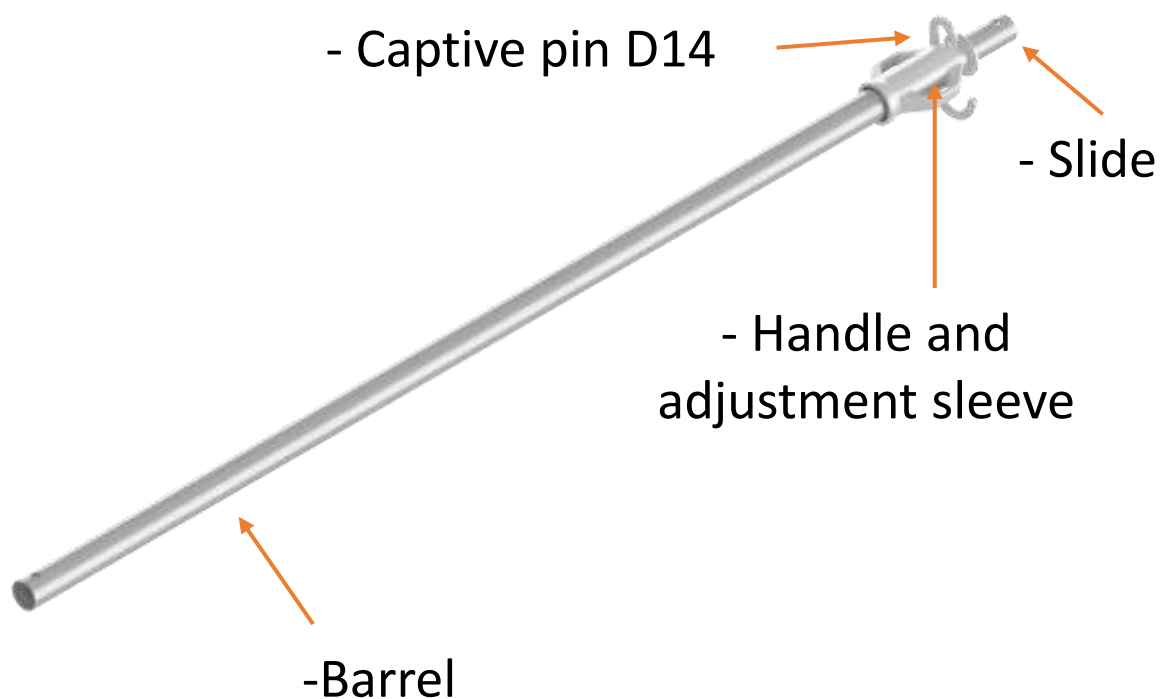
- Screw prop 100/180
- Sleeve prop 105/180

The props

Screw props:



Sleeve props:



Props: Bracing and footplate



Prop TPE
220-400

Prop TPE
300-500

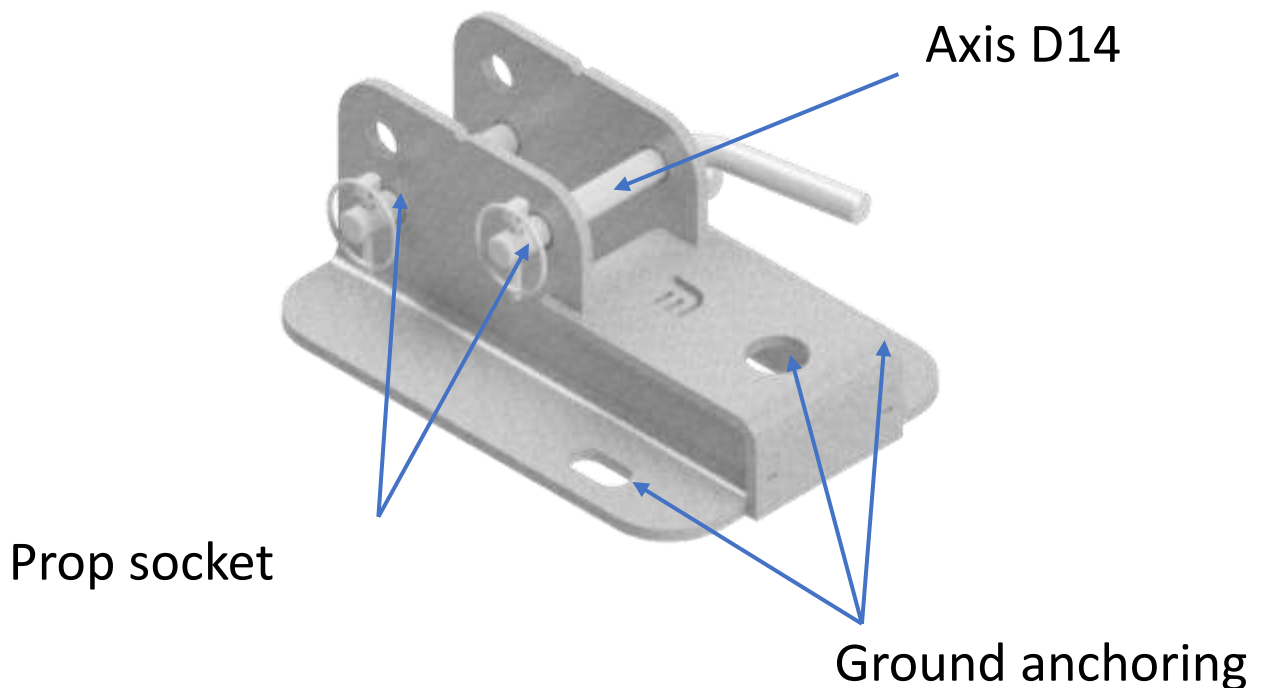
Prop RAS TP
400-700

Screw prop
600-1000

Screw prop
1165-1590

Stabilizing triangulation foot plate:

Foot Plate:



The props

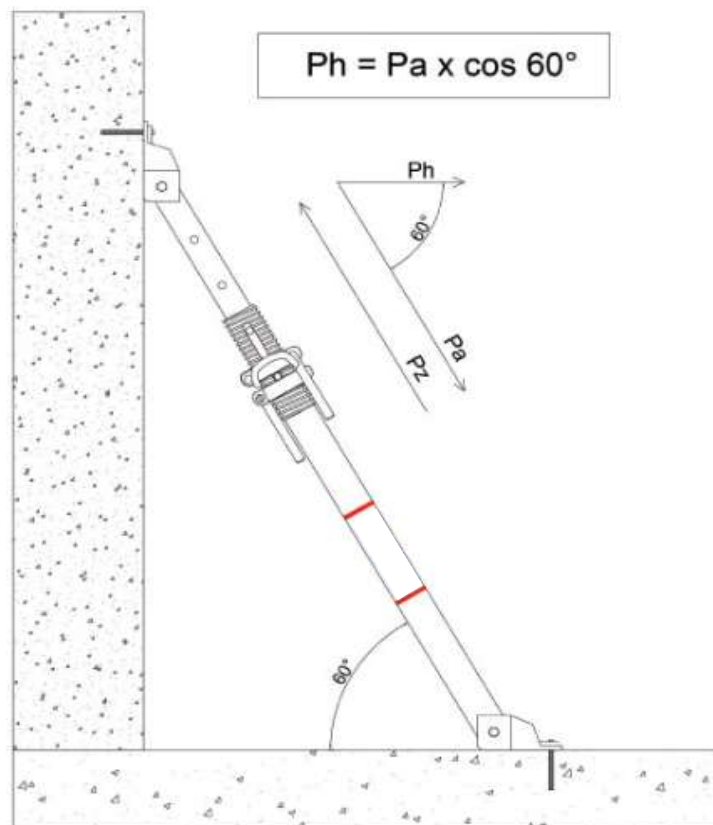
Sleeve prop for stabilization

PTS 1800 L1 (1050mm / 1791 mm) weight 7.00 kg without plates				PTS 3000 L1 (1700mm / 2991 mm) weight 10.00 kg without plates			
Extension	Compression		Tension	Extension	Compression		Tension
(m)	Ph (kN)	Pa (kN)	Pz (kN)	(m)	Ph (kN)	Pa (kN)	Pz (kN)
1,80	25,77	36,44	14,76	3,00	5,10	10,20	22,00
1,70	25,77	36,44	14,76	2,90	5,60	11,20	22,00
1,60	25,77	36,44	14,76	2,80	6,20	12,40	22,00
1,50	25,77	36,44	14,76	2,70	6,85	13,70	22,00
1,40	29,50	41,71	14,76	2,60	7,60	15,20	22,00
1,30	29,50	41,71	14,76	2,50	8,55	17,10	22,00
1,20	29,50	41,71	14,76	2,40	9,65	19,30	22,00
1,10	29,50	41,71	14,76	2,30	11,00	22,00	22,00
1,05	29,50	41,71	14,76	2,20	11,00	22,00	22,00
				2,10	11,00	22,00	22,00
				2,00	11,00	22,00	22,00
				1,90	11,00	22,00	22,00
				1,80	11,00	22,00	22,00
				1,70	11,00	22,00	22,00
				1,60	11,00	22,00	22,00
PTS 4000 L2 (2413mm / 4175 mm) weight 20.50 kg without plates				PTS 5000 L2 (2993mm / 5385 mm) weight 23.00 kg without plates			
Extension	Compression		Tension	Extension	Compression		Tension
(m)	Ph (kN)	Pa (kN)	Pz (kN)	(m)	Ph (kN)	Pa (kN)	Pz (kN)
4,00	3,65	7,29	36,70	5,00	2,42	4,84	36,70
3,90	3,89	7,79	36,70	4,90	2,55	5,11	36,70
3,80	4,17	8,33	36,70	4,80	2,70	5,41	36,70
3,70	4,47	8,94	36,70	4,70	2,87	5,73	36,70
3,60	4,81	9,62	36,70	4,60	3,05	6,09	36,70
3,50	5,19	10,38	36,70	4,50	3,24	6,49	36,70
3,40	5,62	11,24	36,70	4,40	3,46	6,93	36,70
3,30	6,11	12,22	36,70	4,30	3,71	7,41	36,70
3,20	6,67	13,34	36,70	4,20	3,98	7,96	36,70
3,10	7,32	14,65	36,70	4,10	4,29	8,58	36,70
3,00	8,10	16,20	36,70	4,00	4,64	9,28	36,70
2,90	9,03	18,07	36,70	3,90	5,04	10,09	36,70
2,80	10,19	20,39	36,70	3,80	5,51	11,02	36,70
2,70	11,69	23,37	36,70	3,70	6,06	12,12	36,70
2,60	13,71	27,42	36,70	3,60	6,71	13,42	36,70
2,50	16,64	33,29	36,70	3,50	7,47	14,95	36,70
2,40	18,35	36,70	36,70	3,40	8,34	16,69	36,70
				3,30	9,21	18,43	36,70
				3,20	9,89	19,77	36,70
				3,10	10,33	20,65	36,70
				3,00	10,65	21,31	36,70
				2,90	10,96	21,91	36,70

The props

Screw prop for stabilization

Screw prop (1000mm/1800mm) Weight 13.30 kg without plates				Screw prop (2200mm / 4000 mm) weight 25.80 kg without plates			
Extension	Compression		Tension	Extension	Compression		Tension
(m)	Ph (kN)	Pa (kN)	Pz (kN)	(m)	Ph (kN)	Pa (kN)	Pz (kN)
1,80	25,77	36,44	14,76	4,00	3,65	7,29	36,70
1,70	25,77	36,44	14,76	3,90	3,89	7,79	36,70
1,60	25,77	36,44	14,76	3,80	4,17	8,33	36,70
1,50	25,77	36,44	14,76	3,70	4,47	8,94	36,70
1,40	29,50	41,71	14,76	3,60	4,81	9,62	36,70
1,30	29,50	41,71	14,76	3,50	5,19	10,38	36,70
1,20	29,50	41,71	14,76	3,40	5,62	11,24	36,70
1,10	29,50	41,71	14,76	3,30	6,11	12,22	36,70
1,05	29,50	41,71	14,76	3,20	6,67	13,34	36,70
				3,10	7,32	14,65	36,70
				3,00	8,10	16,20	36,70
				2,90	9,03	18,07	36,70
				2,80	10,19	20,39	36,70
				2,70	11,69	23,37	36,70
				2,60	13,71	27,42	36,70
				2,50	16,64	33,29	36,70
				2,40	18,35	36,70	36,70
				2,30	18,35	36,70	36,70
				2,20	18,35	36,70	36,70



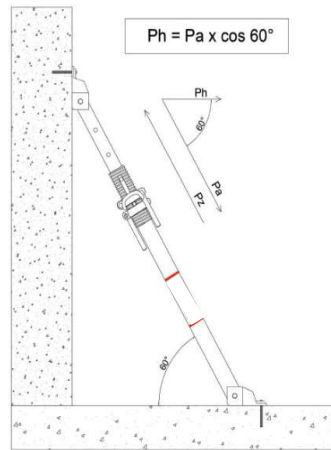
The props

Sleeve prop for bracing

TPE prop (2200mm/4000mm) Weight 19.78 kg without plates			TPE prop (3000mm/5000mm) Weight 19.78 kg without plates		
Extension	Compression	Tension	Extension	Compression	Tension
(m)	Pa (kN)	Pz (kN)	(m)	Pa (kN)	Pz (kN)
4,00	9,00		4,00	6,00	
3,80	11,00		3,80	7,00	
3,50	13,00		3,50	11,00	
3,00	15,00		3,00	17,00	
2,20	18,00		2,20	18,00	

TP flush prop (4050mm / 7050mm) Weight 40,00 kg without plates		
Extension	Compression	Tension
(m)	Pa (kN)	Pz (kN)
7,05	9,00	
6,50	11,00	
5,95	13,00	
5,00	22,00	
4,50	30,00	
4,05	30,00	

Screw prop (6000mm/10000mm) Weight 13.30 kg without plates			Screw Prop (11650mm/15900mm) Weight 13.30 kg without plates		
Extension	Compression	Tension	Extension	Compression	Tension
(m)	Pa (kN)	Pz (kN)	(m)	Pa (kN)	Pz (kN)
10,00	10,00	35,00	15,90	5,50	35,00
9,50	12,00	35,00	15,50	6,00	35,00
9,00	14,00	35,00	15,00	7,00	35,00
8,50	19,00	35,00	14,50	8,00	35,00
8,00	22,00	35,00	14,00	9,00	35,00
7,50	23,00	35,00	13,50	10,00	35,00
7,00	25,00	35,00	13,00	11,00	35,00
6,50	26,00	35,00	12,50	13,00	35,00
6,00	26,00	35,00	12,00	14,00	35,00
			11,65	15,00	36,00



Plumb lines

Positioning the plumb line:



- Passage of the plumb line between two trays for layering



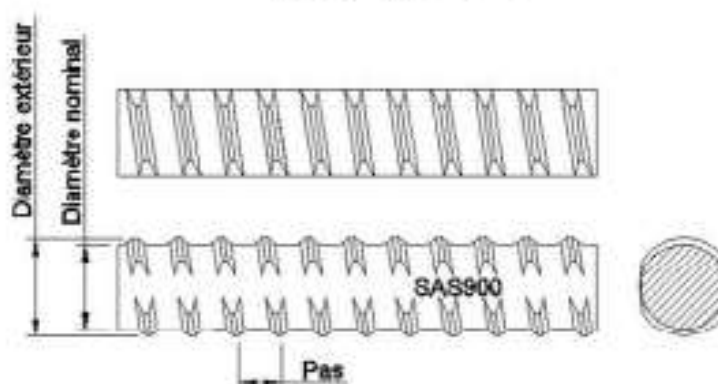
- Plumb line on beam



Clamping rods



TIGE FC / F



Tiges 15FC et 20FC :

- laminée à chaud, filetage pas à droite
- conforme à la norme **NF P 93-350**
- non sensible aux projections de soudure
- cintrable à 180° (diamètre mini du galet = 6xd)
- résilience à -20°C supérieure à 28J
- identifiable grâce à son marquage "SAS900"

Tiges 26 F :

- laminée à chaud, filetage pas à droite
- conforme à l'ATE 05/0122
- non soudable

Diamètre nominal Ø d [mm]	Référence / Item number	
	Noir black	Zinguée zinc plated
15	15 FC	15 FC Z
20	20 FC	20 FC Z
26,5	26 F	26 F Z

Diamètre nominal Ø d [mm]	15	20	26,5
Diamètre extérieur Ø d _A [mm]	17	23	30
Pas c [mm]	10	10	13
Contrainte à la limite élastique / à la rupture / Allongement $f_{yk} / f_{tk} / A_{gt}^{1)}$	900 N/mm ² / 1050 N/mm ² / ≥ 3 %		950 N/mm ² / 1050 N/mm ² / ≥ 5 %
Limite élastique F _{ps,2k} [kN]	159	283	525
Limite de rupture F _{tk} [kN]	186	330	580
Section S [mm ²]	177	314	551
Résilience à -20°C Kv [J]	> 28 J	> 28 J	—
Masse G [kg/m]	1,44	2,56	4,48
Charge Maximale d'Utilisation [kN]	93	165	290

1) Pourcentage d'allongement à la charge maximale

1) percentage total elongation at maximum force

Clamping rods

For the use of Meta Steel, it is **imperative** to use a D23 rod that meets the NFP 93-350 standard, allowing a pressure of 10T/m² to be restored.

It is advisable to monitor the pressure in the formwork using a pressure sensor or other system to obtain the pressure on the rods.

Clamping rods in diameter 23 are mandatory for any overlapping of the Meta Steel panel. When using Modalu or Modacier panels with Meta Steel, D23 rods must also be used.

When using at a height of 3m, the use of the upper rod passage is recommended for a concrete finish without markings.

The use of the upper rod passage at the head of the beam is limited to the use of a standard concrete and wall thickness. In the case of an overlap of any height, the use of rod passages remains standard.

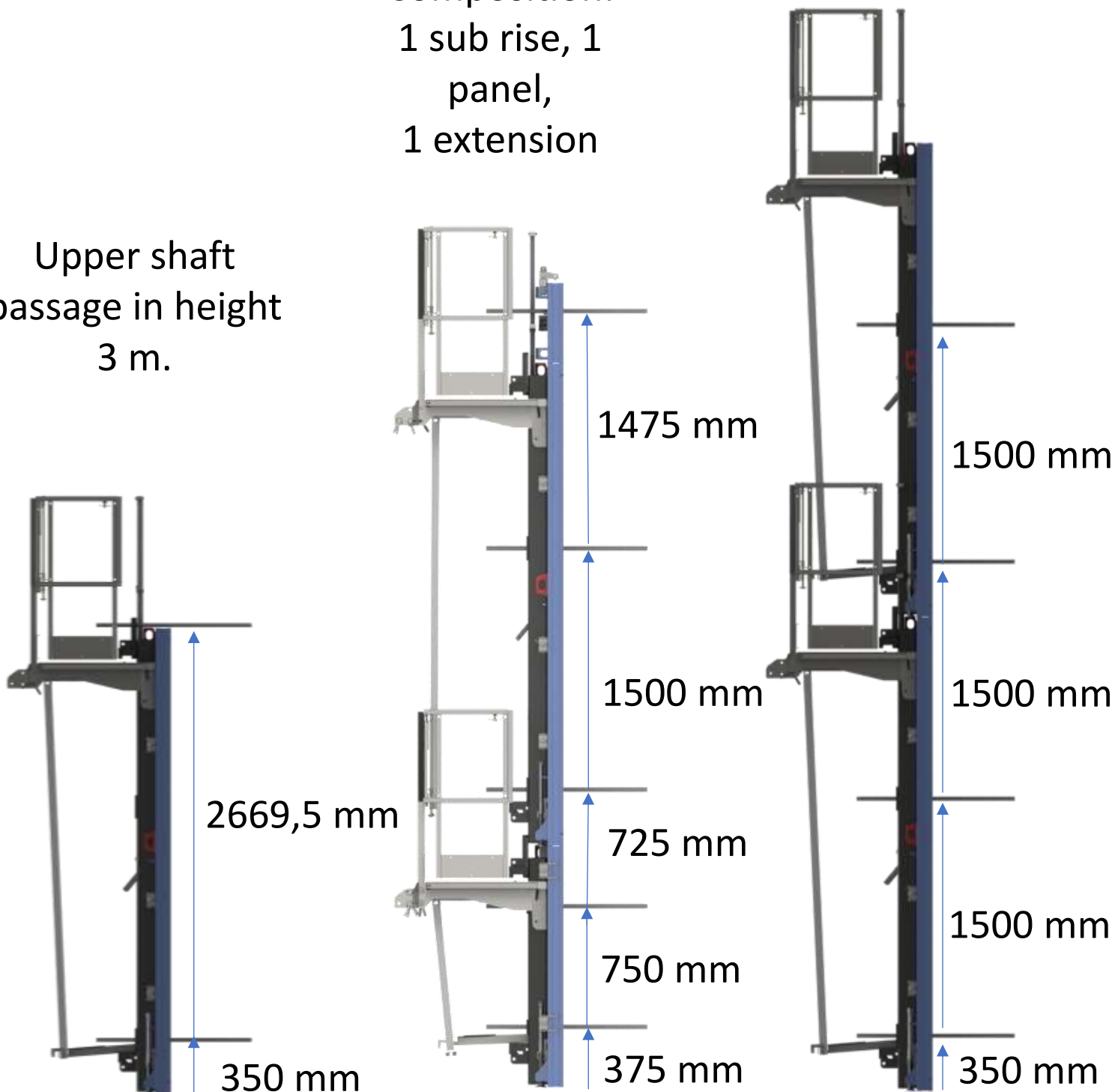
When using the top rod passage on the beam head, it is imperative to use a plug to fill the free rod passage.

Clamping rods

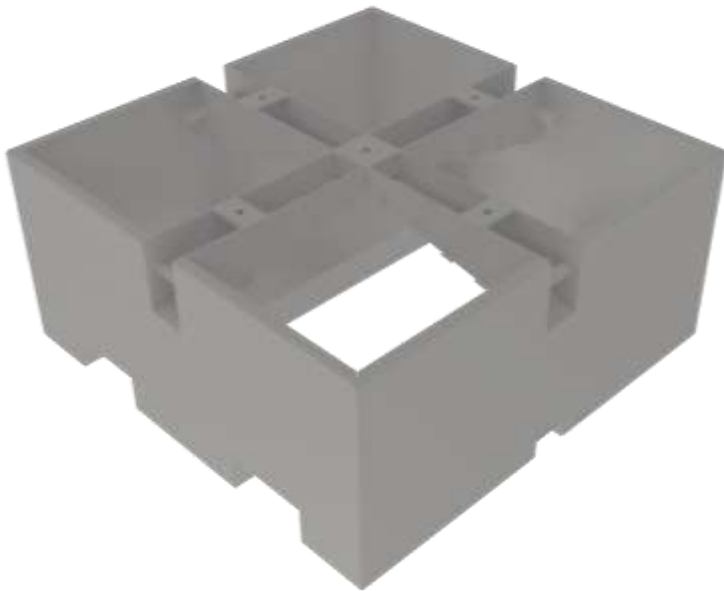
High shaft passage
for all configurations
over 3 m.

Composition:
1 sub rise, 1
panel,
1 extension

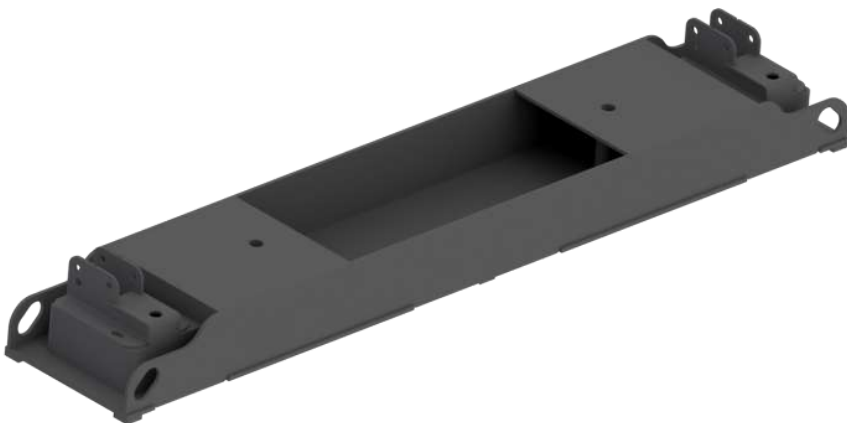
Upper shaft
passage in height
3 m.



Concrete ballast

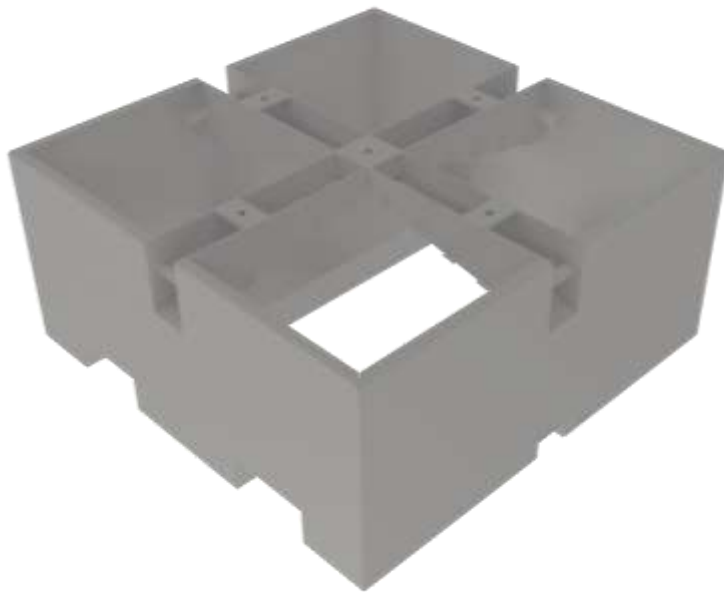


To be filled in
1T5 Final
Curb weight
97,518 Kg



To be filled in if
necessary
Final 295 Kg
Curb weight
125 Kg

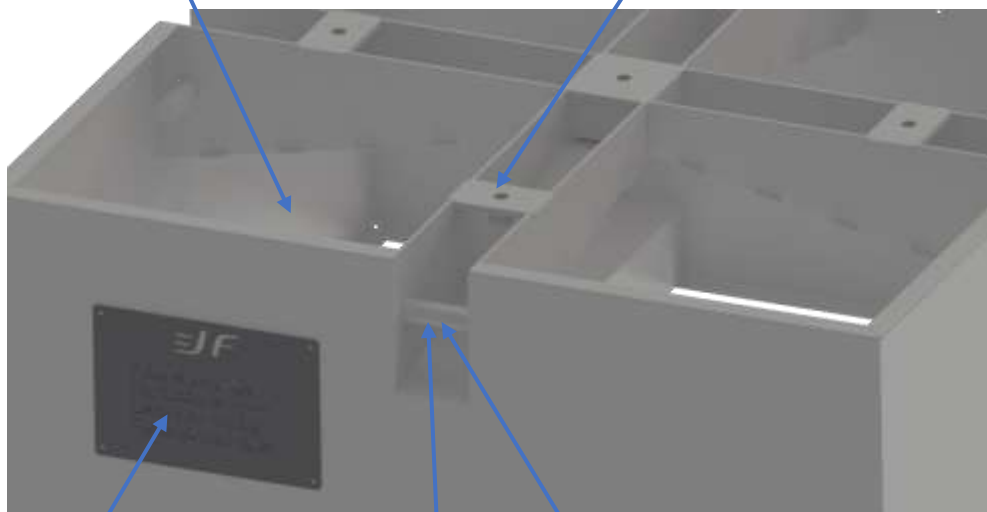
Concrete ballast



To be filled in
1T5 Final
Curb weight
97.5 kg

Concrete location

Prop clevis socket



Information plate

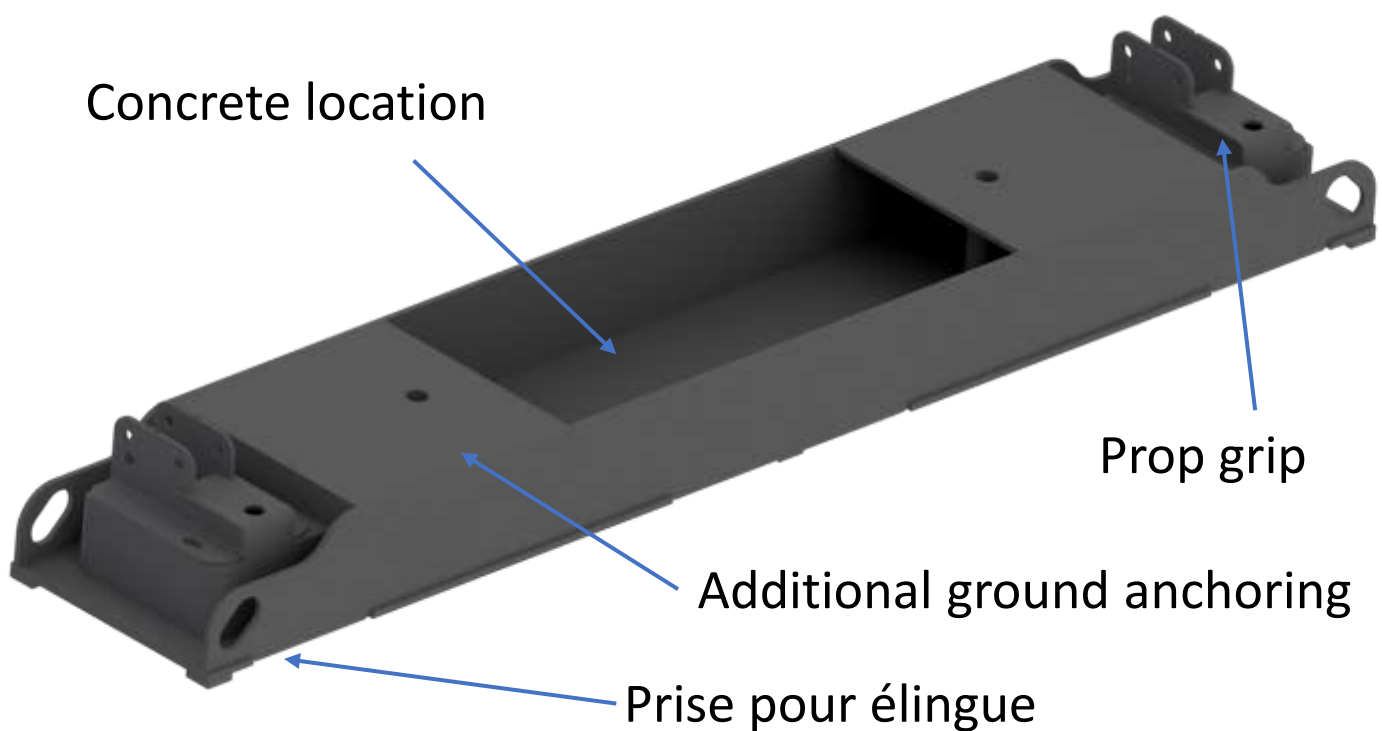
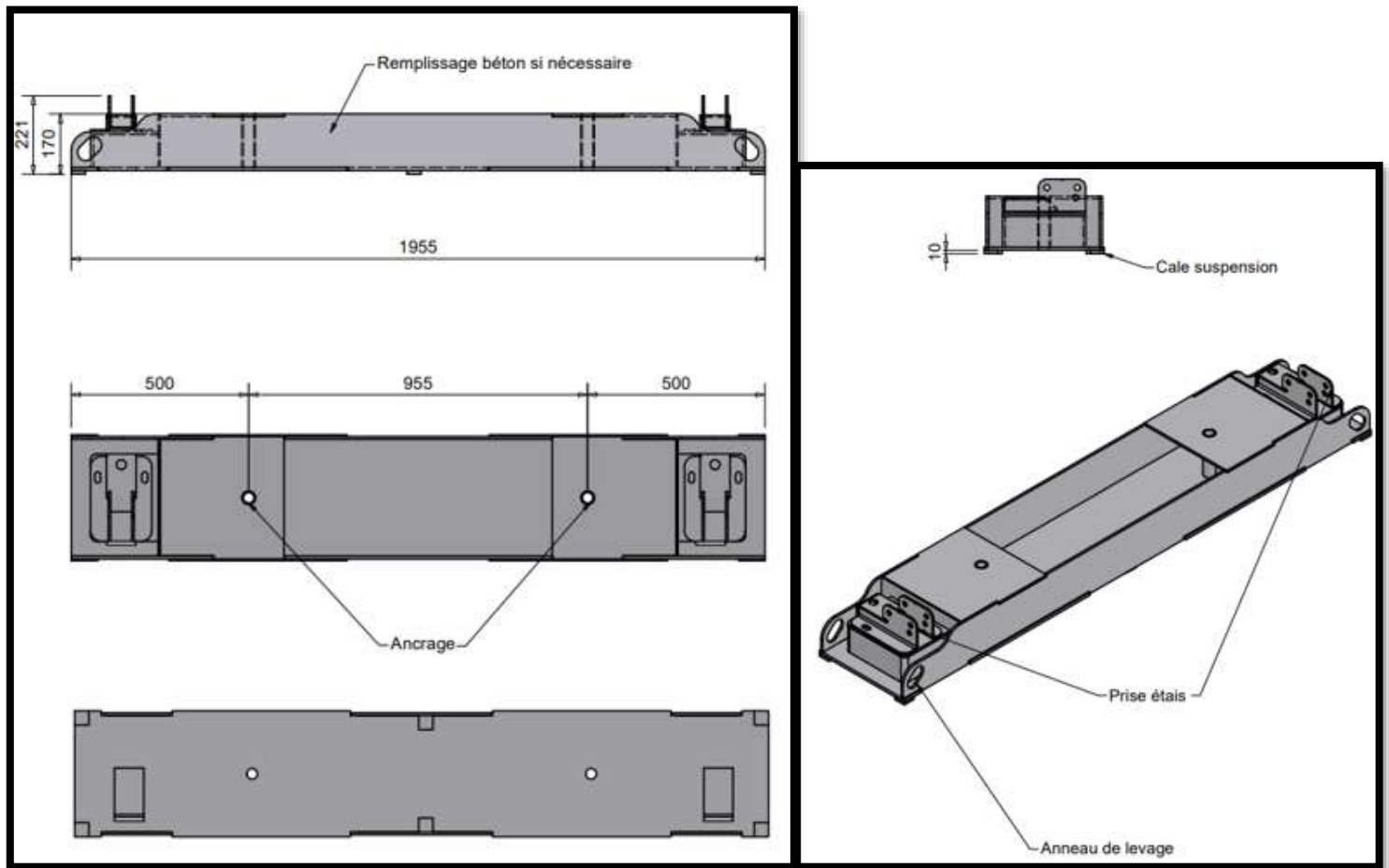
Sling Grip



Connection flange for
overlapping the weights

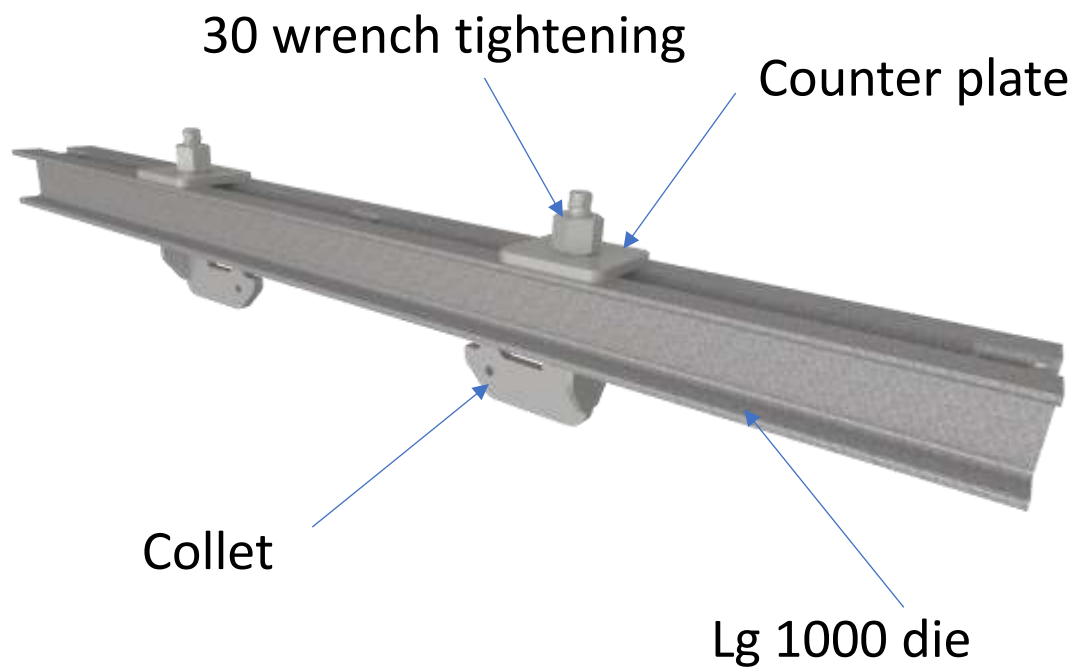
Concrete ballast

The product is not standard – Contact us for a pre-order study.



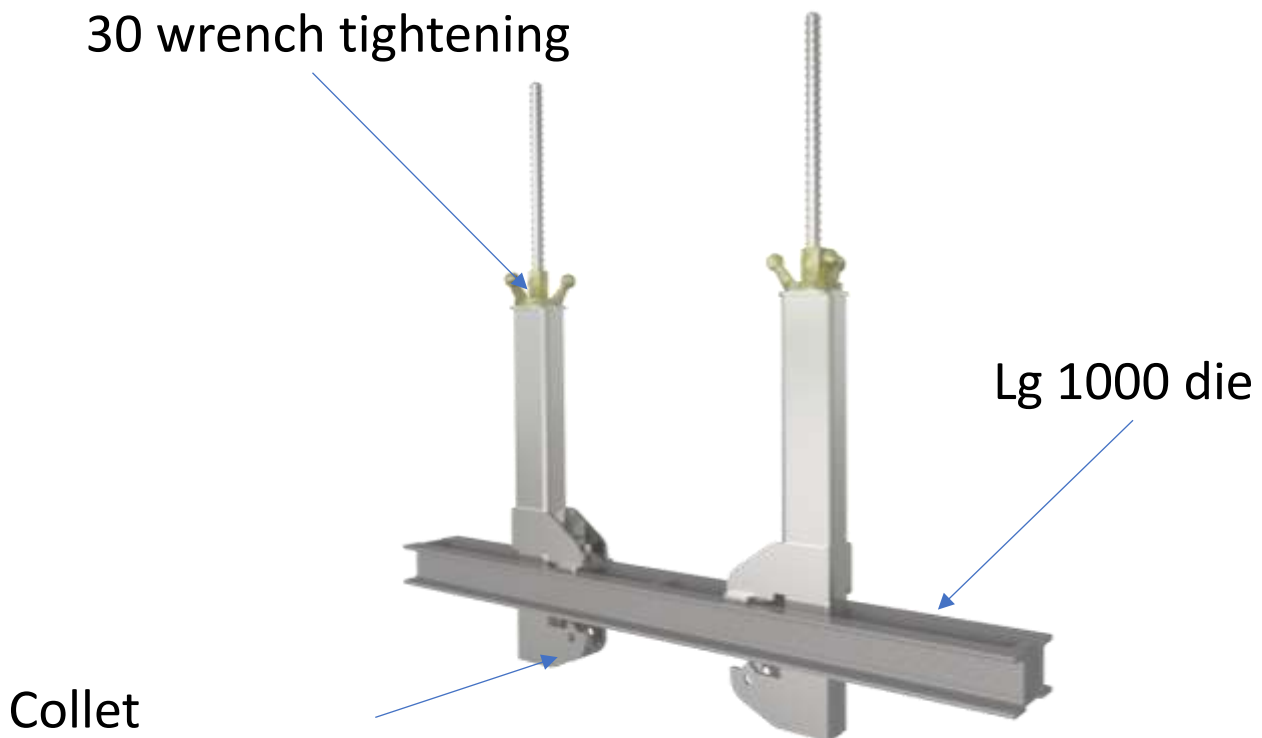
End Strip

Standard end strip 1000 mm

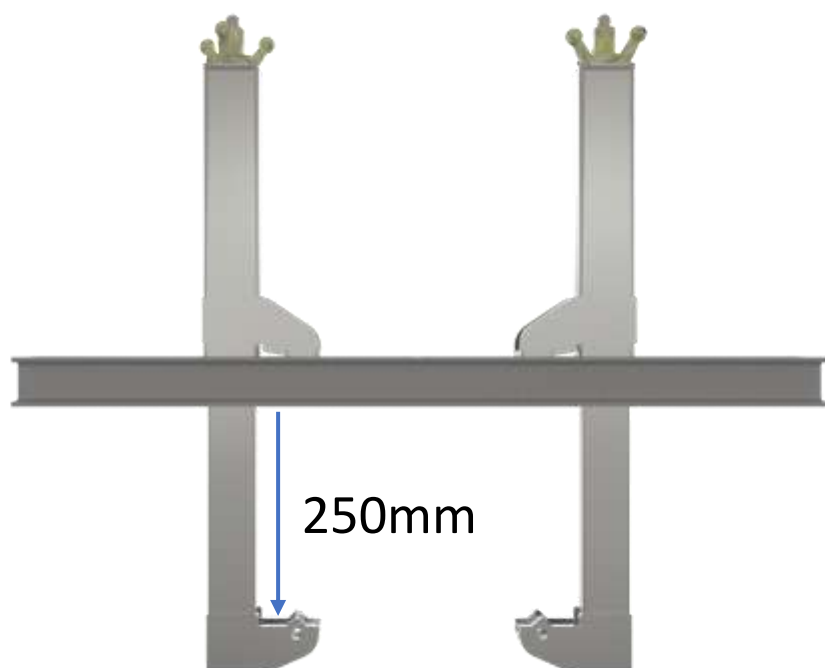


End Strip

SP 1000 mm end strip

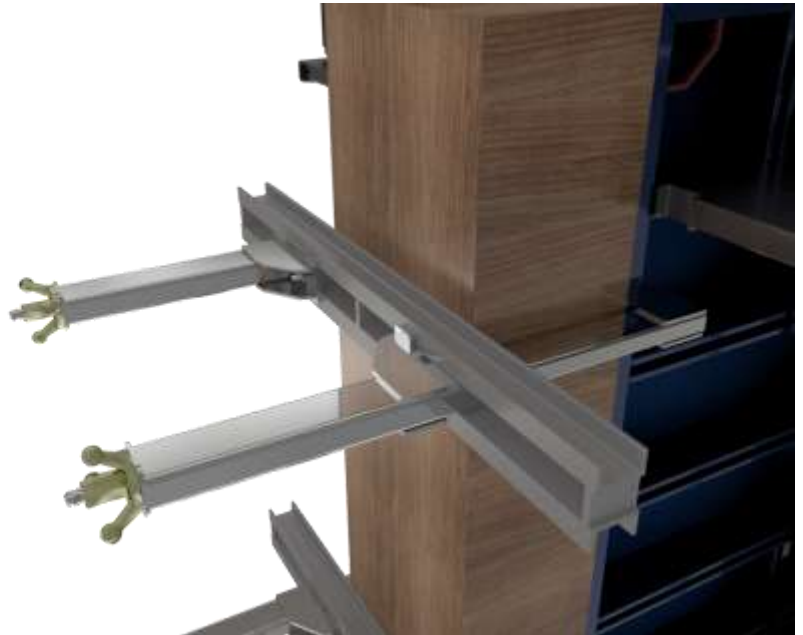


The SP end strip has an adjustment range of up to 250mm.



End Strip

SP 1000 mm end strip

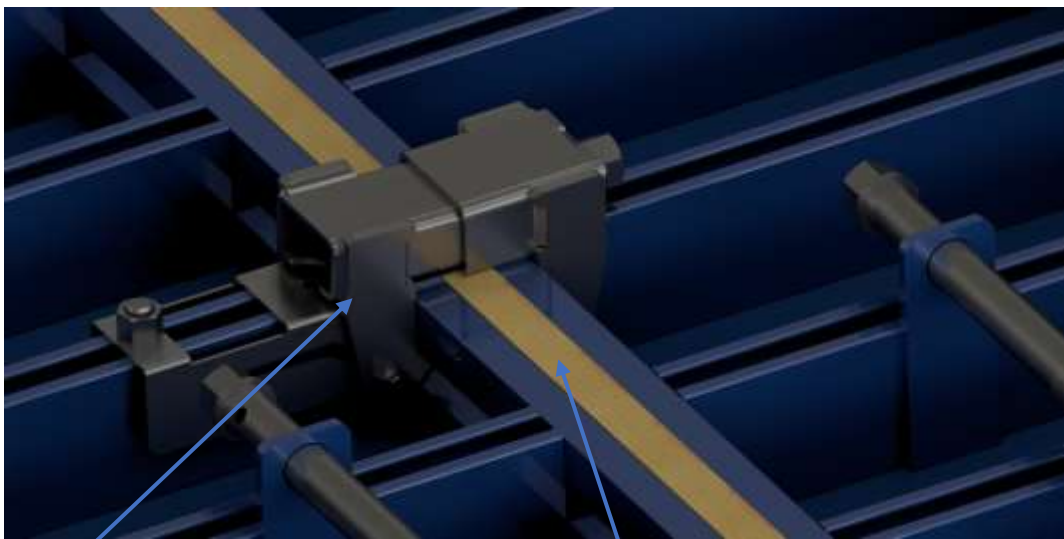


The compensation allows the use of both a panel at the end of the sail and a board up to 250mm thick. Tightening is done with the same wrench as the D17 or hammer rod nuts.

Compensation

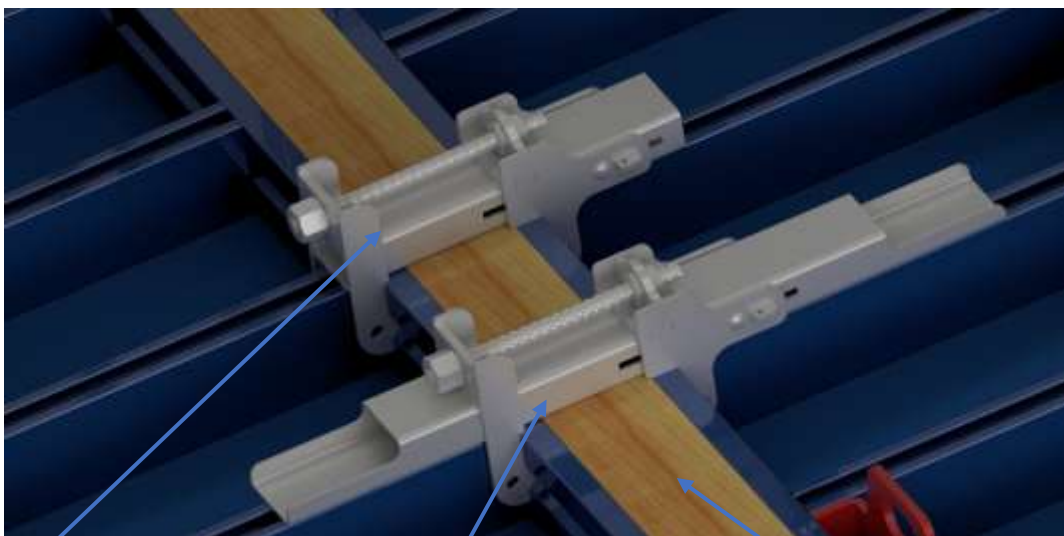
For any compensation size, please contact the Jean Four Eurobress technical service.

The Meta Steel clamp can accept compensations up to 30mm. Above this size, you will need to use a Modalu alignment or furring angle pliers to compensate up to 100mm.



Meta Steel clamp

Compensation of 30



Fur angle clamp

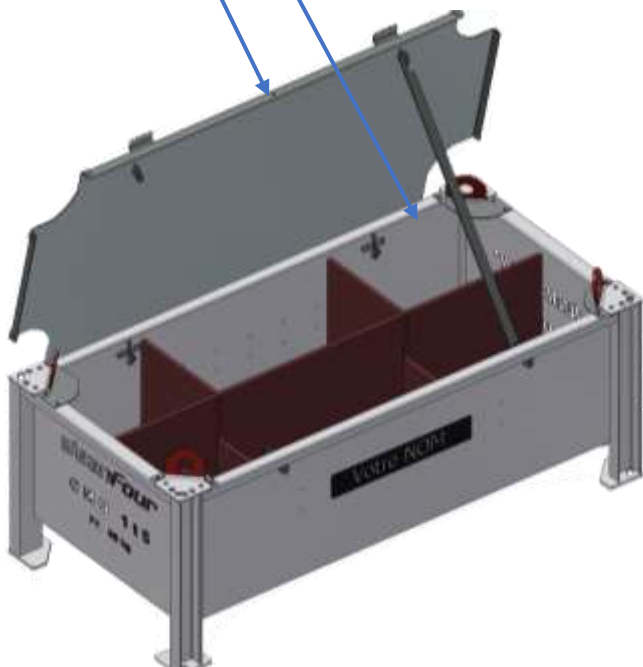
Alignment clamp

Compensation of 100

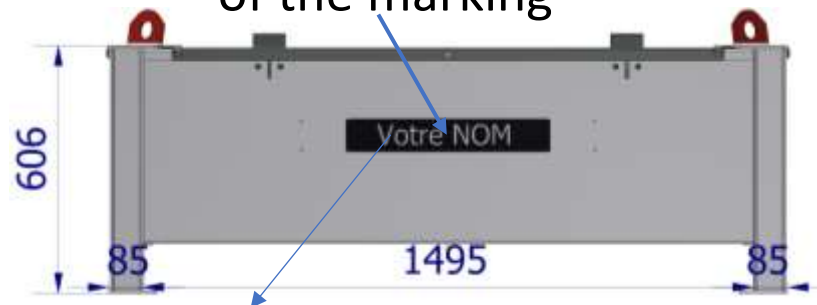
Container Comegal

Comegal containers make it easier to transport your accessories. Several sizes available on request.

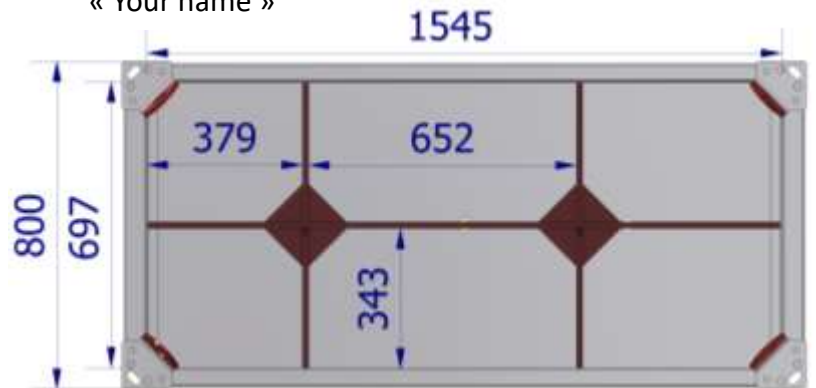
Optional steel or wood lid and walls



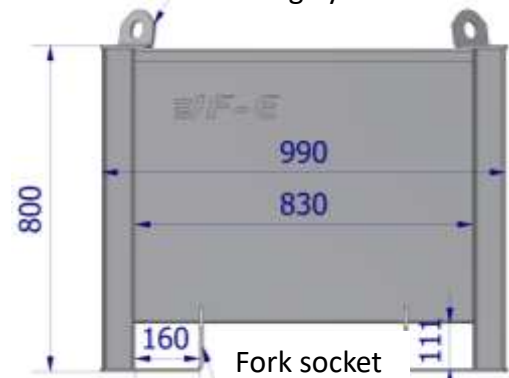
Customization of the marking



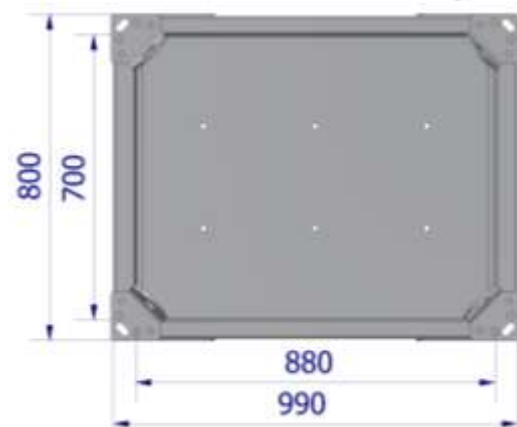
« Your name »



Lifting eye



Fork socket



Deformation of the PFV



Analysis explorer

Displacement : **Mag**

Max: 1.438e+00 mm

— 1.438e+00 mm

— 1.295e+00 mm

— 1.152e+00 mm

— 1.009e+00 mm

— 8.656e-01 mm

— 7.224e-01 mm

— 5.792e-01 mm

— 4.360e-01 mm

— 2.928e-01 mm

— 1.496e-01 mm

— 6.447e-03 mm

Min: 6.447e-03 mm

- In accordance with the NFP93-350 standard, the elastic deflection of Meta Steel subjected to a pyramidal pressure of 100 Kn/m^2 does not exceed 3mm on the entire panel and 2mm on a 2m ruler.

Recommendation

This guide is intended to help you assemble your META STEEL® straight panels step by step with maximum ease.

Before beginning assembly or using this equipment, all persons should read the instructions described in this manual and more particularly the warnings indicated by the logo:



META STEEL® panels must be assembled by qualified, competent people who are used to this type of work.

One person is enough to assemble the META STEEL®

The people involved in the assembly of the META STEEL® panels must have read the layout plans provided.

Tools to bring:

Wrench of 30

Wrench according to shank nut size (26-28)

24 mm wrench to disassemble the
elements fixed to the chassis

Layout and safety instructions

Area of use:

The META STEEL[®] panel is a straight formwork panel that can only be used by construction site personnel. Use by the general public is prohibited.

Unloading and storage area:

Unloading manoeuvres are carried out under the supervision of an authorised person.

Provide an area for unloading and storing equipment, close to the work area.

When using a crane, avoid passing over work areas. No person should be under moving loads during unloading or loading.

Recommendation when using lifting equipment:

Any lifting operation carried out with the help of a crane is carried out in the presence of a master of manoeuvre.

The use of forklifts is reserved for people with a driving licence

Checking and maintaining the equipment:

All parts must be examined before each return to service. If parts have suffered damage such as: permanent deformation, drilling, nicks, oxidation, etc., they must be scrapped and replaced.

Between each pouring, the panels must be oiled on the formwork side to prevent dirt by the laitance, and the threads must be lightly greased.

Caution of assembly and use:

The META STEEL[®] panel is delivered with its stabilizing and bracing props, the latter must be moored to the ground or to concrete blocks, see recommendations on the attached sections.

Ensure that the pouring pressures during use do not exceed the permissible pressure of 10 tonnes/m² of the formwork in the case of the use of clamping rods and nuts of Ø 23 mm.

Check that the clamping elements used (rods and nuts) withstand forces of 165 Kn/rod.

Do not approach live electrical cables.

Use reliable, appropriate lifting elements equipped with safety hooks to ensure a good fixing

Load capacities:

The safety decks of the META STEEL[®] panel can accommodate 2 men and their tools, i.e. 150Kg/m² (according to NF P93-350).

Weather:

The assembly of the META STEEL[®] panel becomes dangerous and may justify stopping the site in the case of atmospheric conditions such as:

Frost / Heavy rain / Snow / Ice

Wind (above 85km/h)

In the event of non-use of the equipment or excessive weather conditions, the panels must be placed flat in a storage area provided for this purpose.



Delivery / Storage / Flat Lifting

Delivery

- Meta Steel must always be installed on railings to avoid any damage to the formwork skins. They should be stacked in a maximum of 6.
- They must be lifted at most by 3 out of 4 balanced strands (about 2668Kg) depending on crane capacity. Use the crane rings provided for this purpose.
- Keep the panels at least 16cm from the ground.



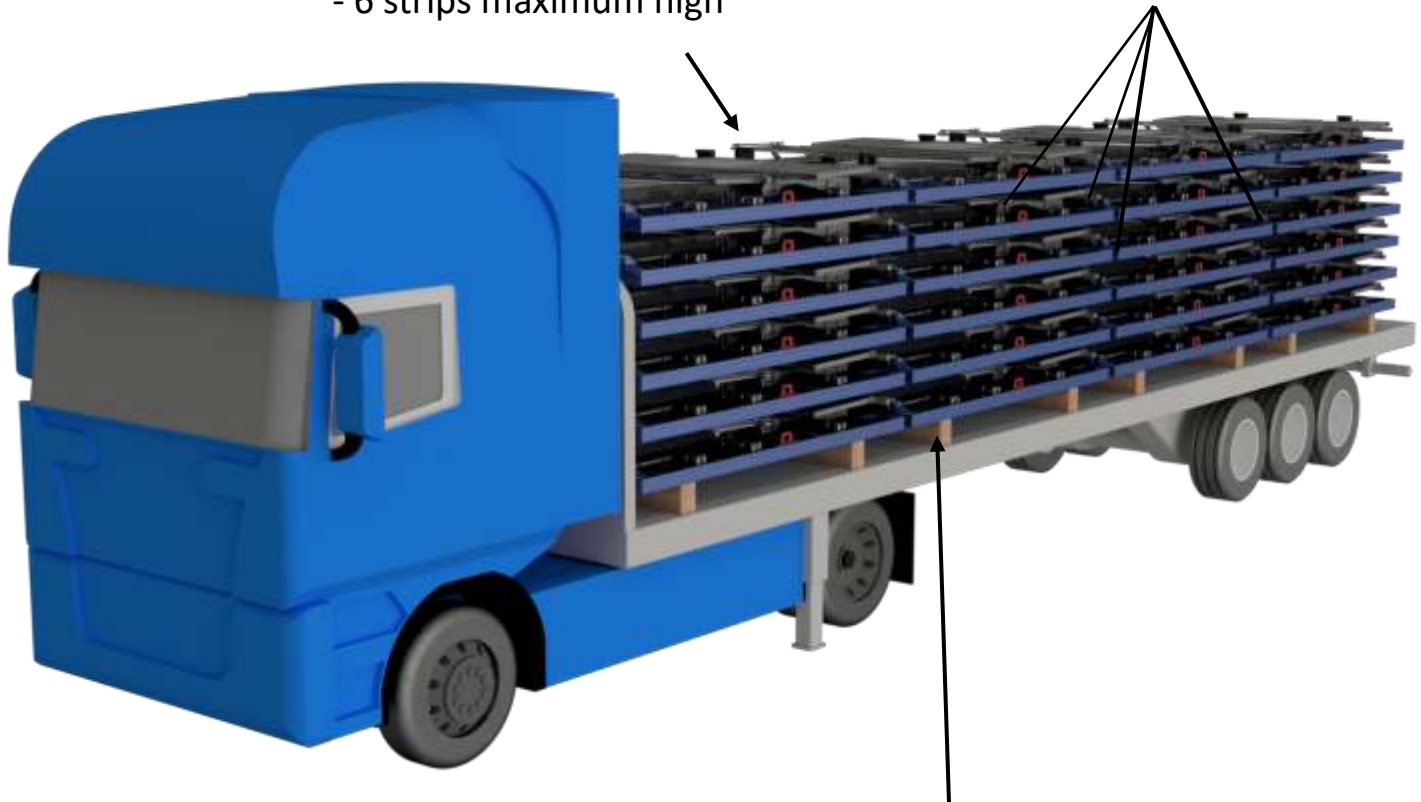
-Wood storage



- Return material transport in the same layout

- Lifting on 4 strands with an angle between each of 60° maximum.
Set of 3 panels maximum

- 6 strips maximum high



- Spacing of 16cm on railings

Delivery / Storage / Flat Lifting

Delivery

- For more comfort when loading and unloading the truck for transport, the use of a panel pallet can be beneficial. This product is available as an option.



- Panel pallet



- Return material transport in the same layout

- Lifting on 4 strands with an angle between each of 60° maximum.
Set of up to 6 panels

- 6 strips maximum high



Truck loading

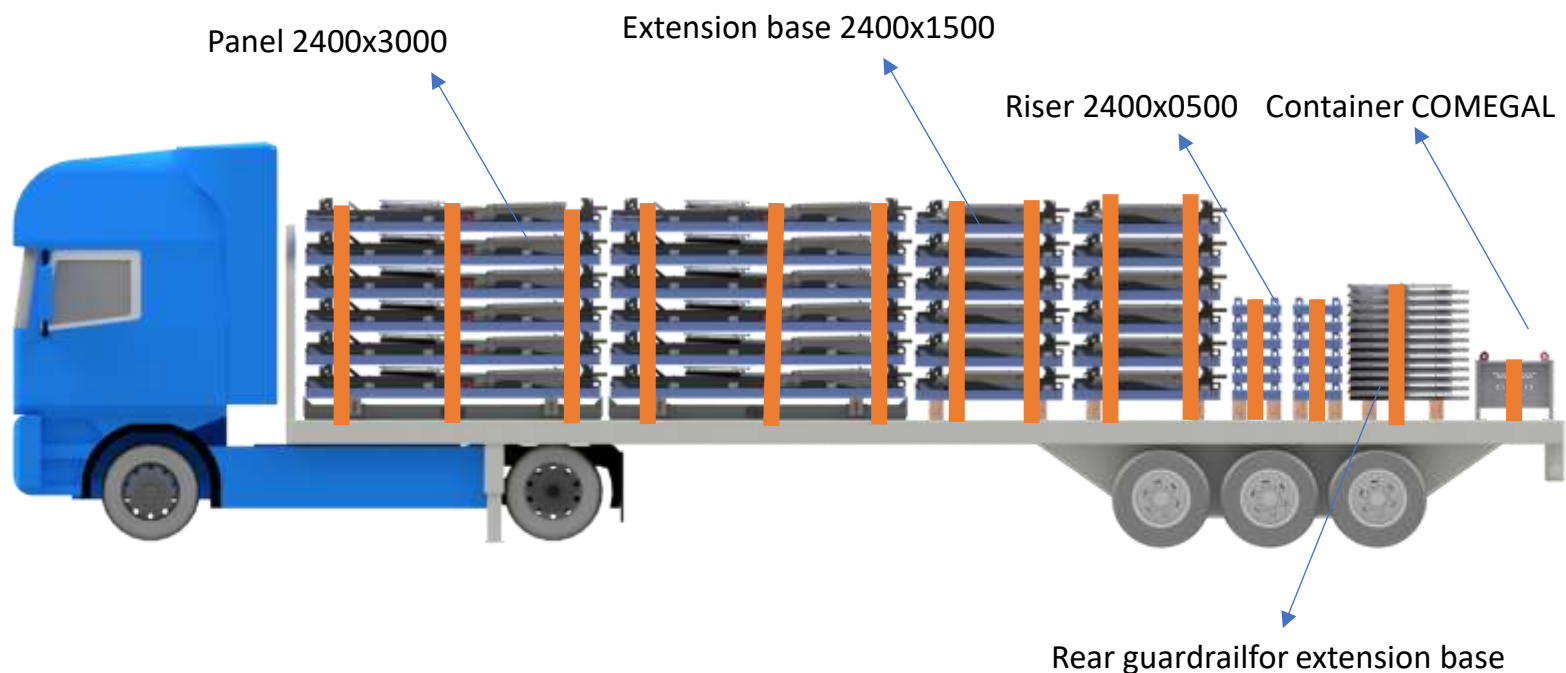
Delivery

Example: Material load on a 13m trailer.

Total surface area of 144 m² of formwork

Composition:

- 12 panels 2400x3000 with safety
- 12 2400x1500 extension base with safety
- 12 Riser 2400x0500
- 1 accessory COMEGAL container (Option)



Representation of the carrying straps in orange

Delivery / Storage / Flat Lifting

Storage

- The panel pallet is available for 2400x3000 panels. It has stackable rings on the sides. It allows a package of 6 superimposed panels to be lifted if the handling equipment can support it. It has a capacity of 6T.



- Panel pallet



- Return material transport in the same layout

- 6 strips maximum high

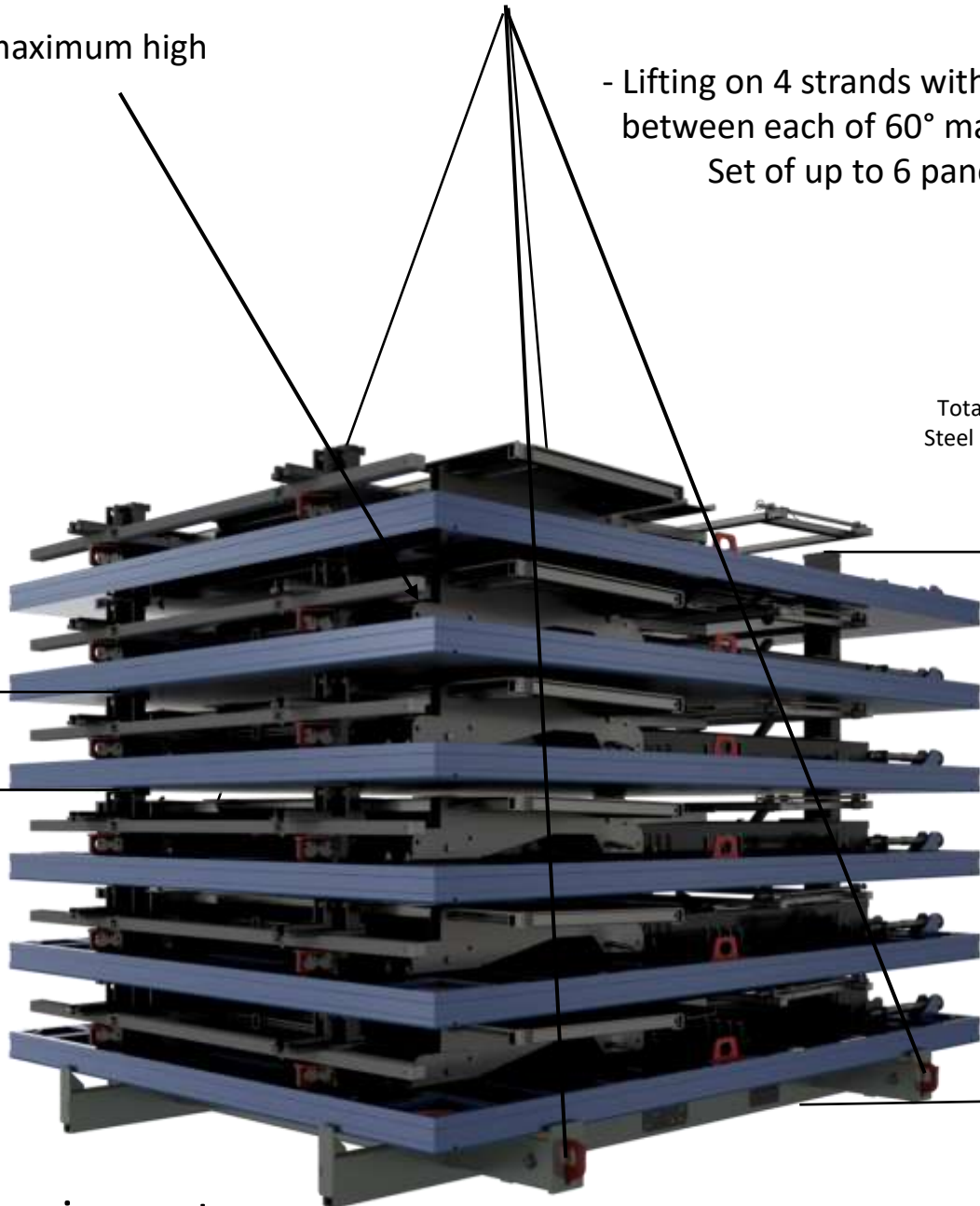
- Lifting on 4 strands with an angle between each of 60° maximum.
Set of up to 6 panels

Height of a Meta Steel in transport position:

338 mm

Total height of Meta Steel package on panel pallet:

2249 mm



- Optional equipment

Delivery / Storage / Flat Lifting

Storage

Maximum storage by 6 panels on railings at least 16cm from the ground.
Stacking on the packing cleats provided for this purpose.

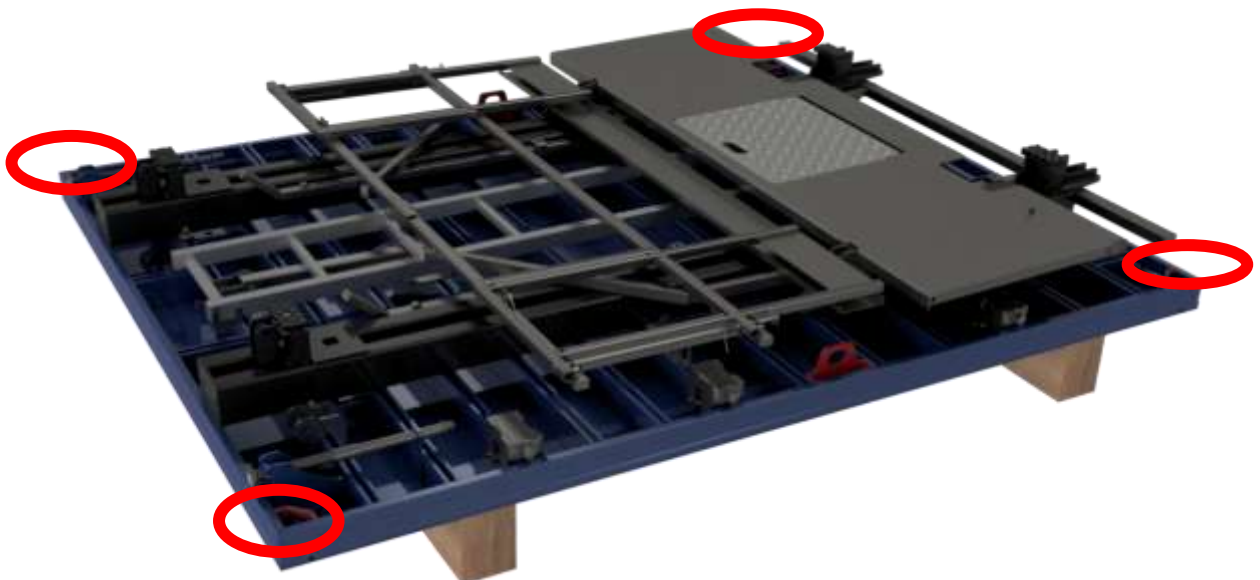
-Wood storage

Total height of Meta Steel on wood 20 cm:



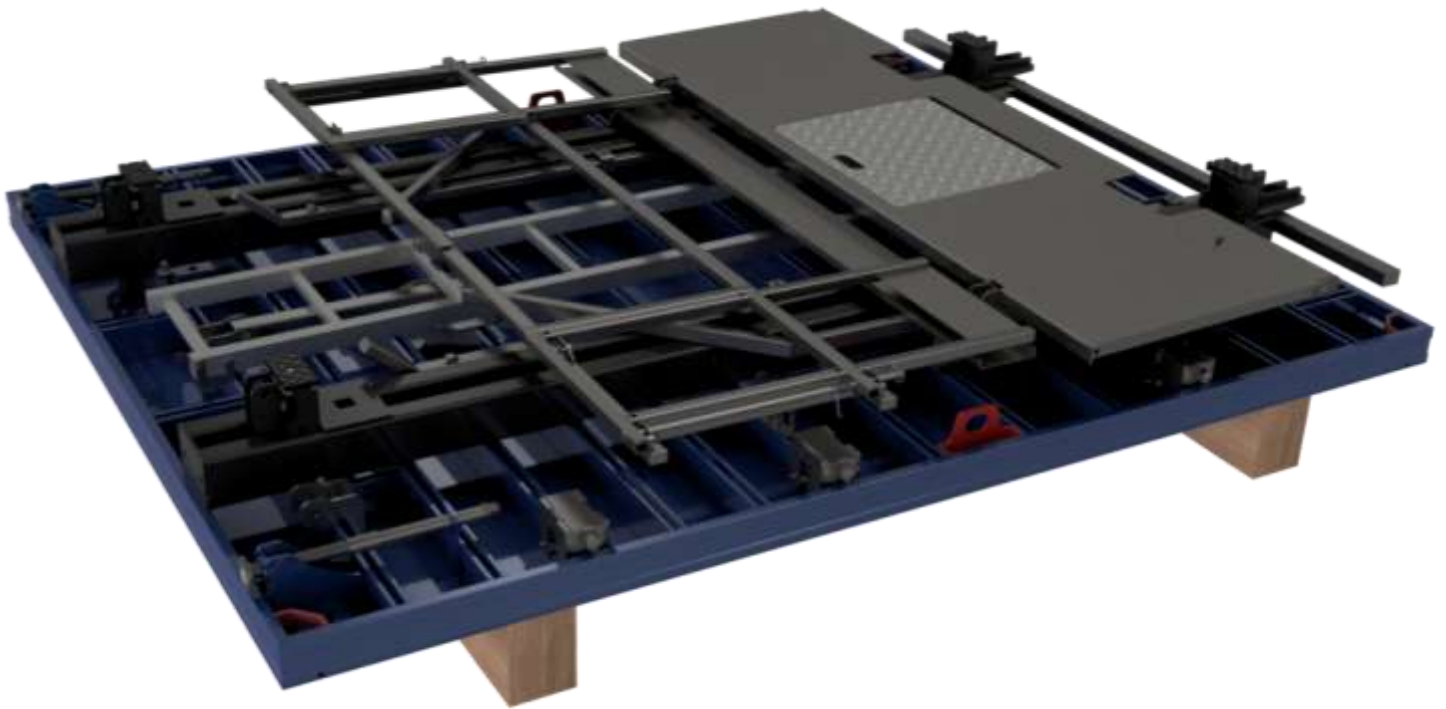
Flat Lifting

Flat lifting is carried out on the rings at each corner of the Meta Steel. The weight of the Meta Steel is distributed over the 4 strands. By using the flat lifting rings you can lift up to 3 panels.



Assembly

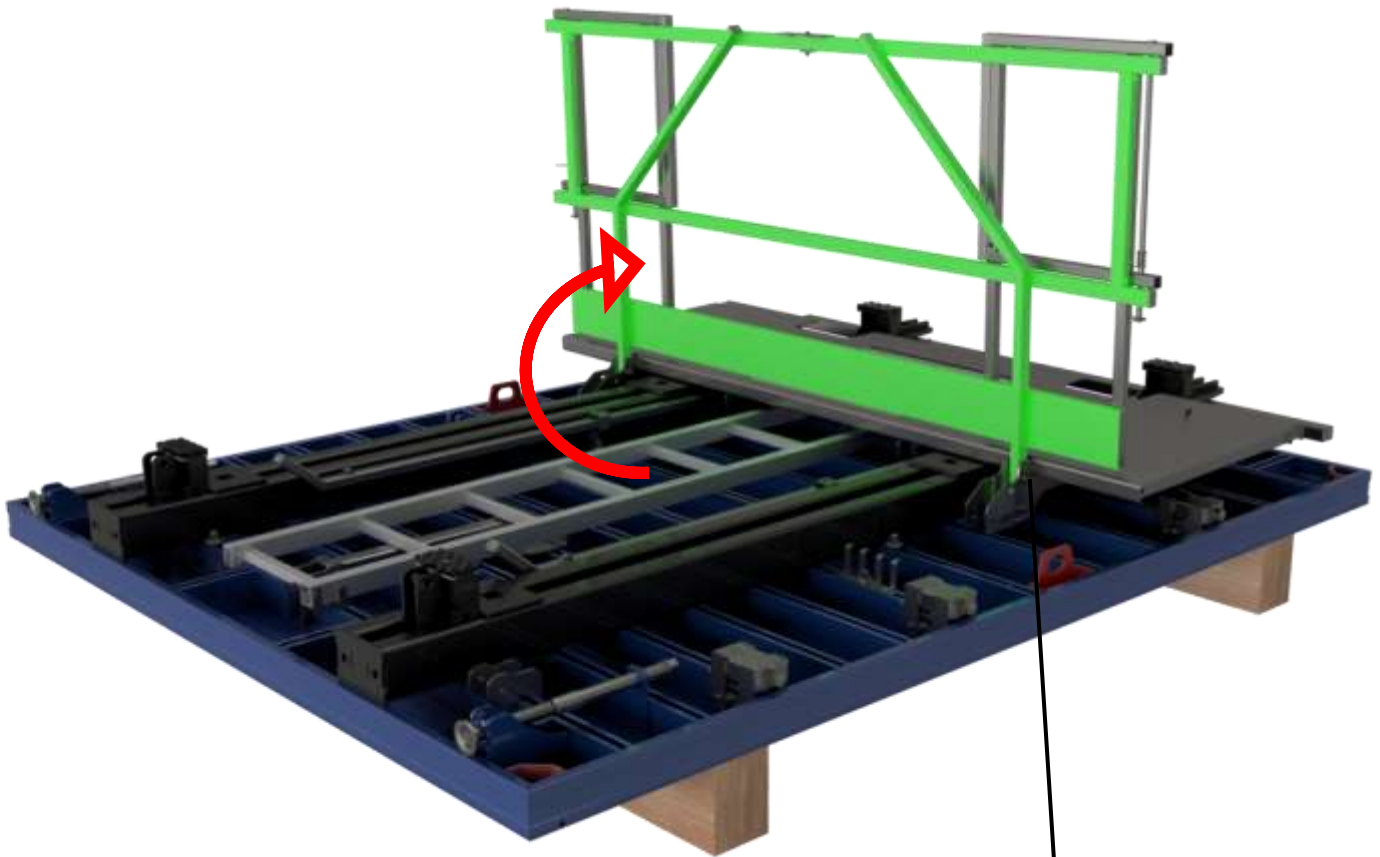
1) Installation of the panel on railings in order to implement it



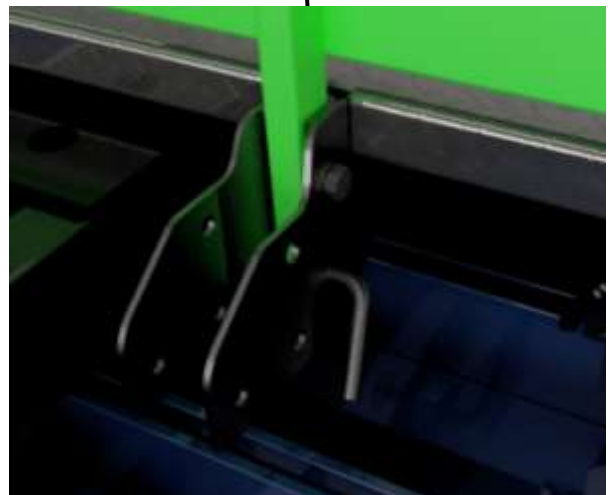
Each green element is concerned by the stage in which it appears.

Assembly

2) Raise the railing and pin the pins. Insert the pins into the axes.



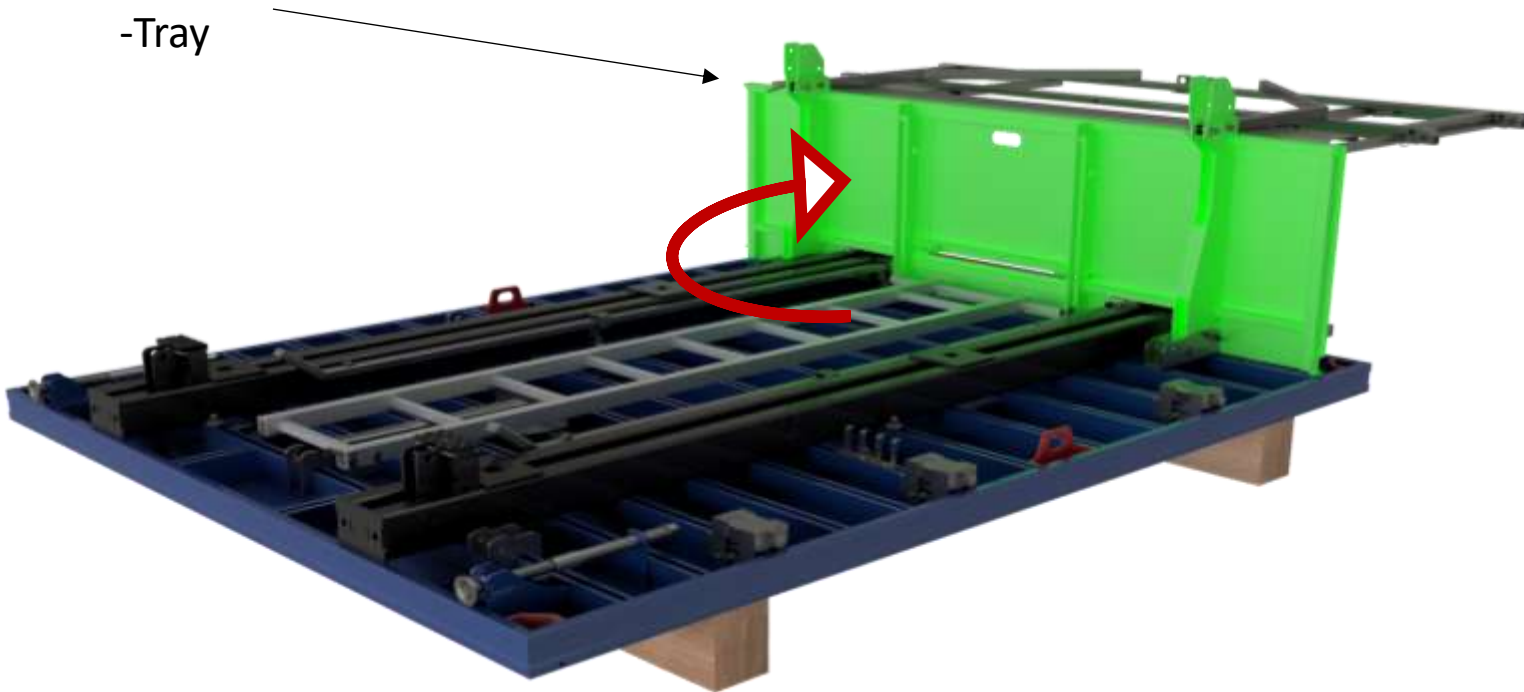
- Spindle with axle



Assembly

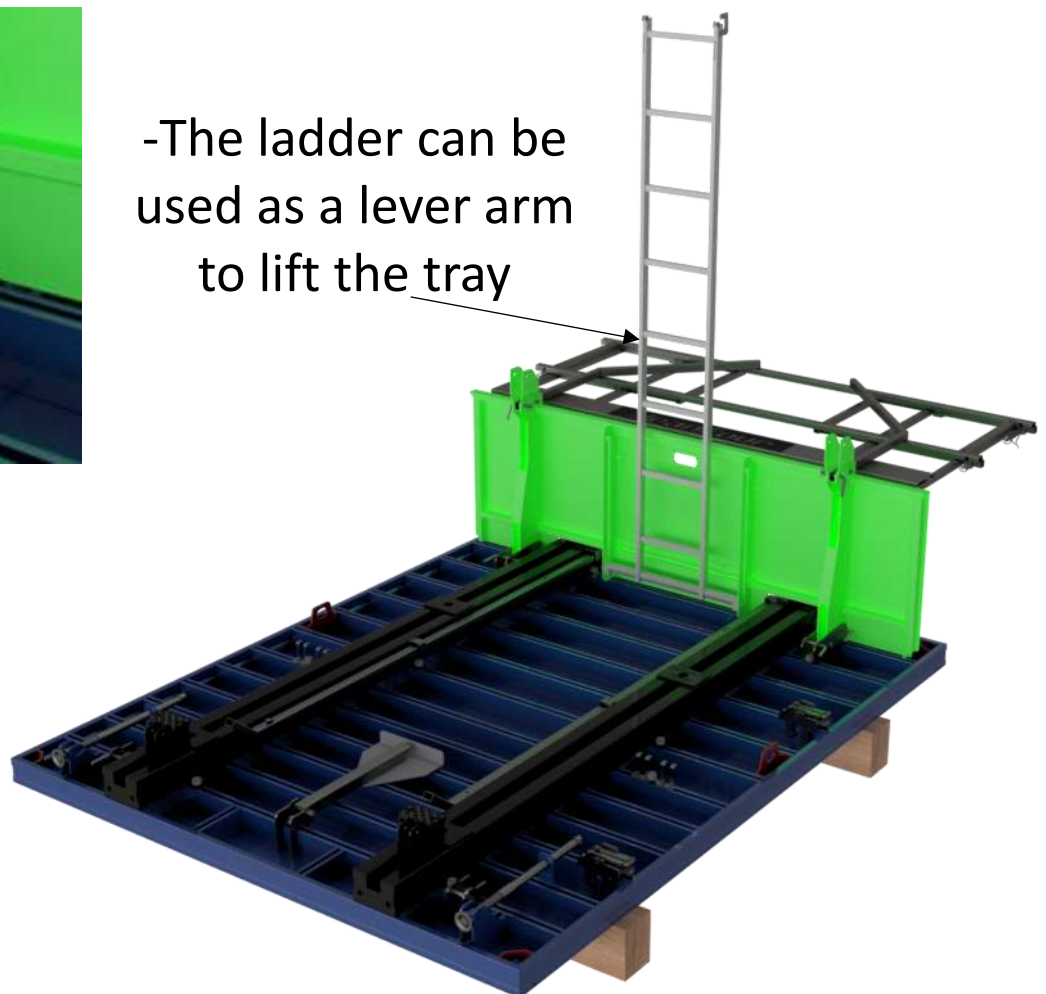
3) Raise the tray

-Tray



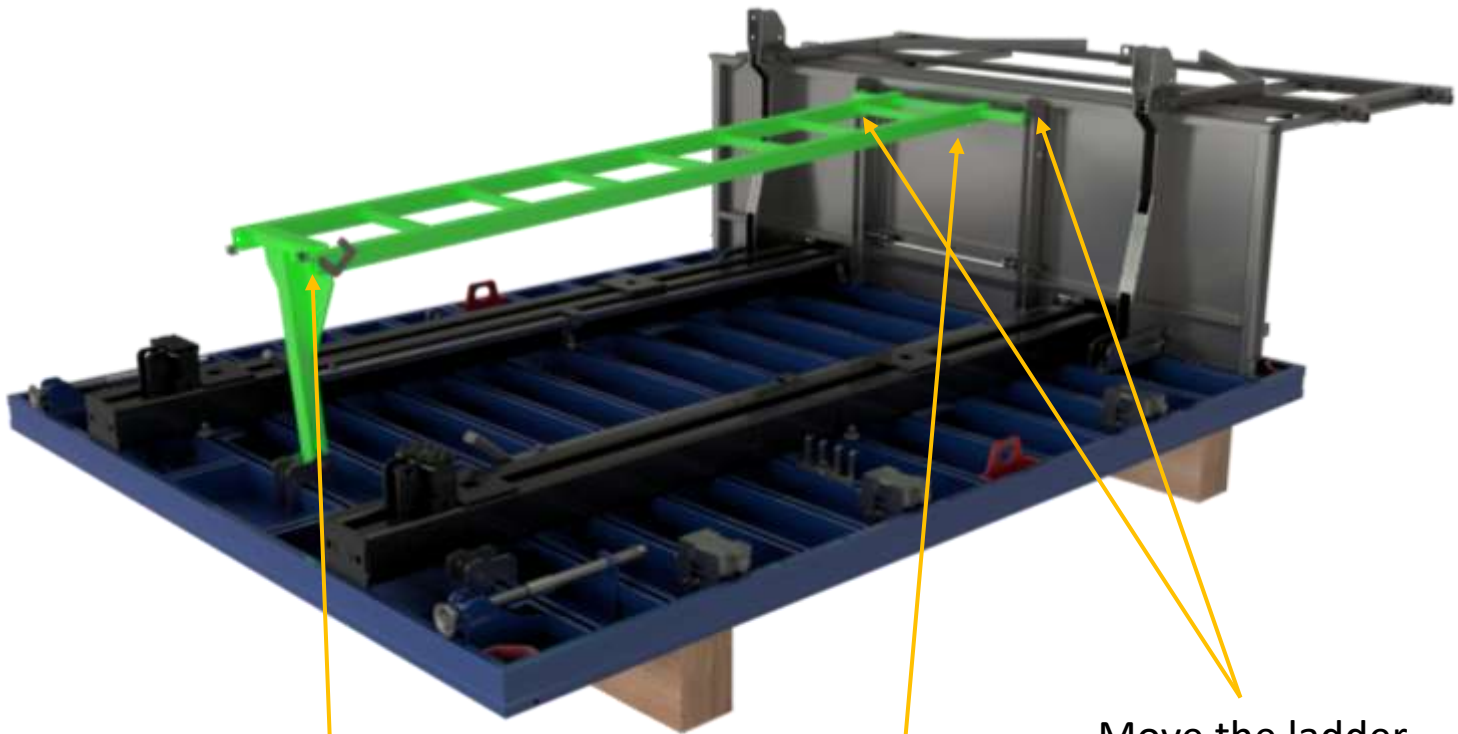
- Spindle with axle

-The ladder can be used as a lever arm to lift the tray

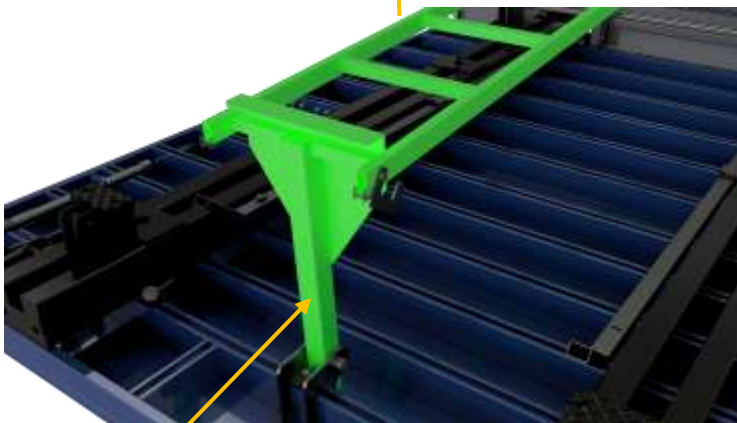


Assembly

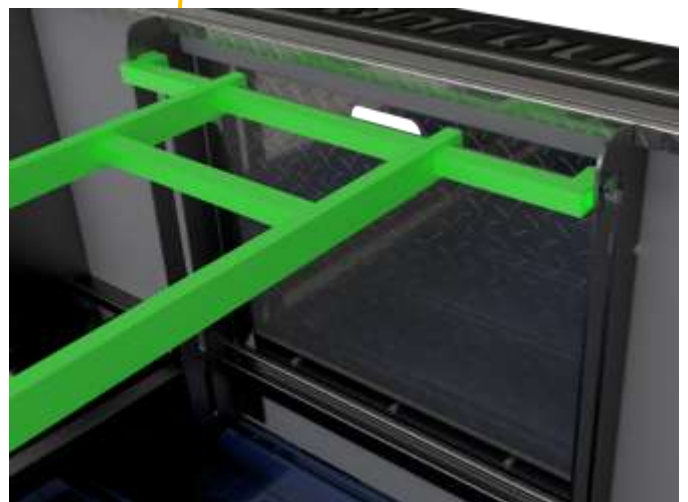
5) Raise the ladder in the slide and insert the first ladder rung into the footboard.



- Move the ladder axis up in the slides in the notches



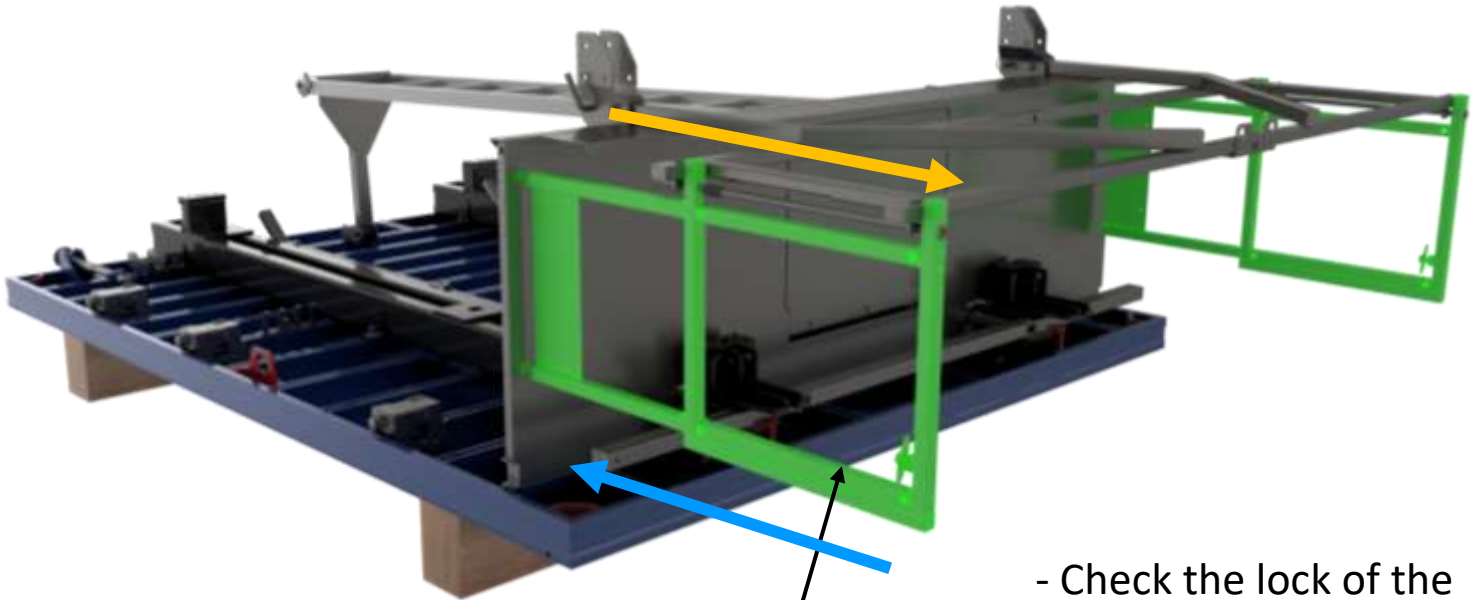
- Lock by lowering the step



Assembly

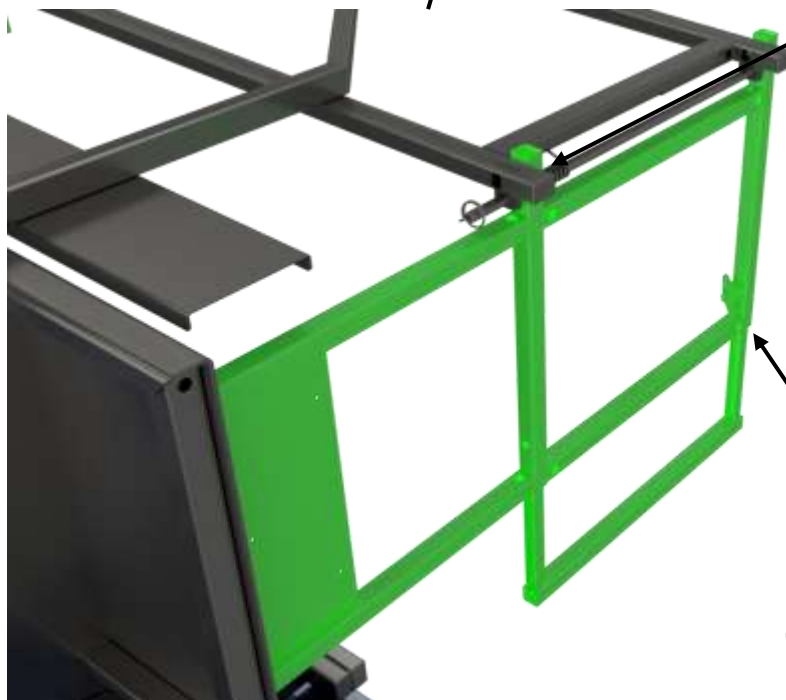
6) Deploy the gates.

- To deploy the gates, simply push them upwards



- Locking is done by pushing them down

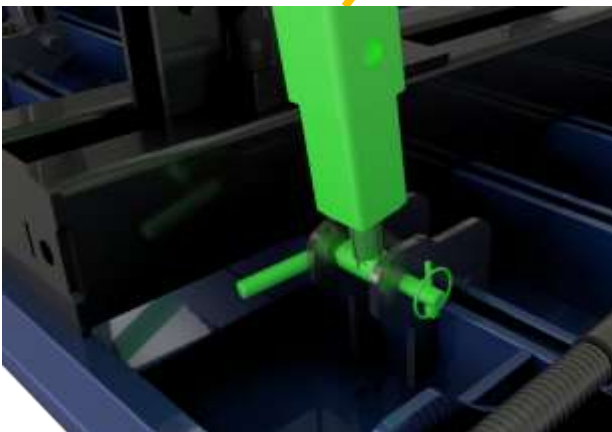
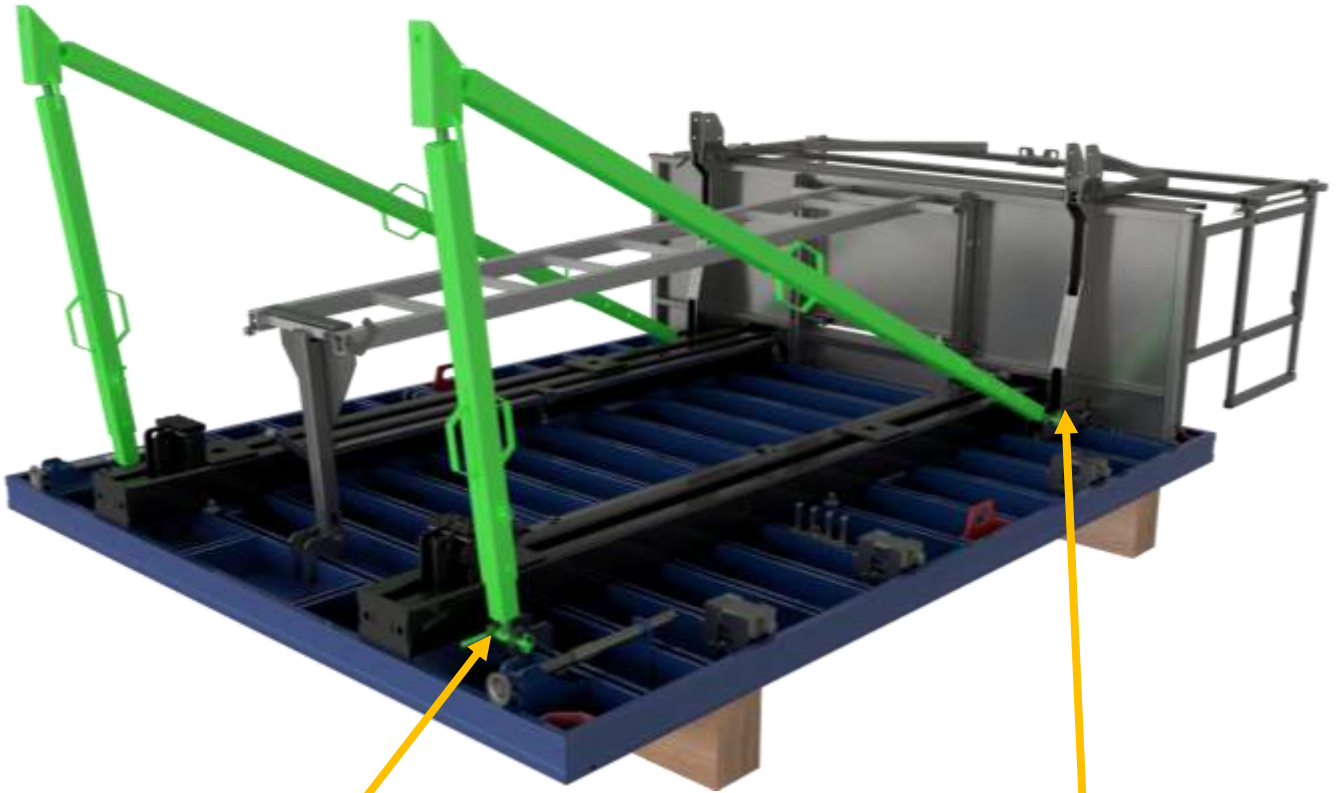
- Check the lock of the gate (the axle at the end of the gate must be tucked into the rear guardrail)



- Extend the gate extensions using the shank screw

Assembly

7) Install the stabilizing props, their poles and their foot plates.



- Axial attachment of
the braces to the prop
clevis

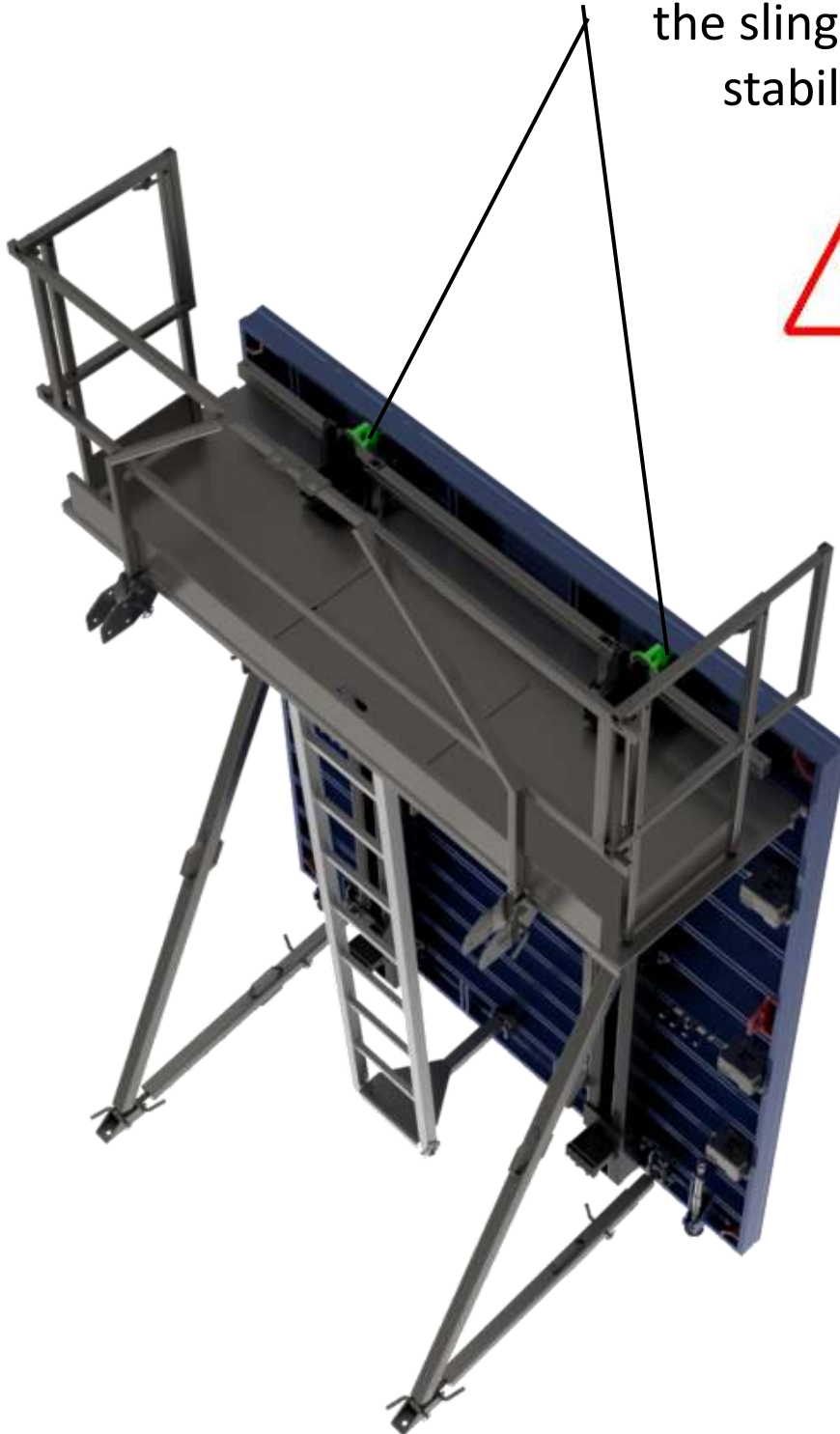


- Axial fixing on
safety platform
clevis

Assembly

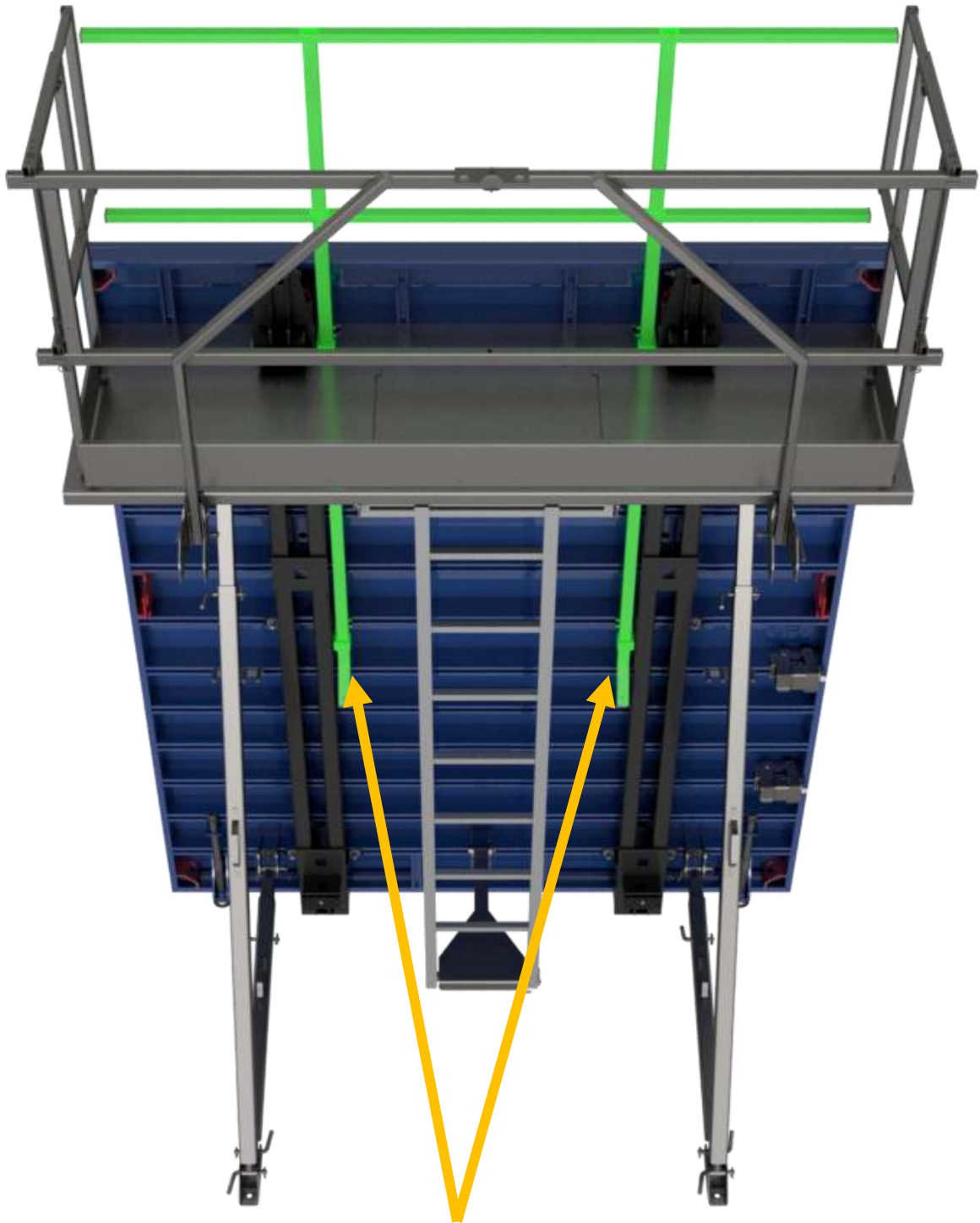
8) Raise the Meta Steel with the lifting rings vertically with slings provided for this purpose

- Do not unhook the slings until full stabilization



Assembly

9) Once raised, deploy the front guardrail



- Push the two handles under the console simultaneously to raise the front guardrail.

Assembly

9) Once raised, deploy the front guardrail



- Lock the front guardrail
by positioning the hooks
on the guide tubes

- You can unhook the slings once the front guardrail is
deployed

Assembly

Mounting the Meta Steel

- Your Meta Steel is now assembled and ready to use.



For the packaging of the Meta Steel panel, please follow the order of assembly in reverse.

Meta Steel extension base

The Meta Steel undermount is mounted in the same way as the 3m panel. The Meta Steel undermount is not equipped with a front guardrail. On this panel, the rear guardrail is not colitable and will have to be dismantled at the end of each project.



Packing

Meta Steel extension base

To seal the extension base, start by folding the gates



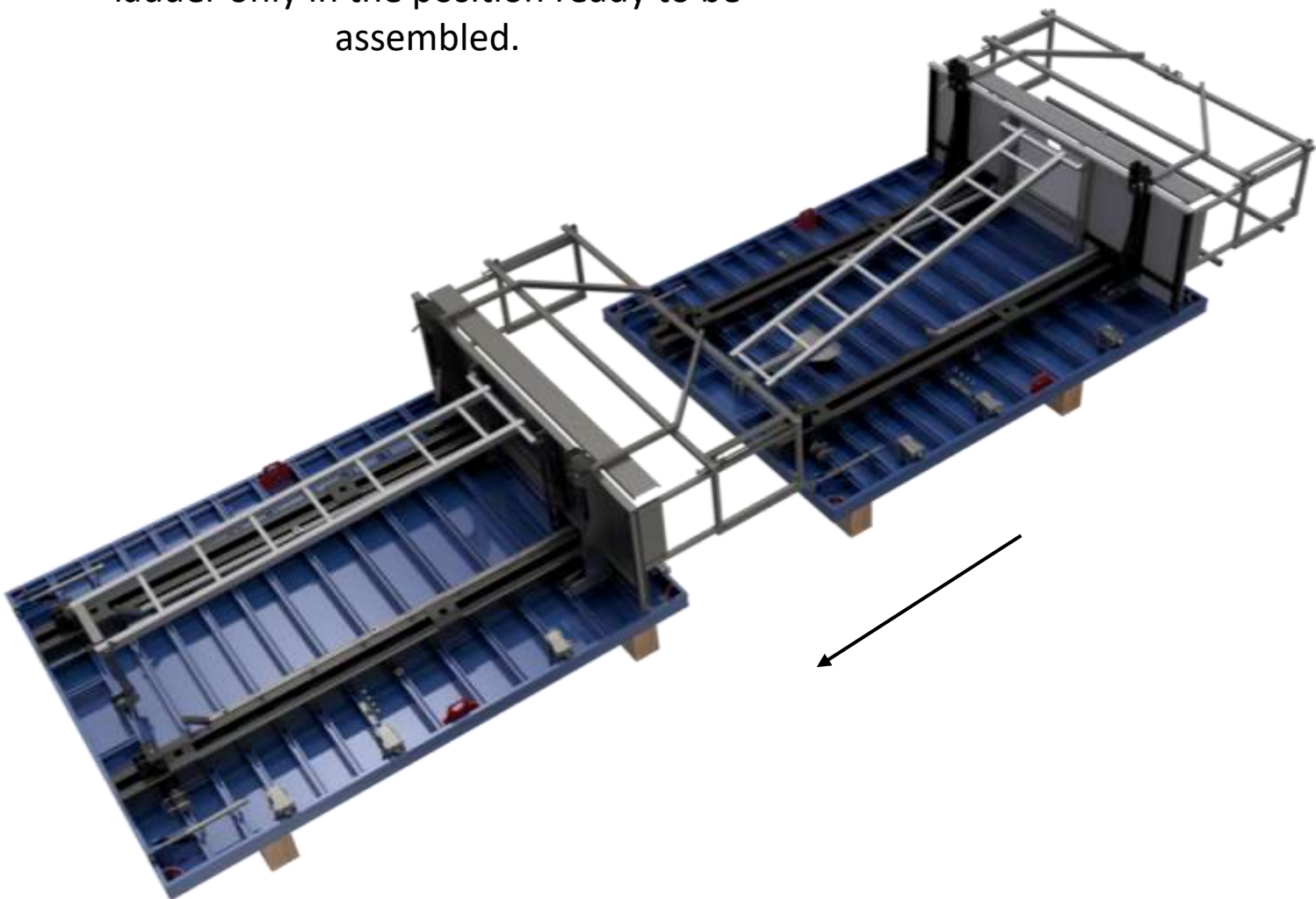
Then fold the tray and disconnect the rear guardrail. Store the guardrail in an area provided for this purpose.



Overlay

1) In the case of overlapping, prepare the panels as follows: safety devices deployed and uninstalled.

- The formwork panel that will be above it must have the colosseum step and the ladder only in the position ready to be assembled.



Overlay

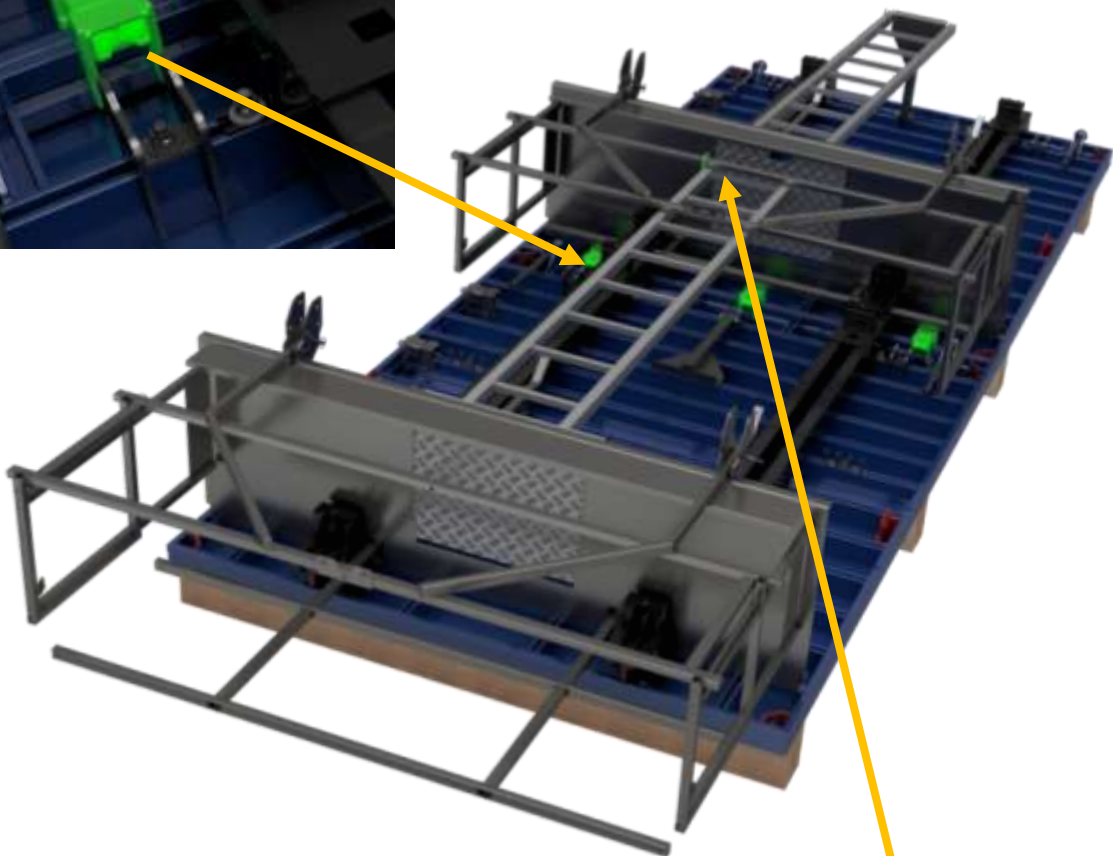
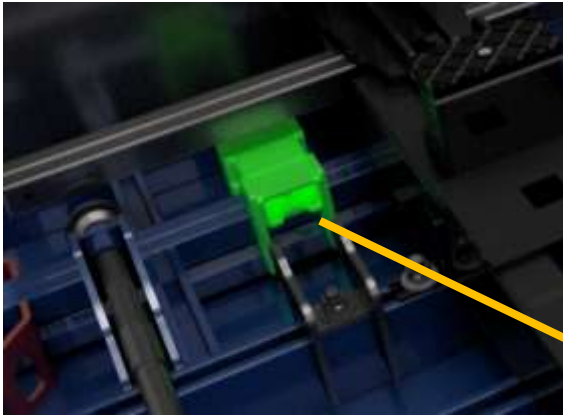
2) Approach the panels until they are in contact.



Overlay

3) When the edges are well aligned, block the assembly clamps.

- The connection between the two superimposed Meta Steel is made with 3 Meta Steel clamps without integration

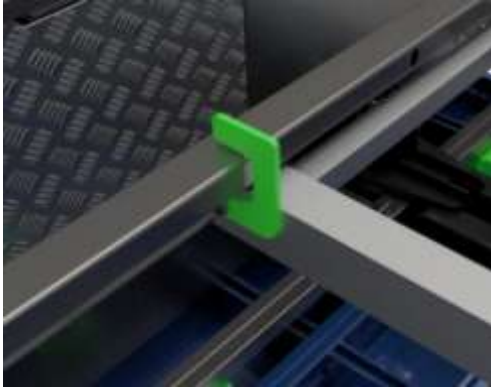


- Assembling the ladder with the connecting leg

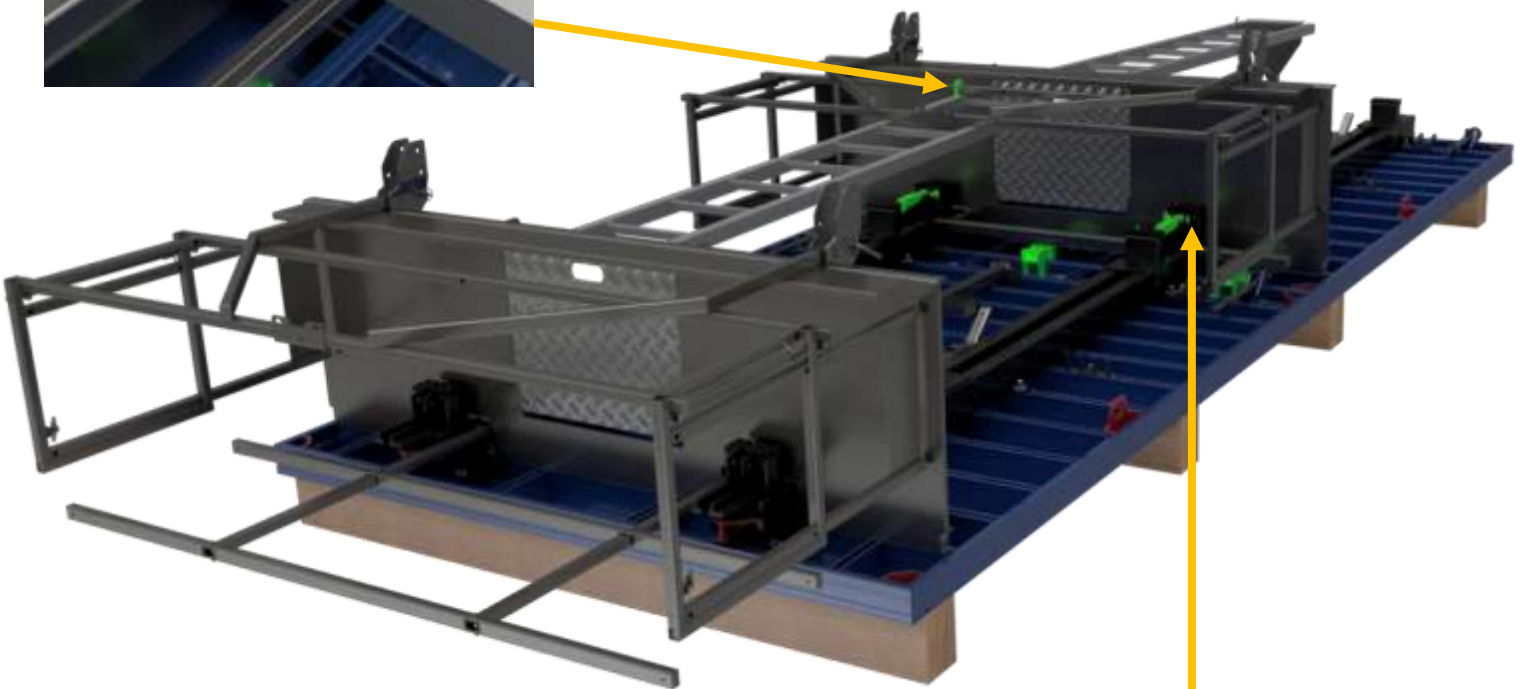


Overlay

3) When the edges are well aligned, lock the assembly clamps and install the alignment cylinders (optional).

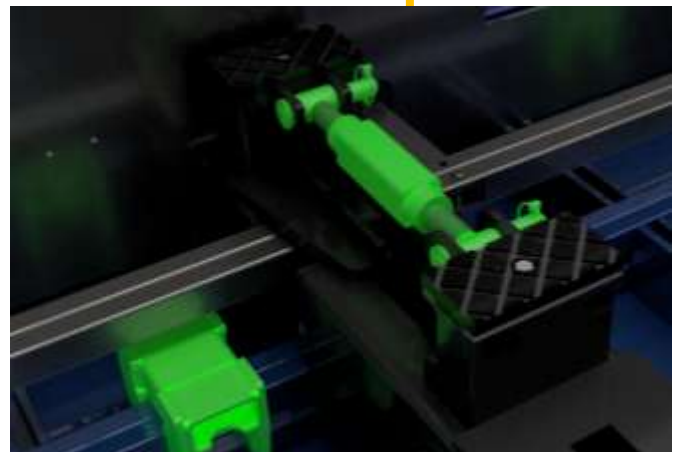


- Assembling the ladder with the connecting leg



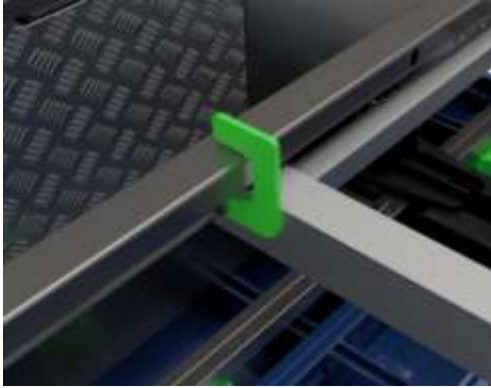
- The cylinder can be used with 20 diameter axes. It allows the two beams to be linked together.

- The connection between the two superimposed Meta Steel is made with 3 Meta Steel clamps without integration and optionally: 2 alignment cylinders

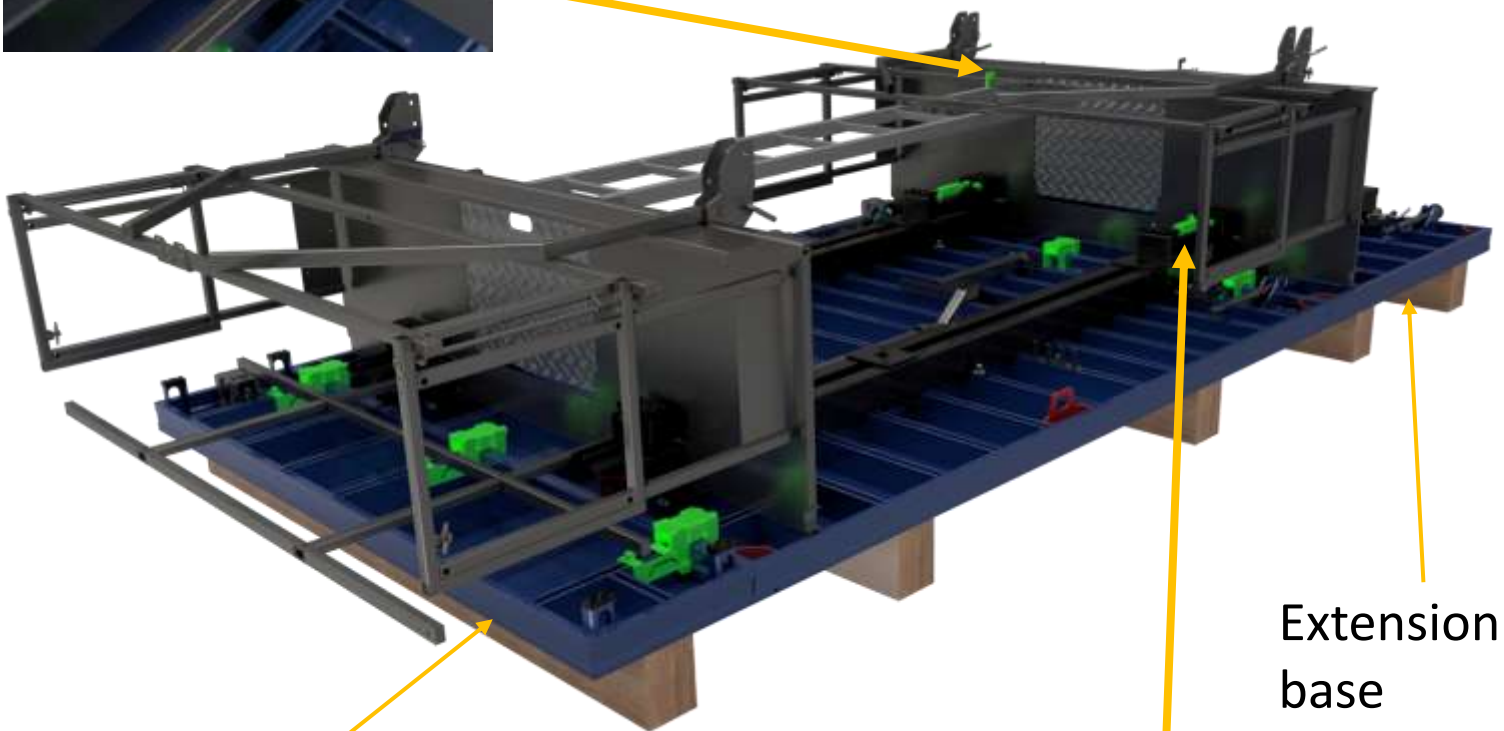


Overlay

3) Same procedure for the superposition with the under-rise and elevation



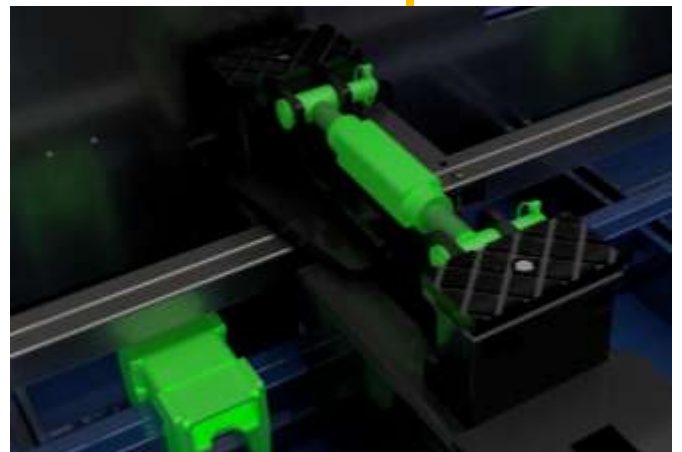
- Assembling the ladder with the connecting leg



Riser

Extension base

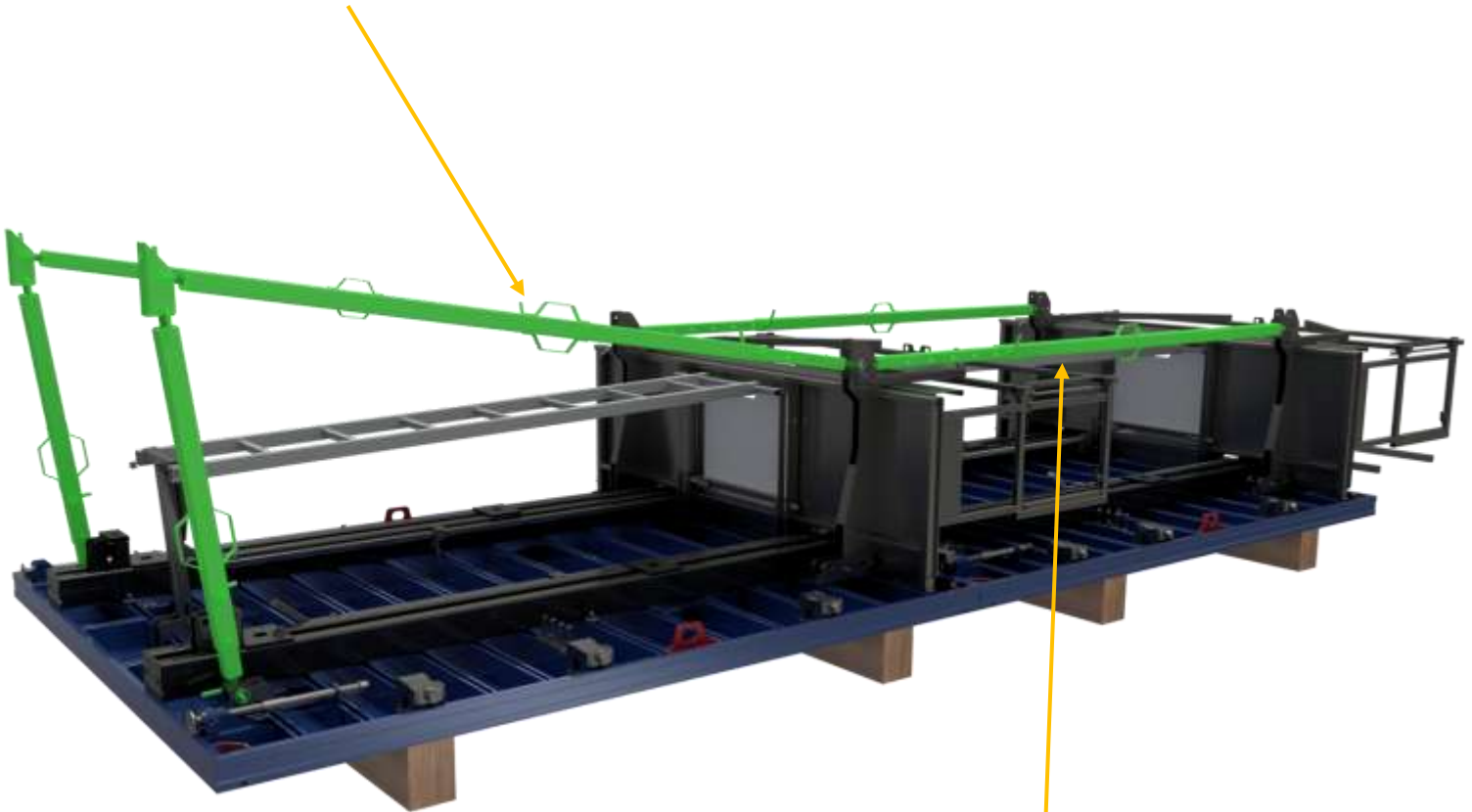
- The connection between the different MS modules is carried out in the same way as between two 3m panels using 3 clamps and the possibility of adding the alignment cylinder on the extension base.



Overlay

4) Mount the props and their foot plates.

- Overlay mounting



- Prop of stabilisation

Overlay

5) Raise the panels by the lifting rings.

- Upper lifting eyes to
raise the stacked
assembly

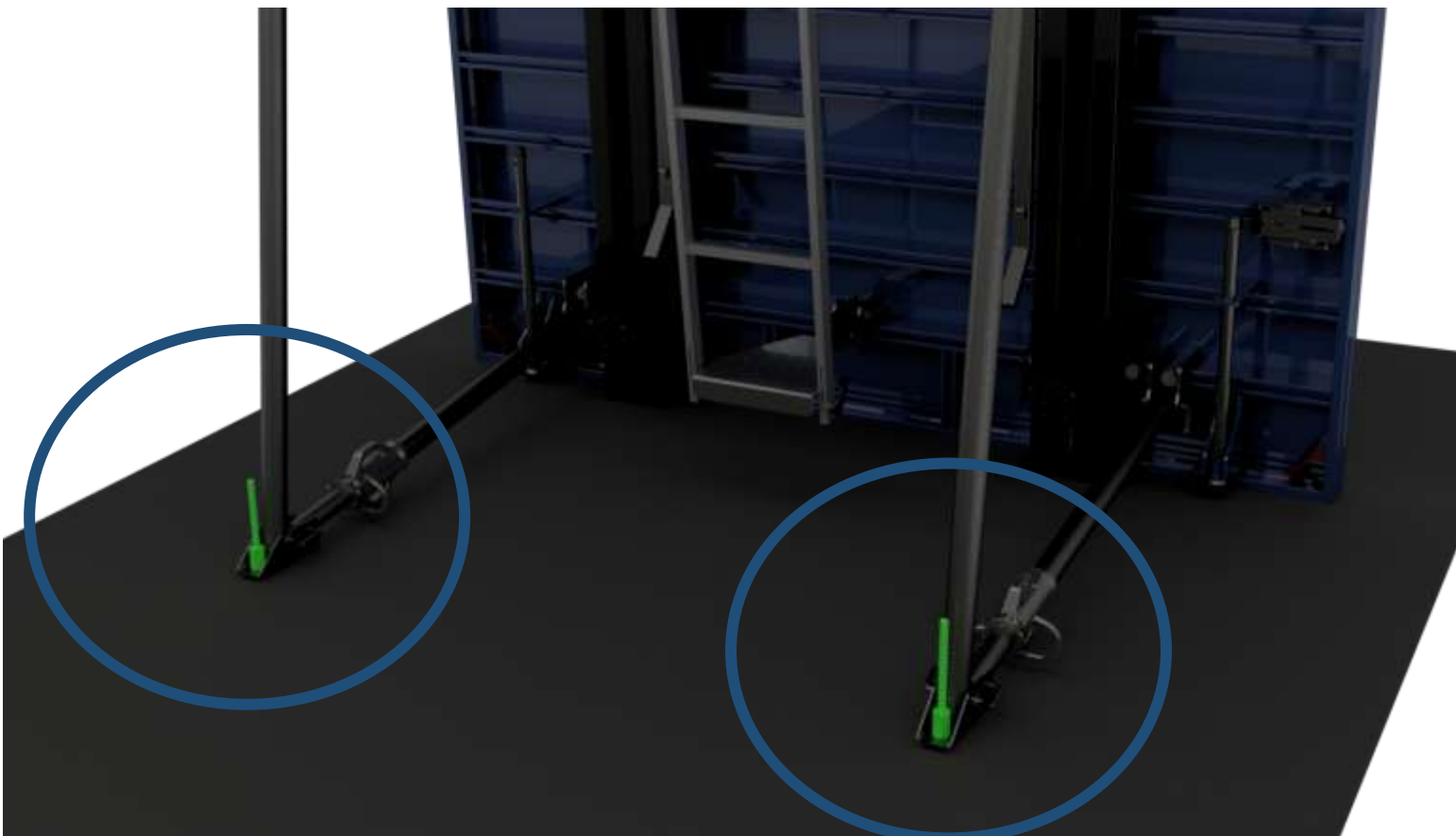


Overlay

6) When the panels are in place, anchor the stabilizing props.

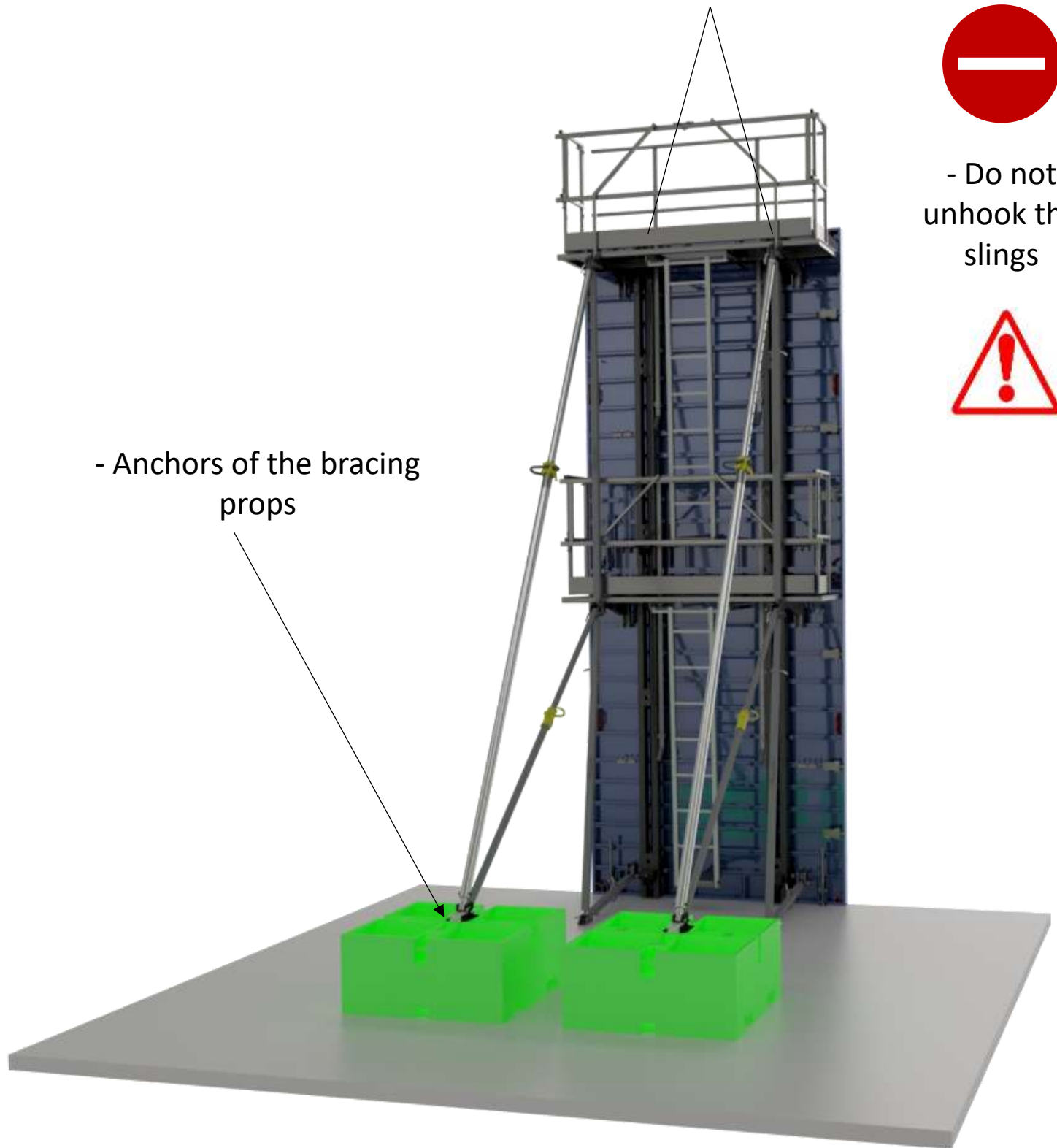


- Do not unhook
the slings



Overlay

6) When the panels are in place, anchor the bracing props.



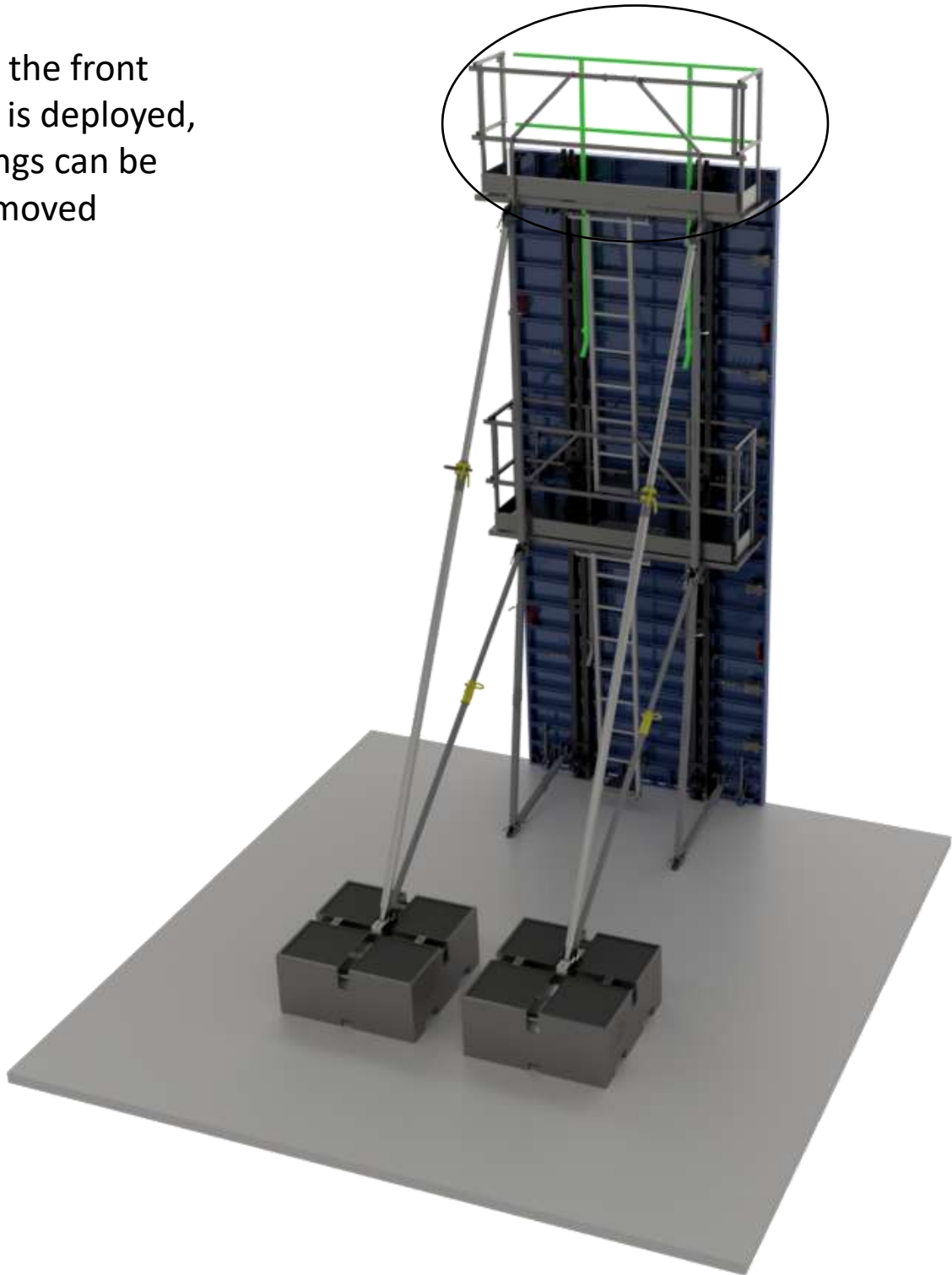
- Anchors of the bracing props

- Do not unhook the slings

Overlay

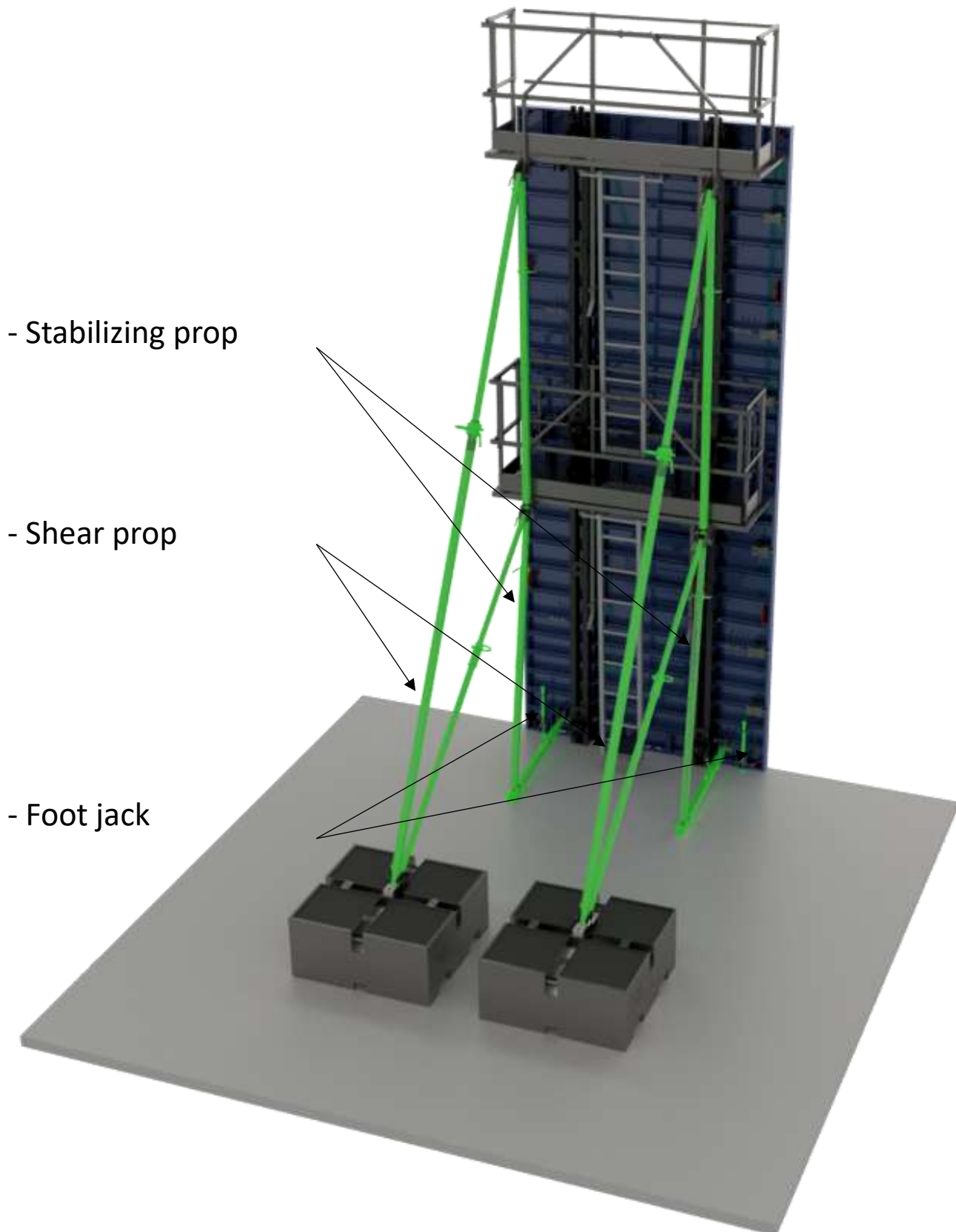
7) Deploy the front guardrail, when deployed, unhook the slings.

-Once the front guardrail is deployed, the slings can be removed



Overlay

8) Adjust the plumb of the panels in both directions using the foot jacks and shear props and the stabilizing props.



Overlay

- Your Meta Steel overlay assembly is now complete



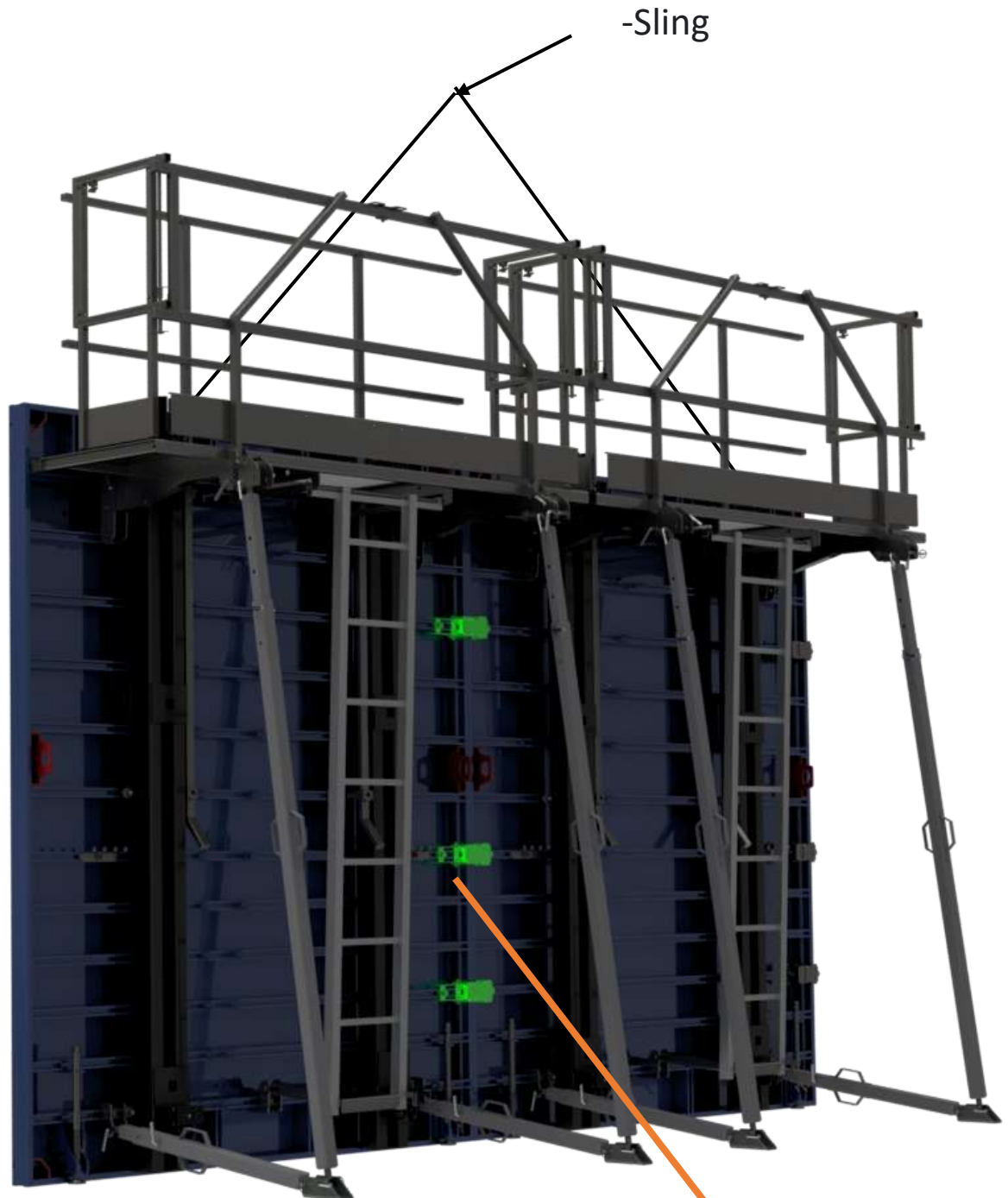
Juxtaposition

1) Bring the panel to be juxtaposed as close as possible to the existing panel.

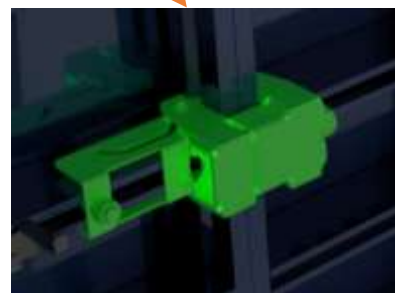


Juxtaposition

2) Install the assembly clamps from the bottom up and lock them in place.



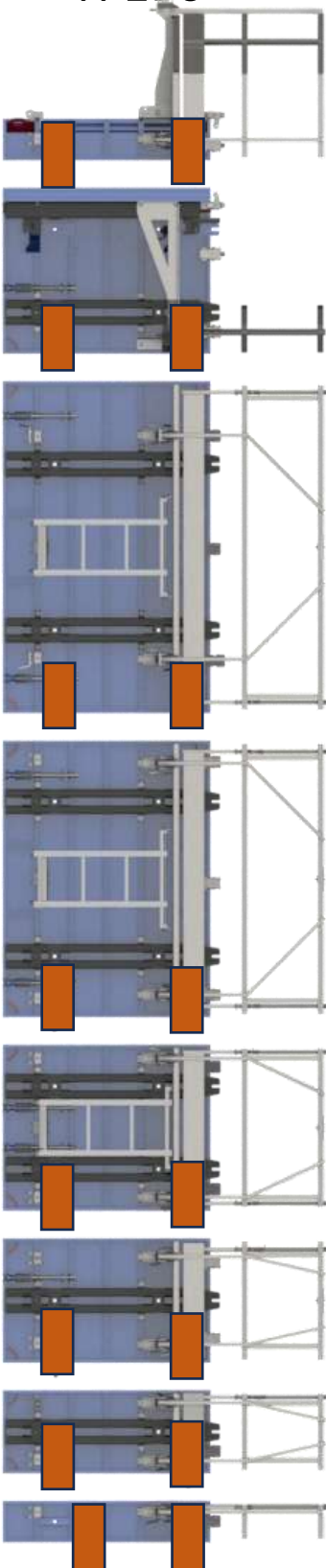
- Connection by only 3 integrated clamps



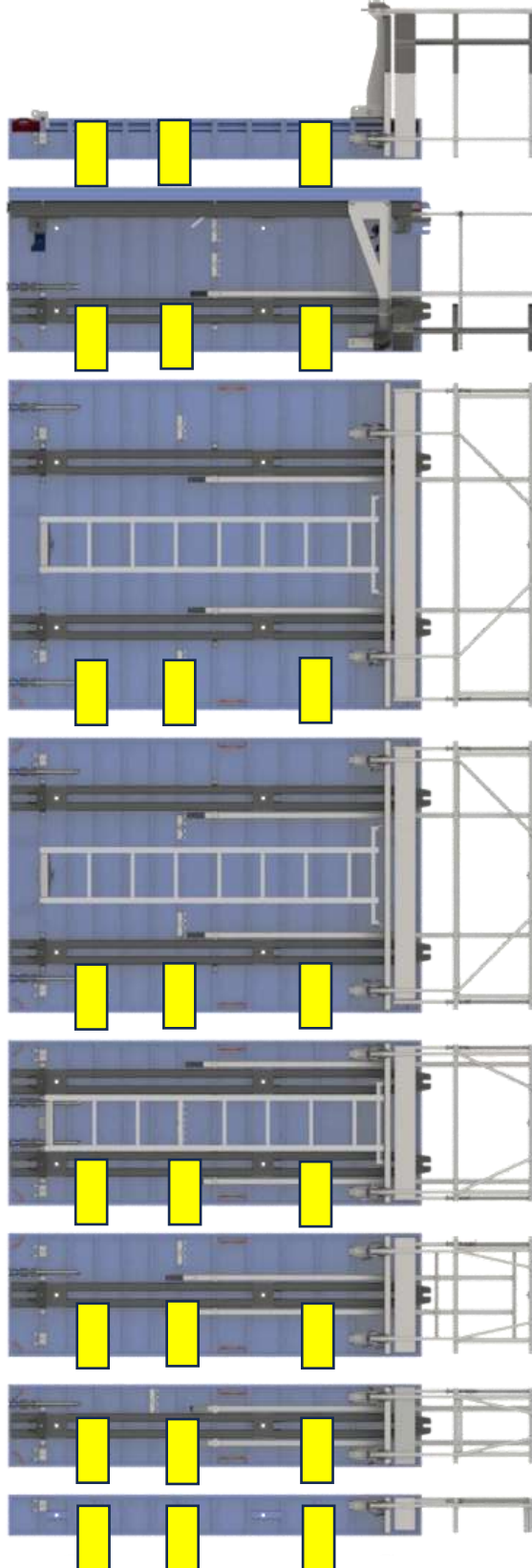
Connection point

Juxtaposition assembly:

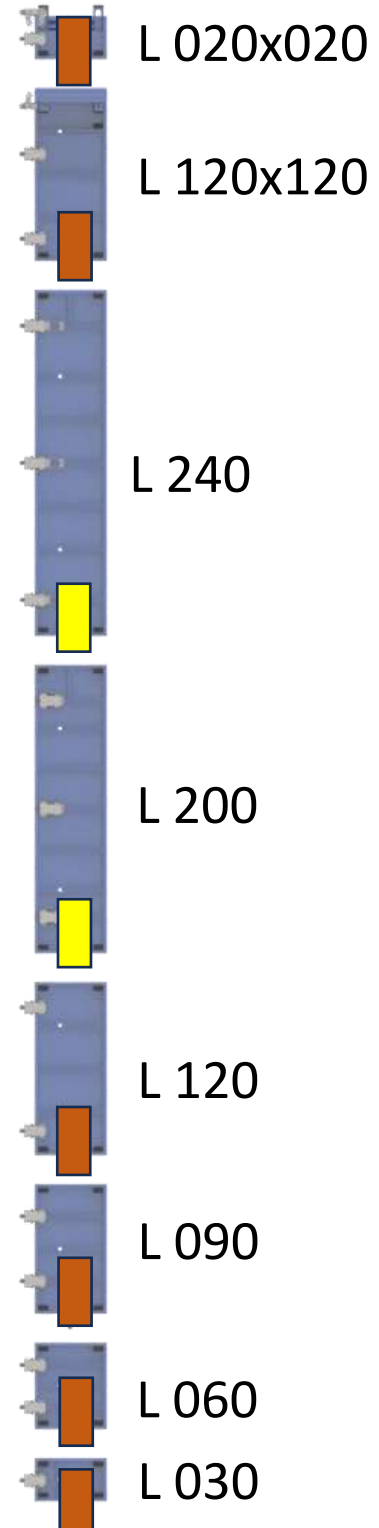
H 150



H 300



H 050



Built-in clamp

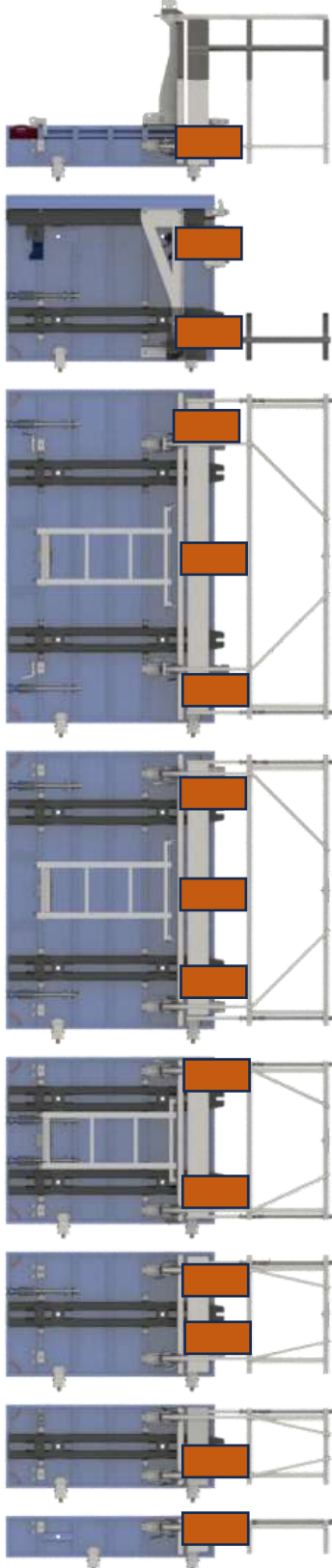


Steering wheel clamp

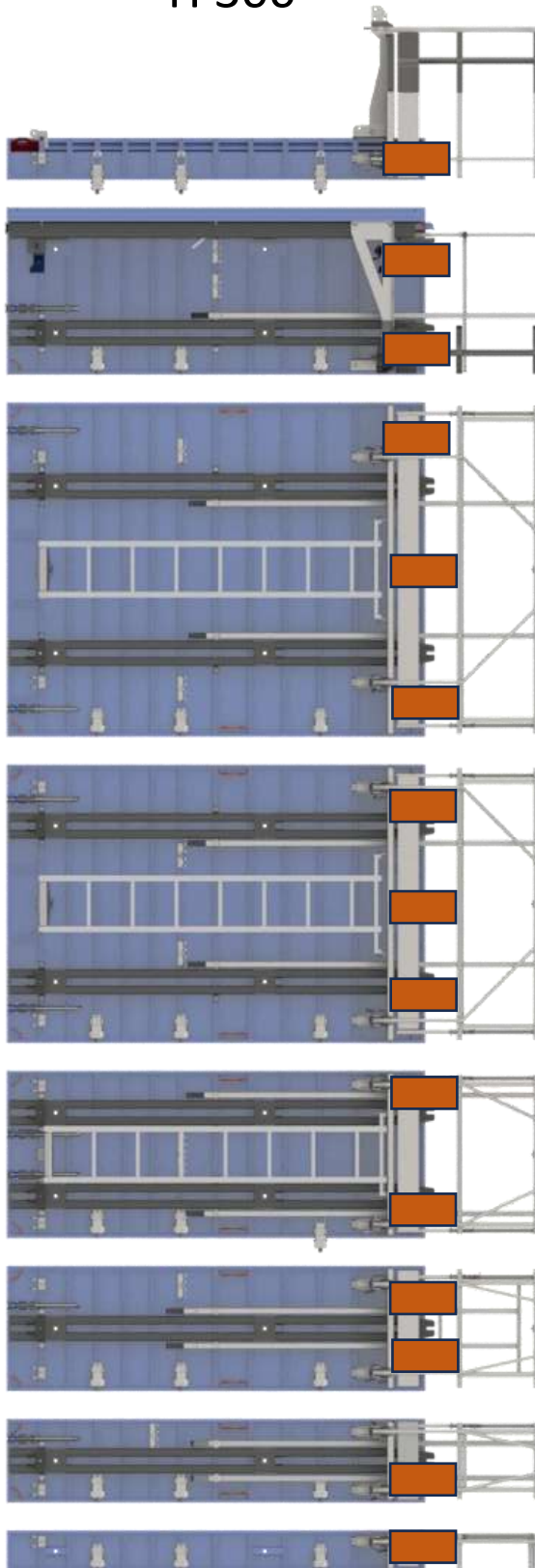
Connection point

Overlay assembly:

H 150



H 300



H 050



L 020x020

L 120x120

L 240

L 200

L 120

L 090

L 060

L 030

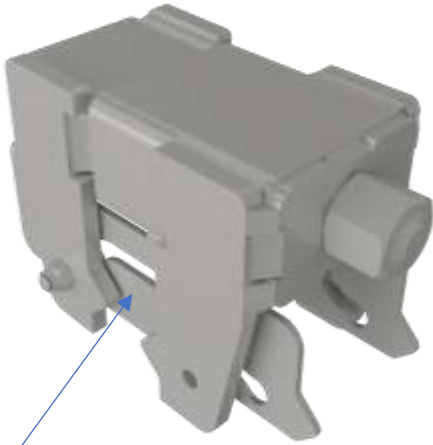


Built-in clamp

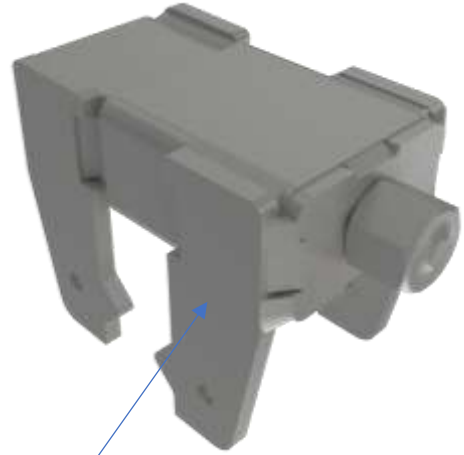


Steering wheel clamp

Connection point



Integration system



Clamp only

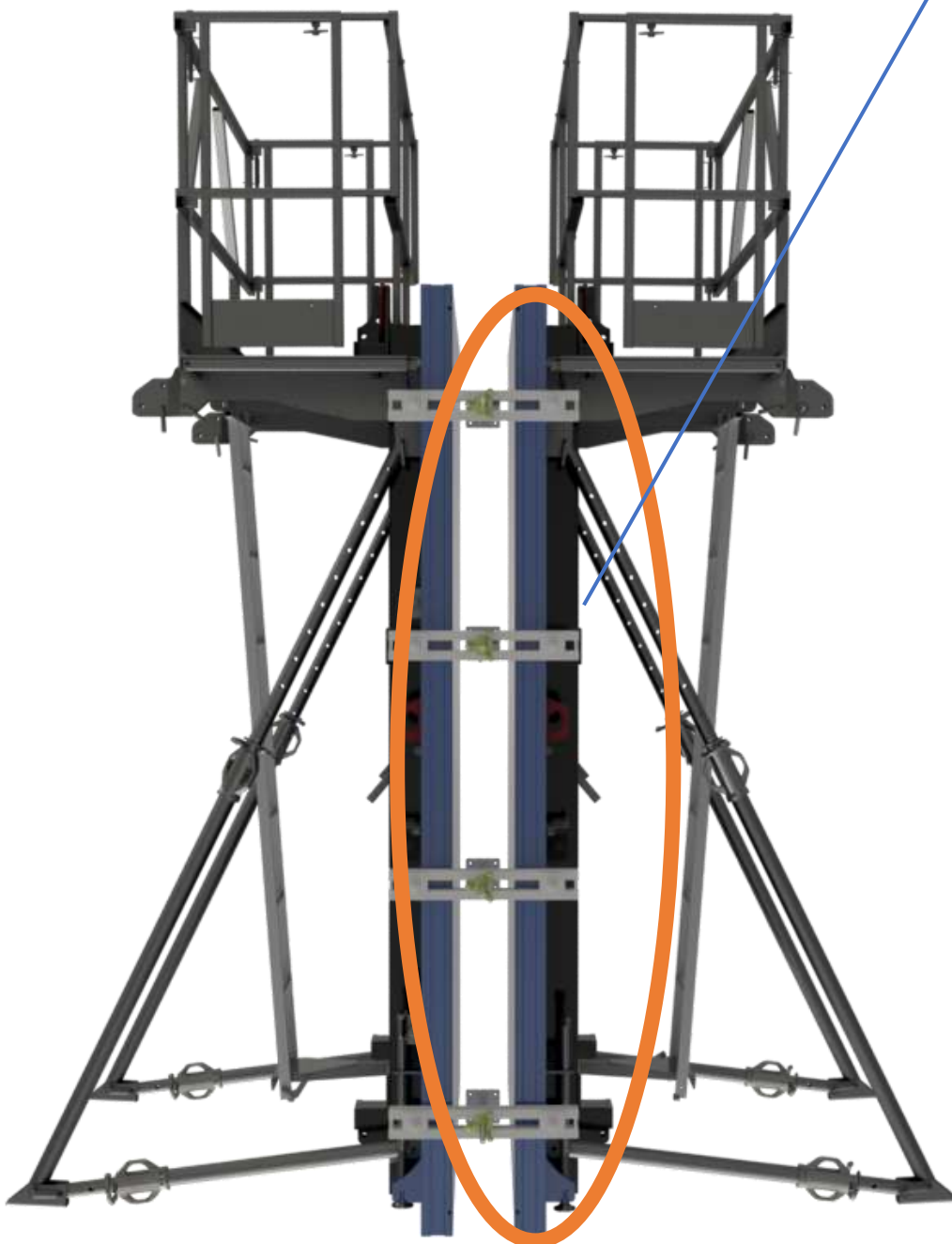
- At a height of 3 m, the assembly is done by 3 Meta Steel clamps.
- At a height of 1.5 m, the assembly is made by 2 Meta Steel clamps.
- At a height of 0.5 m, the assembly in juxtaposition is done by 1 Meta Steel clamp.
- Over a width of 2.4 m (two beams) the overlapping assembly is done by 3 Meta Steel clamps.
- Over a width of 0.9 m (one beam) the overlapping assembly is done by 2 Meta Steel clamps.
- Over a width of 0.6 m (one beam) the overlapping assembly is done by 1 Meta Steel clamp.
- Over a width of 0.3 m (without beams) the overlapping assembly is made by 1 Meta Steel clamp.

Sail stop

Sail stop set

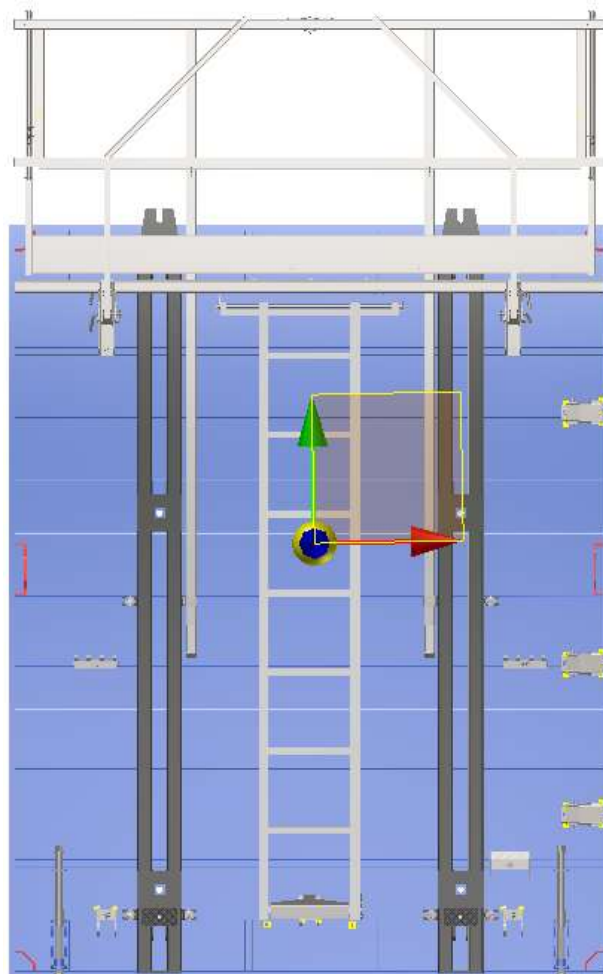
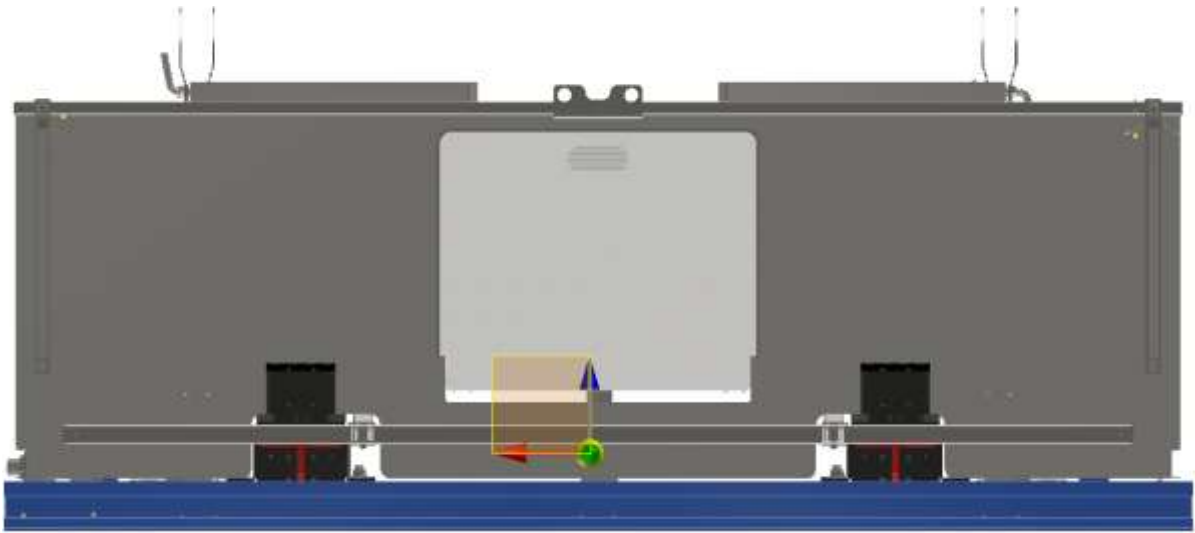
Height	3000	1500	0500
Number of Clamps	4	2	1

1000 Tip Ruler



Center of gravity

The centre of gravity influences the angle of the panel in relation to the ground during lifting. The centre of gravity is different for each additional element attached to the panel.



Lifting instructions

For more safety on the site when lifting the panels, please observe the following slinging instructions and plans:

- The angle of the slings must always be 60° to a horizontal plane when lifting the panels
 - Before lifting the panel train, check that the assembly clamps between the panels are tightened
 - Attach the slings to the lifting rings so that the weight of the panels is balanced.
 - It is forbidden to lift the panels by any accessory other than the lifting rings provided for this purpose
 - The rings have a WLL of 3T each, monitor the weight of each package before lifting
 - For the choice of grip points when lifting the panels, refer to the following diagrams:
- Slinging from the ground is shown in green
 - The slinging on the beam head is shown in blue

Lifting instructions

- When lifting a panel or a train of panels, several factors can accumulate and add weight. The NFP 93-350 standard indicates a formula with a safety factor.
- Extract from the standard:

"The force F_{exp} induced by the formwork weight P_{exp} (per point of the gripping device) is calculated as follows:

$$F_{exp} = P_{exp} \times 1.68 \times 1.15 \times 1.2$$

Where

$1.68 = 1.50 \times 1.06 \times 1.06$ (oscillation coefficient x centrifugal force x wind over load);

$1.15 = 1/\sin 60^\circ$;

$1.2 = \text{weight of concrete accumulated on formwork + additional accessories}$ "

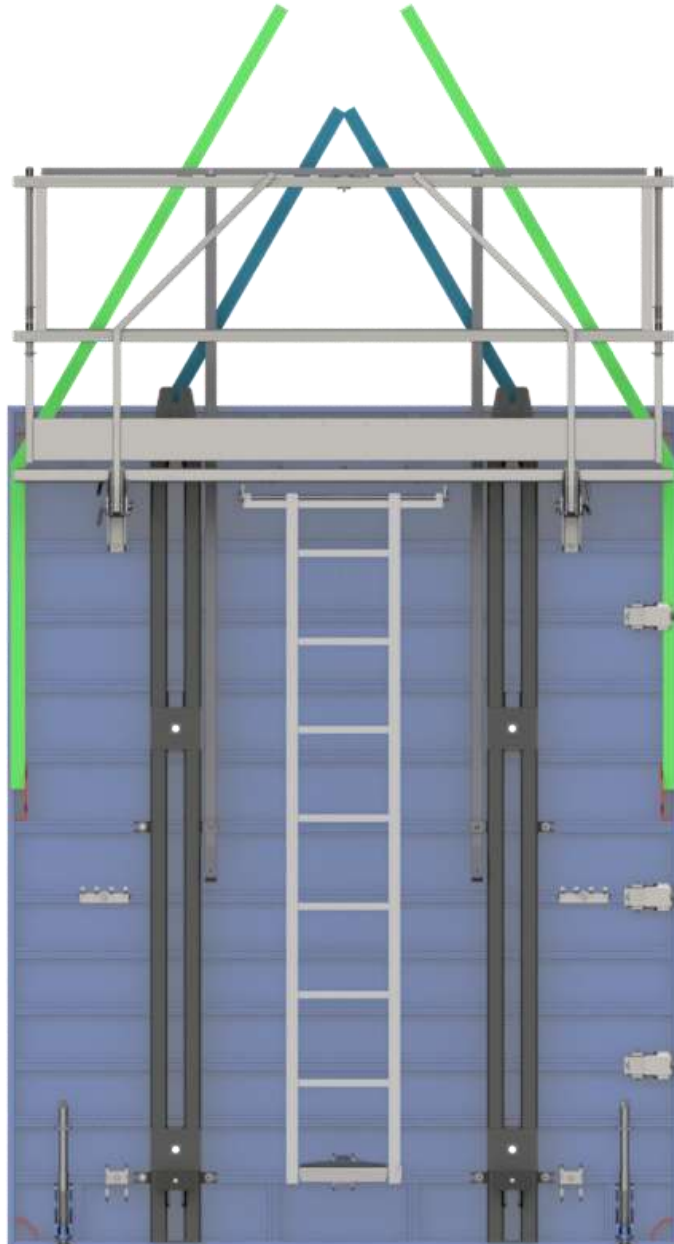
- The P_{exp} value is therefore to be used to determine whether the load can be taken up by the lifting rings.

Lifting plan

P Total: 950 Kg / F exp: 2202,48 Kg / P avg: 132 Kg/m²

S=7.2m²

Sling angle: 60°

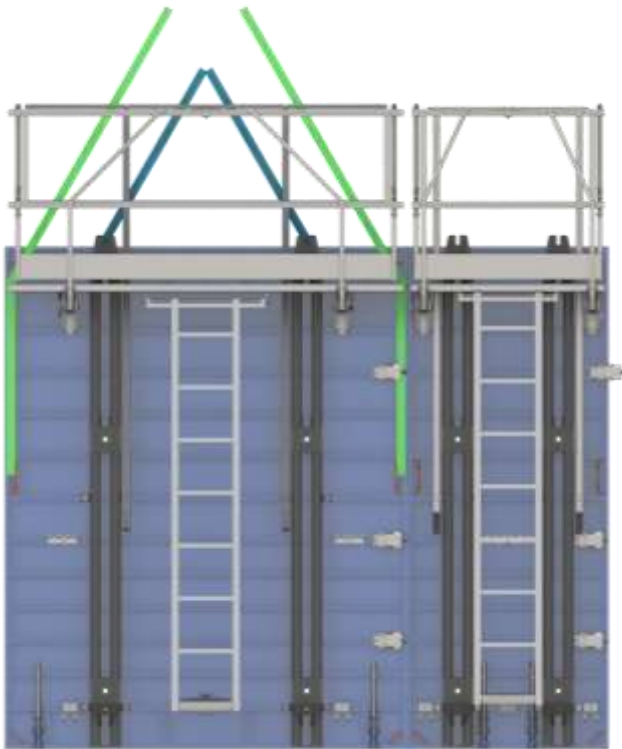


Lifting plan

P Total: 1619 Kg / F exp: 3753,5 Kg / P avg: 149 Kg/m² S= 10.8m²

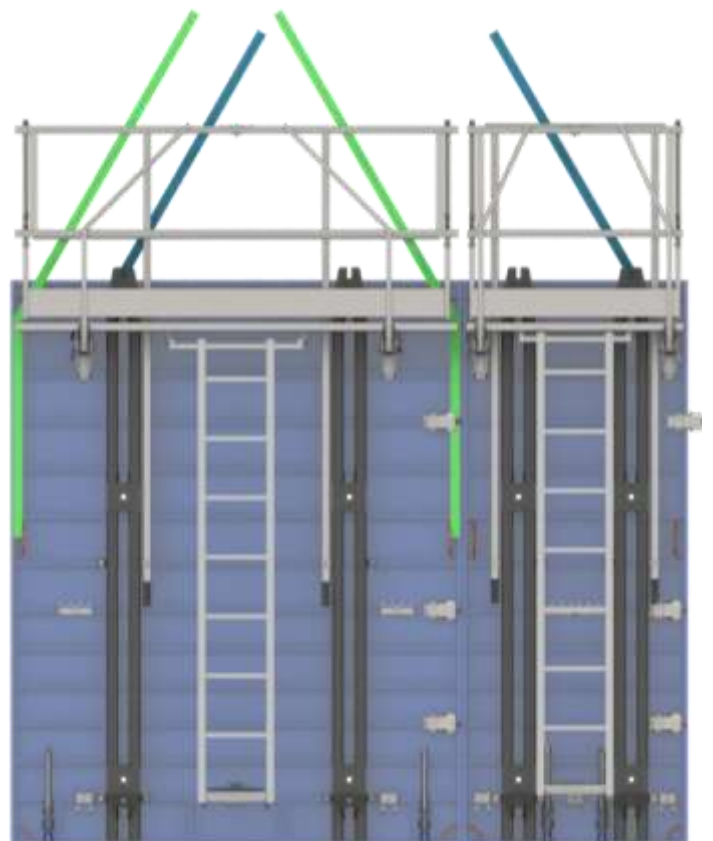
Cantilevered mass: 670 Kg Safety factor = $670 \times 1.2 \times 1.68 = 1350.72$ Kg

Sling angle: 60°



In this case, the mass of the 1200 panel is considered to be "cantilevered", so it is necessary to recalculate its weight with a safety factor using the following formula:

Cantilevered Mass x 1.2 x 1.68

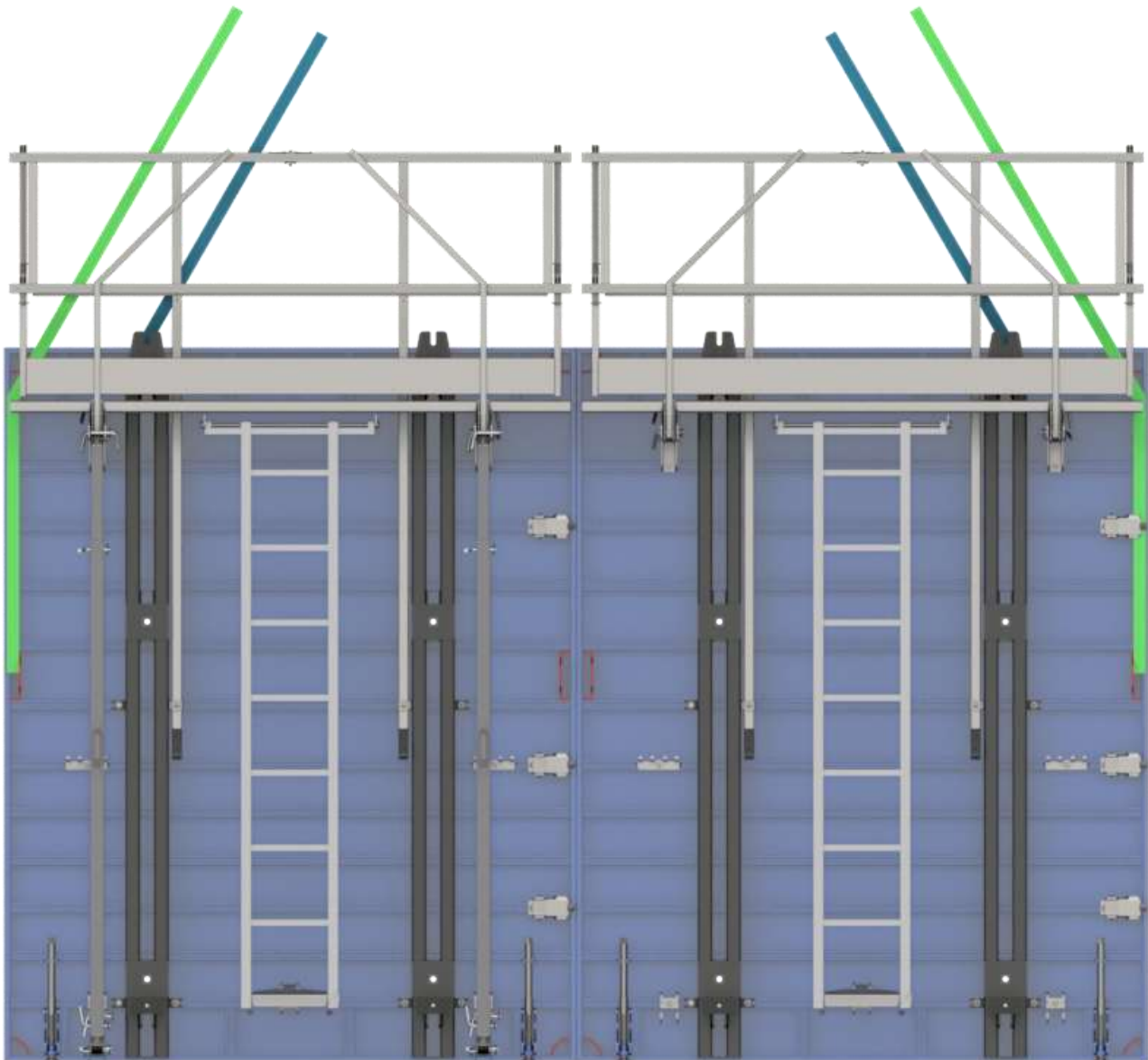


Lifting plan

P Total: 1902 Kg / F exp: 4409,6 Kg / P avg: 132 Kg/m²

S=14.4m

Sling angle: 60°

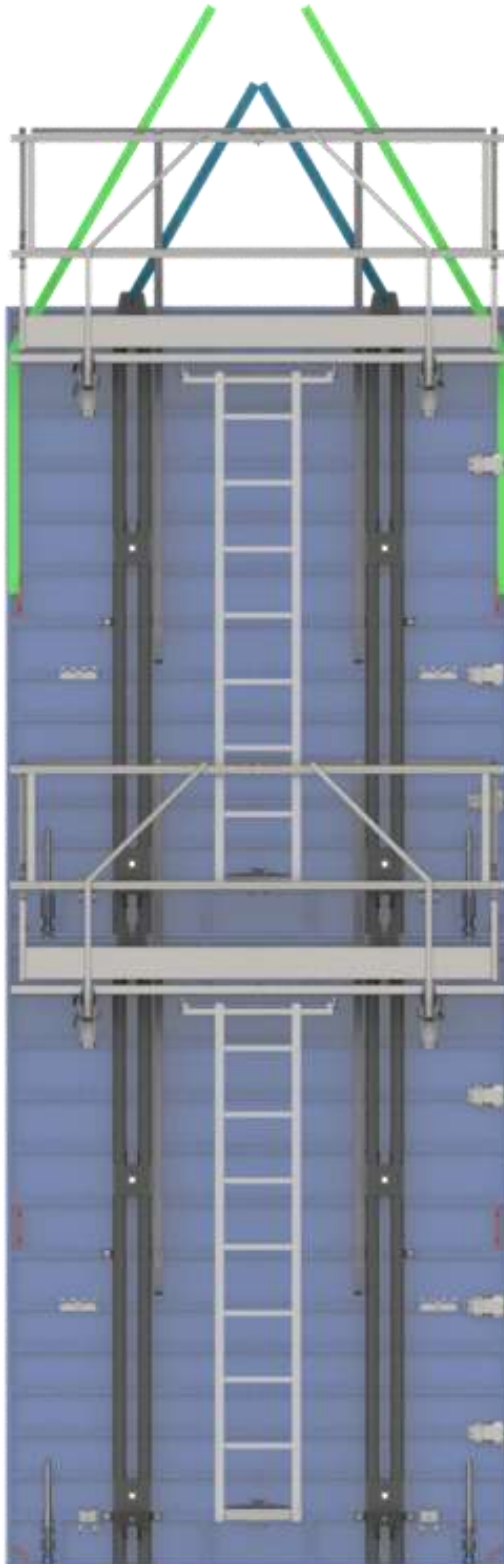


Lifting plan

P Total: 1902 Kg / F exp: 4409,5 Kg / P avg: 132 Kg/m²

S=14.4m²

Sling angle: 60°



Lifting plan

P Total: 2564 Kg / F exp: 5944,4 Kg / P avg: 142.4 Kg/m²

S=18m²

Sling angle: 60°



Lifting plan

P Total: 2851 Kg / F exp: 6609,7 Kg / P avg: 132 Kg/m²

S=21.6m²

Sling angle: 60°



Overlay Bracing

Wind stability calculation:

- The maximum wind speed when using the panels is defined in the NFP 93-350 standard and specifies the maximum speed at 85km/h.

Some data extracted from the standard:

CT = 1.75 (overall drag coefficient)

Vmax = 85 Km/h

For a wind speed of 85 km/h:

$q_{dyn} = (v^2 / 16.3) = (85/3.6)^2 \times 1/16.3 = 34.2 \text{ daN/m}^2$ and
 $q_{wind} = q_{dyn} \times ct = 34.2 \times 1.75 = 60 \text{ daN/m}^2$

Wind pressure calculation on formwork:

Fv = 60 x H x W

Example on Meta Steel 2.4m x 3.0m:

$Fv = 60 \times 3 \times 2.4 = 432 \text{ daN}$

The wind pressure on the formwork face of a Meta Steel 2.40m by 3.0m formwork panel is 432 daN.

Overlay Bracing

The calculated wind force is evenly reflected in the stays. The props are chosen and dimensioned taking into account a safety factor of 2 in relation to the force induced in the prop. The positioning of the anchor is defined by the following formula:

$$Lx = Hy/2 + 1150$$

Lx: Length between formwork face and anchor position

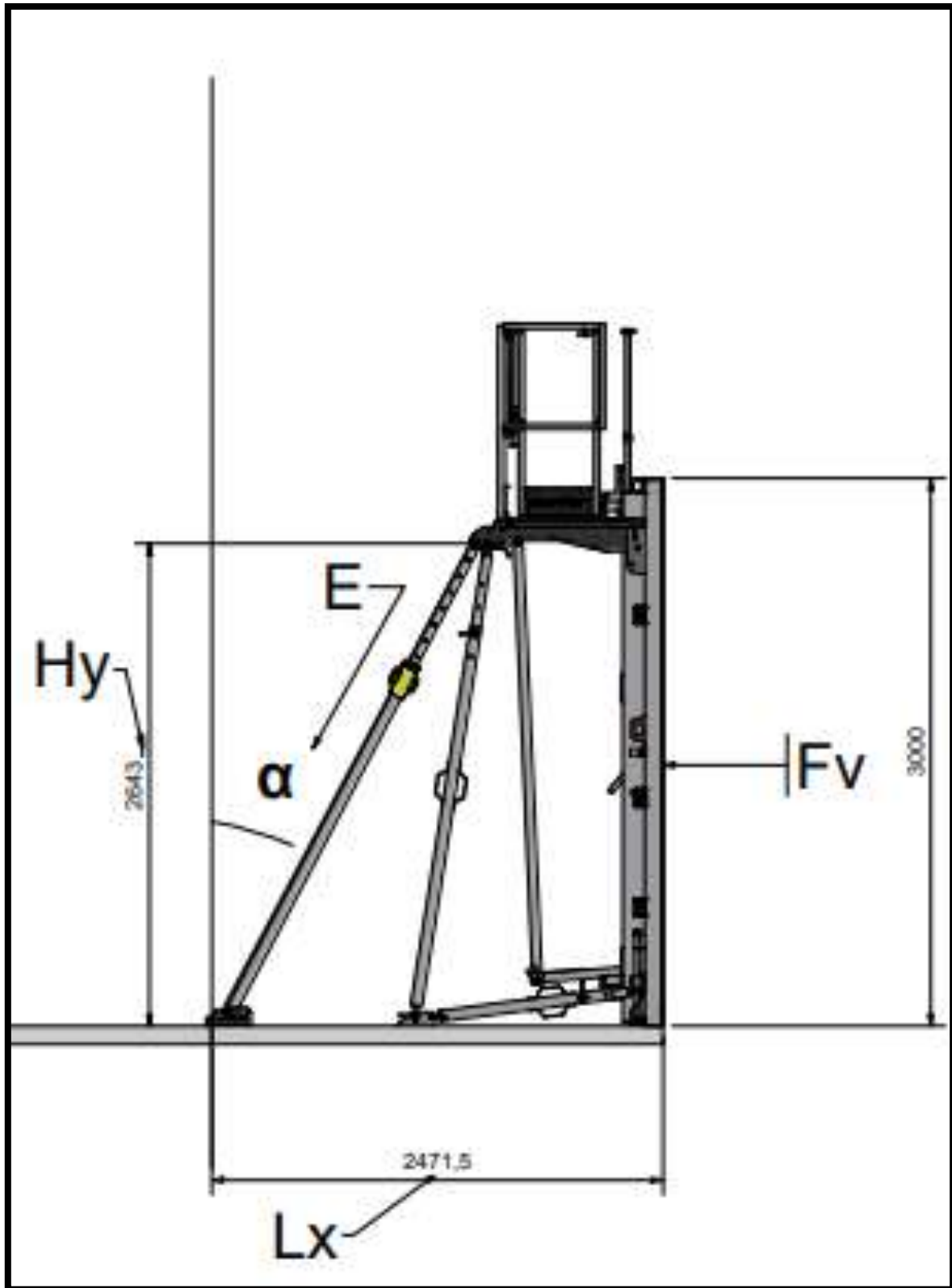
Hy: Height between the ground and the recovery point of the prop positioned highest on the safety platform.

It is up to the customer to choose and adapt his anchoring system according to the resulting forces of the bracing.

In the following configurations, E corresponds to the force of the resultants of the wind pressure in the stays. The different configurations make it possible to determine which type of prop is to be used according to the formwork height.

Panel widths between 0.3 and 0.9m (One triangulation) cannot be used and stabilised alone and must be assembled with a panel with a width between 2.4 and 1.2 m (Two triangulations).

Overlay Bracing



Overlay Bracing

Height 3 m

$F_v = 432 \text{ daN}$

$E = 460 \text{ daN / prop}$

Prop TPE 220-400

Extended Length When

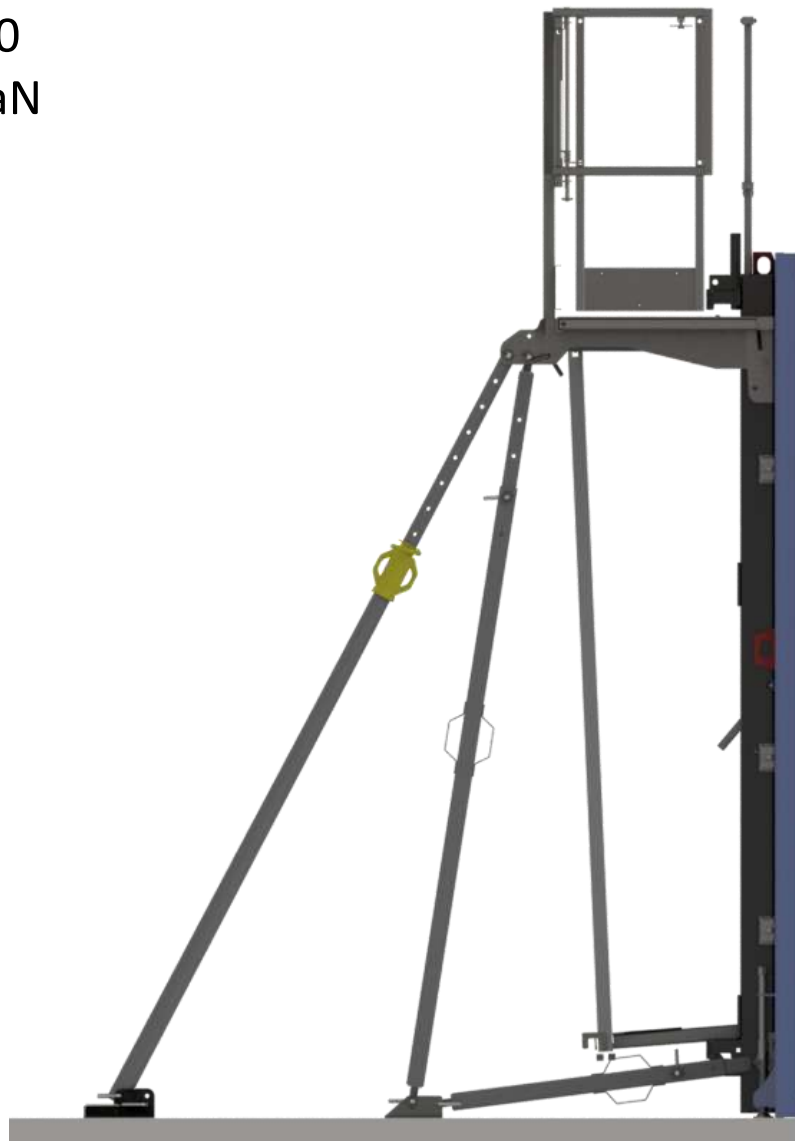
Used: $2898.8 = 3000$

$R \text{ to } 3000 = 1500 \text{ daN}$

$1500 > 460$

Config OK

Coeff. : 3.26



Overlay Bracing

Height 3.5 m

$F_v = 504 \text{ daN}$

$E = 536.7 \text{ daN / prop}$

Prop TPE 220-400

Extended Length When

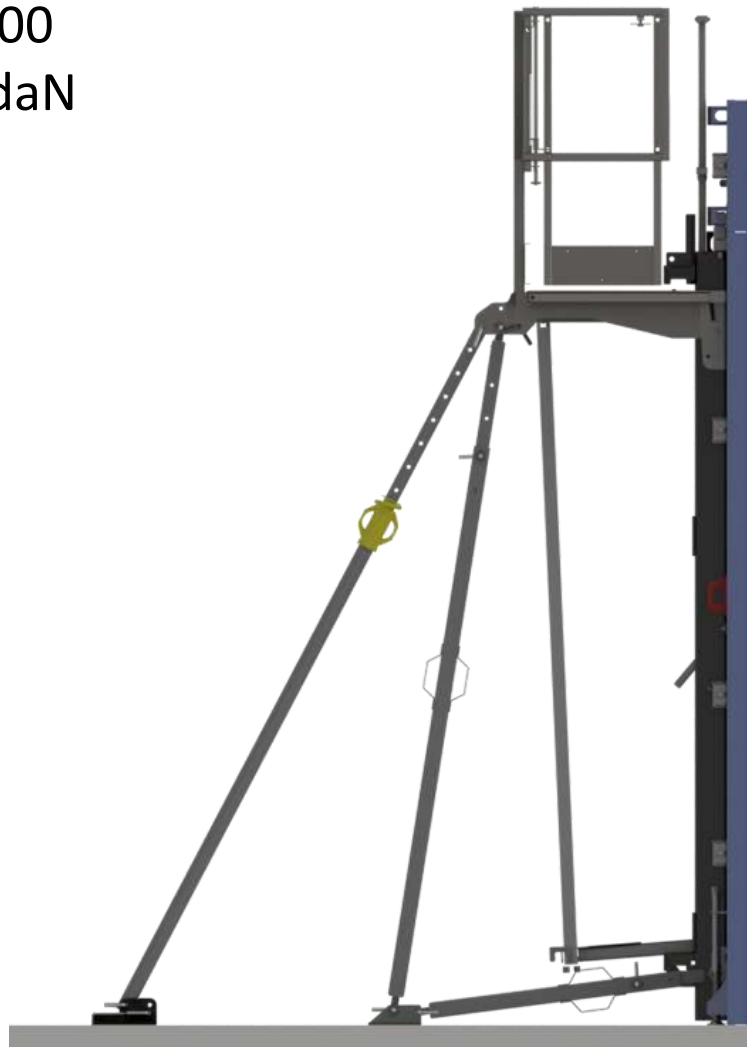
Used: $2898.8 = 3000$

$R \text{ to } 3000 = 1500 \text{ daN}$

$1500 > 504$

Config OK

Coeff. : 2.97



Overlay Bracing

$F_v = 648 \text{ daN}$

$E = 690.1 \text{ daN / prop}$

Prop RAS TP 400-700

Extended length when in use:

$4575 = 4500$

$R \text{ to } 4500 = 3000 \text{ daN}$

$3000 > 690.1$

Config OK

Coeff. : 4.34

Height 4.5 m



Overlay Bracing

Height 5 m

$F_v = 720 \text{ daN}$

$E = 766.8 \text{ daN / prop}$

Prop TPE 290-500

Extended length when in use:

$4575 = 4500$

$R \text{ to } 4500 = 3000 \text{ daN}$

$3000 > 766.8$

Config OK

Coeff. : 3.91



Overlay Bracing

Height 6 m

$F_v = 864 \text{ daN}$ Config 4 props

$F_v = 216 \text{ daN/prop}$

$E = 460 \text{ daN / prop (4-7m)}$

$E = 296.3 \text{ daN/prop (2.2-4m)}$

Prop RAS TP 400-700

Extended length when used:

$6252 = 6500$

$R \text{ to } 6500 = 1100 \text{ daN}$

$1100 > 460$

Config OK

Coeff. : 2.4

Prop TPE 220-400

Extended length when in use:

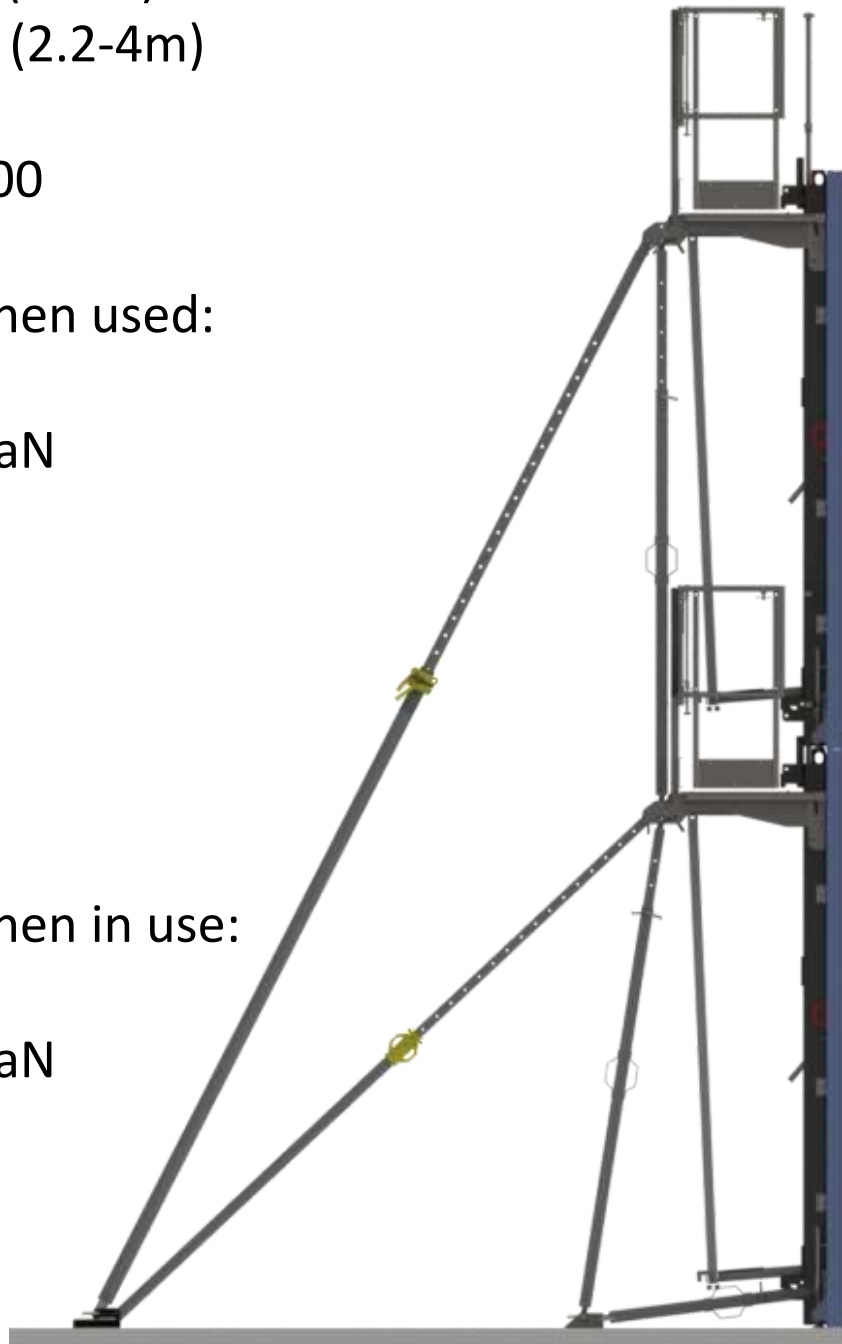
$3791.123 = 3800$

$R \text{ to } 3800 = 1100 \text{ daN}$

$1100 > 296.3$

Config OK

Coeff. : 3.71



Overlay Bracing

Height 6.5 m

$F_v = 936 \text{ daN}$

Config 4 props

$F_v = 234 \text{ daN/prop}$

$E = 498 \text{ daN / prop (4-7m)}$

$E = 321 \text{ daN/prop (2.2-4m)}$

Prop RAS TP 400-700

Extended length when used:

$6252 = 6500$

$R \text{ to } 6500 = 1100 \text{ daN}$

$1100 > 498$

Config OK

Coeff. : 2.2

Prop TPE 220-400

Extended length when in use:

$3791.123 = 3800$

$R \text{ to } 3800 = 1100 \text{ daN}$

$1100 > 321$

Config OK

Coeff. : 3.42



Overlay Bracing

Height 7.5 m

$F_v = 1080 \text{ daN}$

$E = 1150.3 \text{ daN / prop}$

Prop RAS TP 400-700

Extended length when in use:

$4575 = 4500$

$R \text{ to } 4500 = 3000 \text{ daN}$

$3000 > 1150.3$

Config OK

Coeff. : 2.6



Overlay Bracing

Height 8 m

$F_v = 1152 \text{ daN}$

$E = 1226.9 \text{ daN / prop}$

Prop RAS TP 400-700

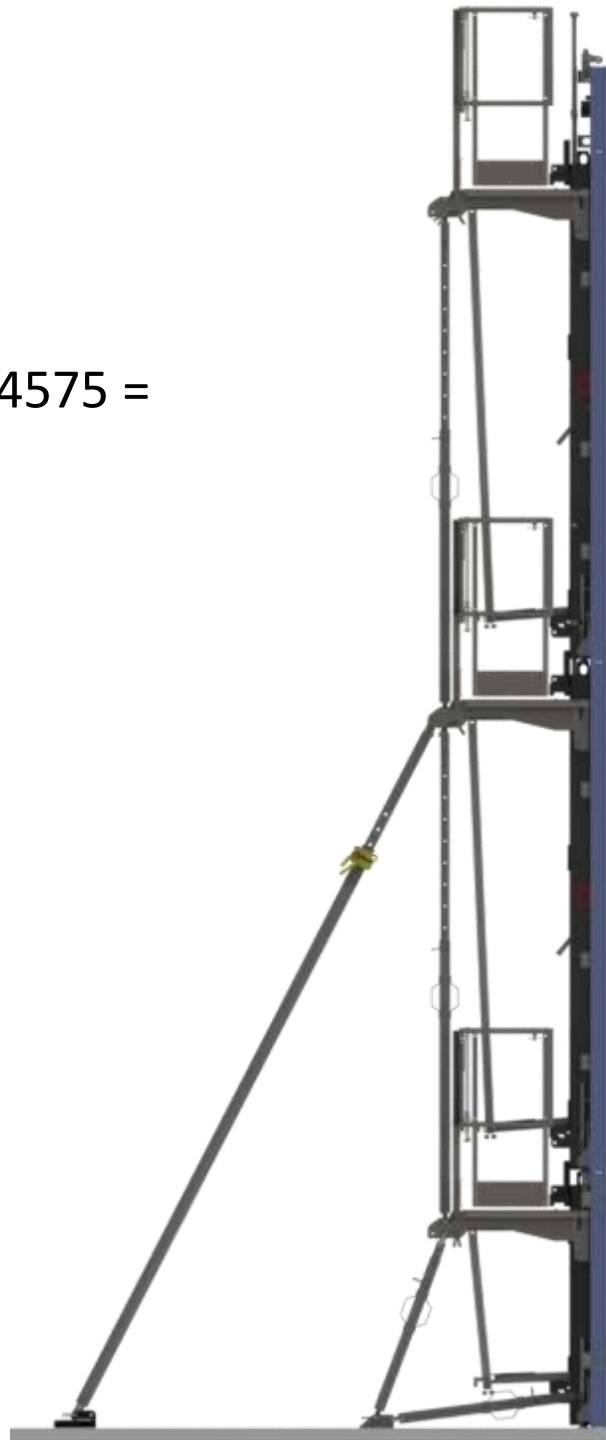
Extended length when in use: $4575 = 4500$

$R \text{ to } 4500 = 3000 \text{ daN}$

$3000 > 1226.9$

Config OK

Coeff. : 2.4



Overlay Bracing

Height 9 m

$F_v = 1296 \text{ daN}$

Config 4 props

$F_v = 324 \text{ daN/prop}$

$E = 690.1 \text{ daN / prop (4-7m)}$

$E = 444.5 \text{ daN/prop (2.2-4m)}$

Screw prop 6-10m

Extended length when used:

$6252 = 6500$

$R \text{ at } 6500 = 2600 \text{ daN}$

$2600 > 690$

Config OK

Coeff. : 3.7

Prop TPE 220-400

Extended length when in use:

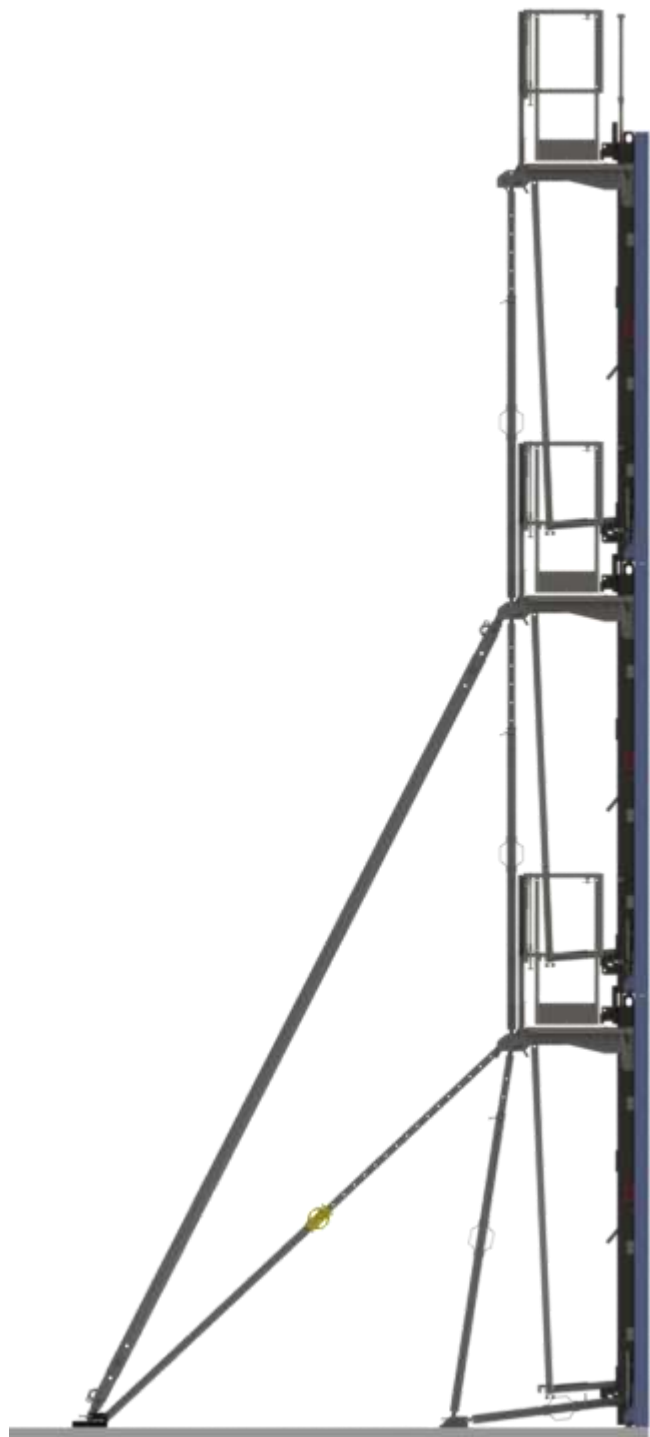
$3791.123 = 3800$

$R \text{ to } 3800 = 1100 \text{ daN}$

$1100 > 444.5$

Config OK

Coeff. : 2.4



Overlay Bracing

Height 9.5 m

$F_v = 1368 \text{ daN}$

Config 4 props

$F_v = 342 \text{ daN/prop}$

$E = 728.5 \text{ daN / prop (4-7m)}$

$E = 469.1 \text{ daN/prop (2.2-4m)}$

Screw prop 6-10m

Extended length when used:

$6252 = 6500$

$R \text{ at } 6500 = 2600 \text{ daN}$

$2600 > 728.5$

Config OK

Coeff. : 3.5

Prop TPE 220-400

Extended length when in use:

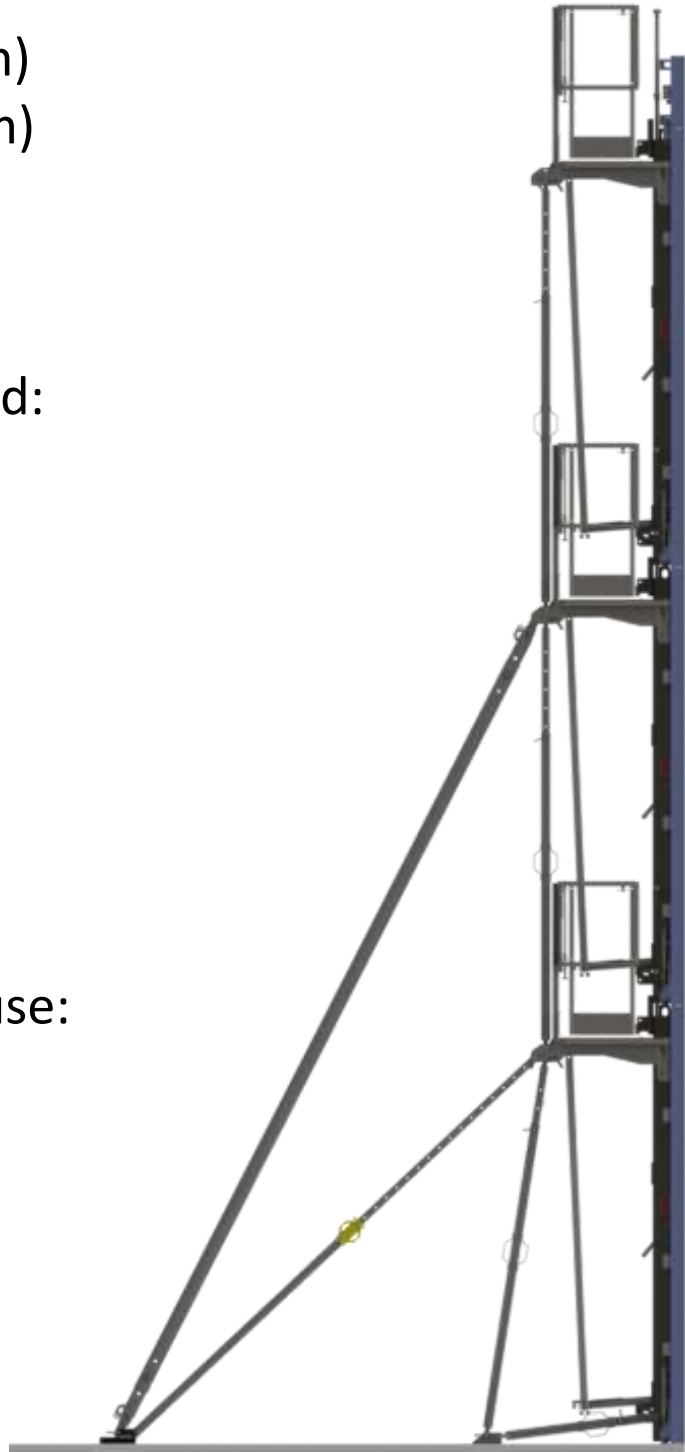
$3791.123 = 3800$

$R \text{ to } 3800 = 1100 \text{ daN}$

$1100 > 469.1$

Config OK

Coeff. : 2.3



Overlay Bracing

Height 10.5 m

$F_v = 1512 \text{ daN}$

Config 4 props

$F_v = 378 \text{ daN/prop}$

$E = 805.1 \text{ daN / prop (6-10m)}$

$E = 582 \text{ daN/prop (4-7m)}$

Screw prop 6/10 m

Extended length when in use:

$7929 = 8000$

$R \text{ at } 8000 = 2200 \text{ daN}$

$2200 > 805.1$

Config OK

Coeff. : 2.7

Screw prop 4/7 m

Extended length when in use:

$5396 = 5950$

$R \text{ to } 5950 = 1300 \text{ daN}$

$1300 > 582$

Config OK

Coeff. : 2.2



Overlay Bracing

Height 11 m

$F_v = 1584 \text{ daN}$

Config 4 props

$F_v = 396 \text{ daN/prop}$

$E = 843.5 \text{ daN / prop (6-10m)}$

$E = 609.7 \text{ daN/prop (4-7m)}$

Screw prop 6/10 m

Extended length when in
use: $7929 = 8000$

$R \text{ at } 8000 = 2200 \text{ daN}$

$2200 > 843.5$

Config OK

Coeff. : 2.6

Screw prop 4/7 m

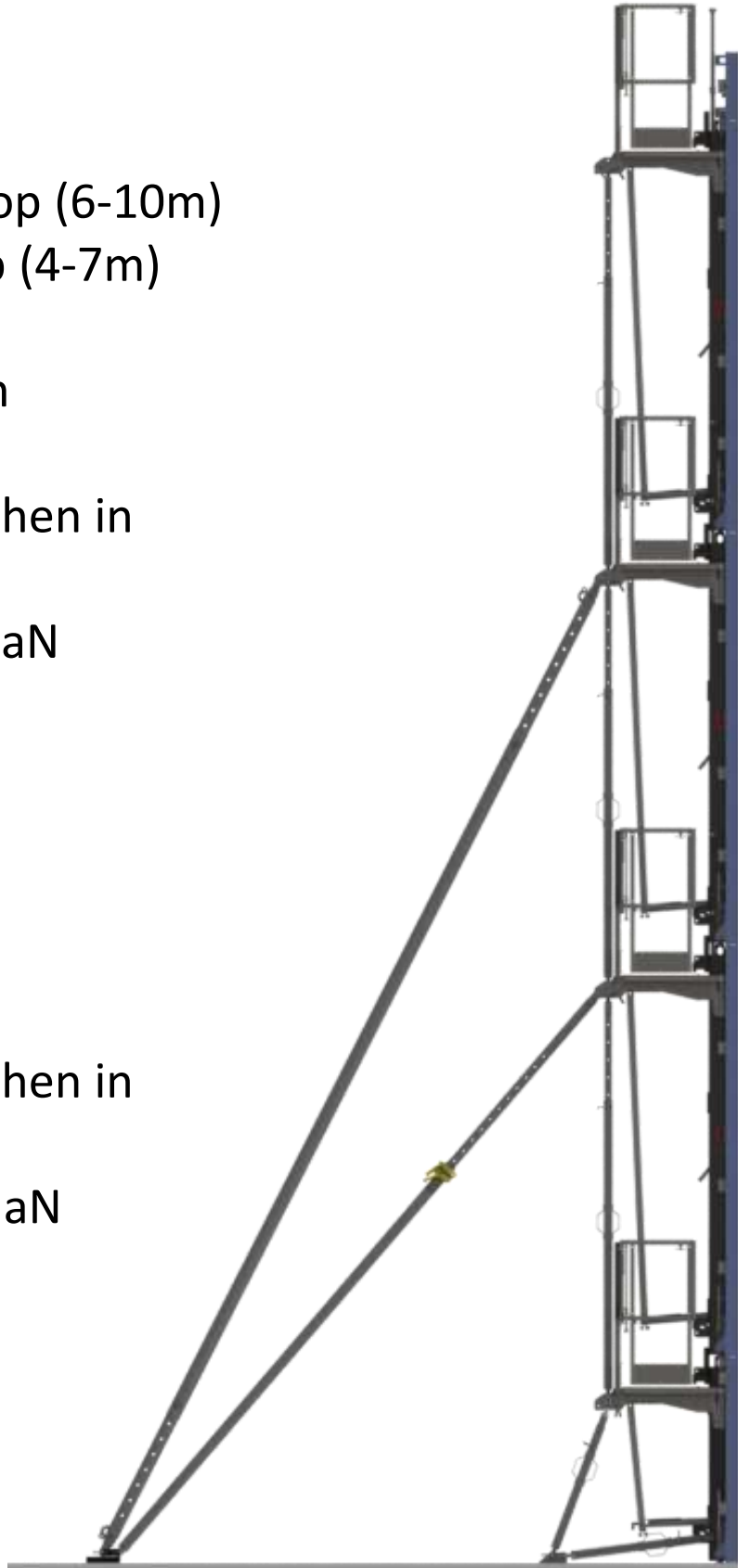
Extended length when in
use: $5396 = 5950$

$R \text{ to } 5950 = 1300 \text{ daN}$

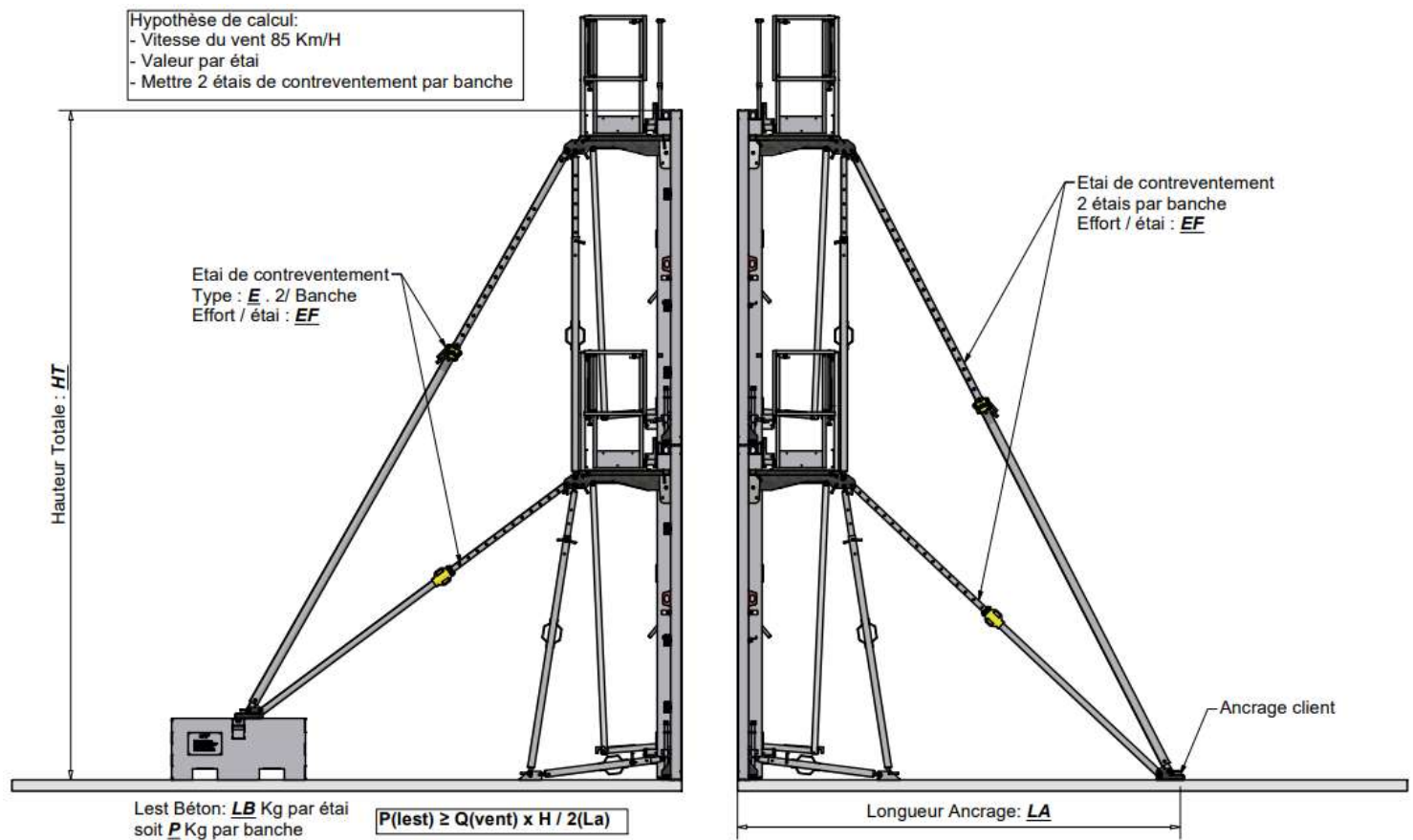
$1300 > 609.7$

Config OK

Coeff. : 2.1

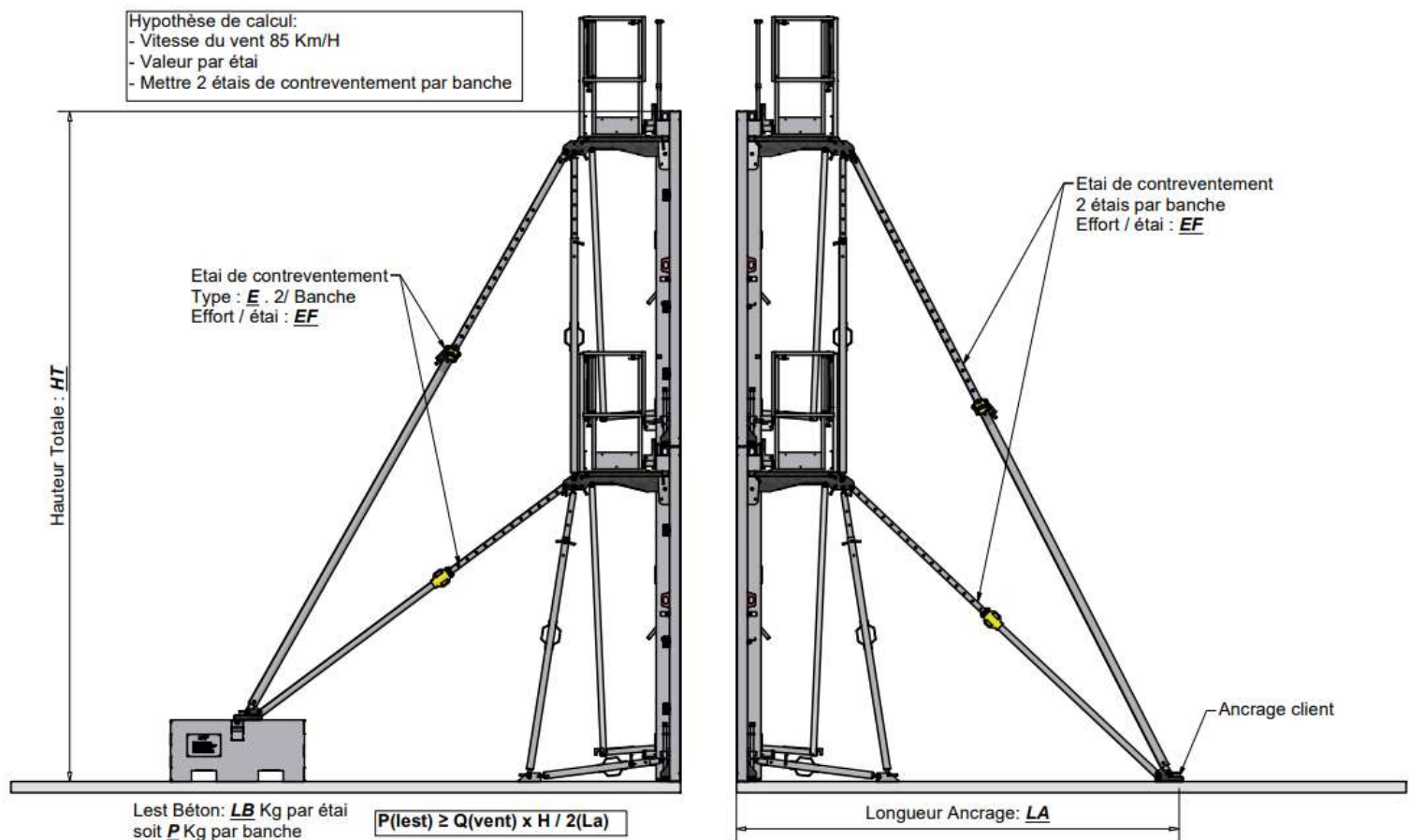


Installation with concrete ballast



HT(m)	Detail of the panels	E	EF(kg)	P(kg)	LB/prop (kg)	LA(m)
3	Panel ht 3m	TPE 220/400	432	262,3	1500	2,47
3,5	Riser ht 0.5m + Panel ht 3m	TPE 220/400	504	357,1	1500	2,47
4,5	Extension base ht 1,5m + Panel ht 3m	RAS TP 400/700	648	452,8	1500	3,22
5	Extension base ht 1.5m + Panel ht 3m + 1 riser ht 0,5m	RAS TP 400/700	720	559,0	1500	3,22
6	2 Panels ht 3m	RAS TP 400/700 + TPE 220/400	864	652,9	1500	3,97
6,5	2 Panels ht 3m + 1 Riser ht 0,5m	RAS TP 400/700 + TPE 220/400	936	766,2	1500	3,97
7,5	Extension base ht 1,5m + 2 Panels ht 3m	RAS TP 290/500	1080	1257,8	1500	3,22
8	Extension base ht 1,5m + 2 Panels ht 3m + 1 Riser ht 0,5m	RAS TP 290/500	1152	1431,1	1500	3,22
9	3 Panels ht 3m	Screw prop 6-10m + TPE 220/400	1296	1469,0	1500	3,97
9,5	3 Panels ht 3m + 1 Riser ht 0,5m	Screw prop 6-10m + TPE 220/400	1368	1636,8	2x1500	3,97

Installation with concrete ballast



HT(m)	Detail of the panels	E	EF(kg)	P(kg)	LB/prop (kg)	LA(m)
10,5	Extension base ht 1,5m + 3 Panels ht 3m	Screw prop 6-10m + RAS TP 400/700	1512	1681,8	2x1500	4,72
11	Extension base ht 1,5m + 3 Panels ht 3m + 1 Riser ht 0,5m	Screw prop 6-10m + RAS TP 400/700	1584	1845,8	2x1500	4,72

For all higher heights, please refer to the
study office service

Use and maintenance instructions

Through-rods and nuts

The supplied spacer rods have a diameter of 21/23 mm (in accordance with EN 10045-1 and NF P 93-350). It is the only rod authorized for use.

The maximum working load for through rods with a diameter of 21/23 mm is 17 tons. The maximum permissible clamping force is 2.5 tonnes in order to avoid irreversible deformation of the formwork face and spacer cones.

Rod passages above the panel (excluding concrete) should only be used for standard pours (standard concrete, without overlapping and with a standard wall thickness).

Please refer to the pouring speed and concrete pressure charts for standard concrete and use.

For any specific use (height, thickness, non-standard concrete, specific site configuration, etc.), please contact our design office.

Safety of the front panel

For a casting height of more than 3000 mm, we remind you that the safety of the front panel is mandatory. This includes the deployment of the guardrails facing front from below.

Stabilization in case of overlapping

For two superimposed panels, the stabilization of the formwork face must be achieved by triangulation (inclined prop and horizontal foot prop).

For three or more panels on top of each other, we recommend stabilizing both formwork faces and consulting our engineering office.

Casting speed

For optimal use of META STEEL® panels, please refer to the pouring time charts on the next page (this data is provided for casting with a standard wall height and thickness, using standard concrete without admixture or fluidizer).

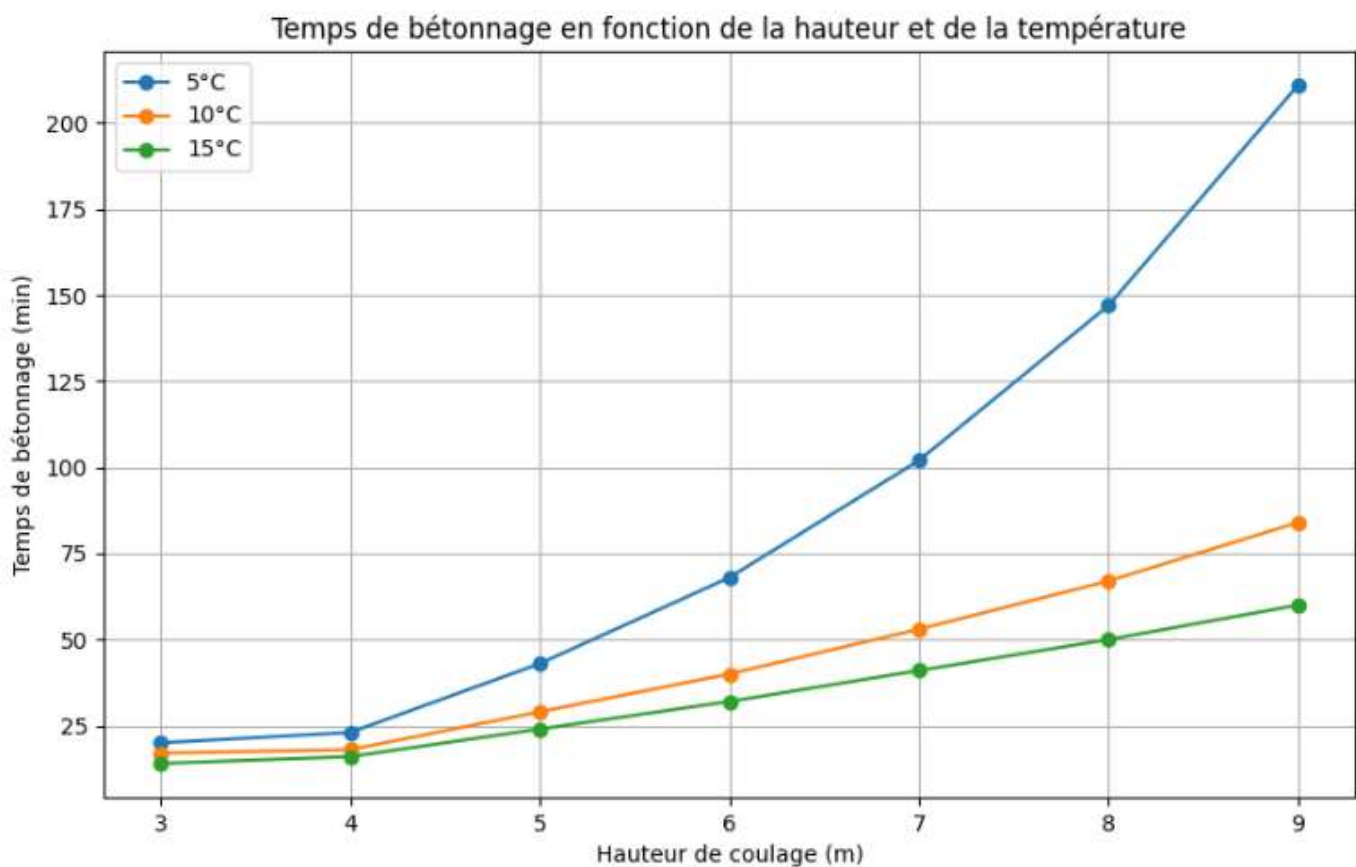
In case of a specific site configuration, casting with a standard height and a non-standard wall thickness, or for any use different from our technical recommendations, please consult our design office. They will advise you on the casting procedure and the appropriate safety instructions.

Use and maintenance instructions

Concreting speed

The META STEEL[®] panel is designed according to the NF-P93-350 standard for a maximum pressure of 10T/m² and the use of Ø23 rods.

The chart below gives the concreting times so as not to exceed the permissible pressure of 10T/m² depending on the height of the wall and the outside temperature.



This data based on the CIRIA – Report 108 method is for reference only and does not replace the use of a pressure sensor.

Use and maintenance instructions

Use and maintenance instructions:

It is up to the user to keep the META STEEL[®] panel he is using in the same state of compliance and without modification since receipt. He is the guardian of the META STEEL[®] bank, therefore the person responsible for the damage that the material can generate.

Like any equipment, the META STEEL panel requires continuous maintenance. Periodic checks of the META STEEL[®] panel are necessary to ensure its compliance and effectiveness.

Additional checks are necessary after any failure of the installation, any abnormal casting pressure, or when the META STEEL[®] panel has undergone disassembly or modifications.

This is why it is important to regularly inspect the META STEEL[®] panel in order to check:

- Lubrication of all cylinders
- Clamping of guardrails
- Vertical lifting ring welds
- The presence of axles equipped with their pins.

This verification is the responsibility of the user: after bad weather, after the site stops, before the commissioning of the META STEEL[®] panel, or at least every month.

The results and dates of these checks, as well as the names and qualifications of the competent persons who carried out, must be recorded in the site's safety register.



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